Project Manual

for

BIDDING
OF THE REMODEL AND EXPANSION FOR

JEFFERSON COUNTY ANIMAL CARE FACILITY
PROJECT NO.: PW19B035BLD

4848 STATE ROUTE 30
HOUSE SPRINGS, MO 63501

Jefferson County Department of Public Works
729 Maple Street
P.O. Box 100
Hillsboro, MO 63050

Date of Issue: 15 March 2019

STATE OF MISSOURI
WARREN C. FREEDENFELD
NUMBER A-2001060673
REGISTERED ARCHITECT

Prepared by: Rauhaus Freedenfeld & Associates, LLP.97 Broadway, Boston, Massachusetts 02116 Project # 1723
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DOCUMENT 004113.03 - BID FORM – UNIT PRICES

UNIT PRICES

The following Unit Prices are a part of this Bid.

UNIT PRICE NO. AND TITLE	UNIT OFMEASURE	UNIT PRICE ADD	UNIT PRICE DEDUCT
1. Removal of Unsatisfactory Soil	Cu. Yd.	$_____	NA
2. Rock Excavation by Backhoe or Excavator Bucket	Cu. Yd.	$_____	NA
3. Rock / Ledge Removal requiring Hammering, Drilling and/or Split-ting	Cu. Yd.	$_____	NA
4. Placement of Additional Com-pacted Soil Fill	Cu. Yd.	$_____	NA
5. Placement of Additional Top Soil at a 6 inch depth	Sq. Yd.	$_____	NA
6. Cutting and Patching Concrete Slabs, including New Concrete & patched-in Vapor Retarder	Sq. Ft.	$_____	-
7. Additional Concrete at footings and/or foundations	Cu. Yd.	$_____	NA
8. Additional Slab Concrete	Cu. Yd.	$_____	NA
9. Miscellaneous Steel	Lb.	$_____	-
10. Duplex Electrical Outlet, installed in Finished Wall, Not including Wiring	Each	$_____	NA

END OF DOCUMENT 004113.03

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DOCUMENT 004393 - BID SUBMITTAL CHECKLIST

1.1 BID INFORMATION

A. Bidder: _____.

B. Prime Contract: _____.

C. Project Name: Jefferson County Animal Care Facility.

D. Project Location: 4848 State Route 30, House Springs, MO 63051

E. Owner: Jefferson County Missouri.

F. Owner Project Number: PW19B035BLD

G. Owner Project Contact: Jason Jonas P.E. , Director, Department of Public Works
729 Maple Street – P.O. Box 100, Hillsboro, MO 63501
T: 636-797-5369 E: jjonas@jeffcomo.org

H. Architect: Rauhaus Freedenfeld & Associates.

I. In an effort to assist the Bidder in properly completing all documentation required, the following checklist is provided for the Bidder's convenience. The Bidder is solely responsible for verifying compliance with bid submittal requirements.

J. Attach this completed checklist to the outside of the Submittal envelope.
1. Prepare the Bid Form as required by the Instructions to Bidders.
2. Indicated on the Bid Form the Addenda received.
3. Attached to the Bid Form: Bid Supplement Form - Allowances.
4. Attached to the Bid Form: Bid Supplement Form - Unit Prices.
5. Attached to the Bid Form: Bid Supplement Form - Alternates.
6. Attached to the Bid Form: Proposed Schedule of Values Form.
7. Attached to the Bid Form (Supplemental Information):
8. Attached to the Bid Form: Preliminary milestone construction schedule that identifies sequence of activities by trade with a proposed duration and projected completion date for the project.
9. Attached to the Bid Form: Bid Bond OR a certified check for the amount required.
10. Bid envelope shows name and address of the Bidder.
11. Bid envelope shows the Bidder's Contractor's License Number.
12. Bid envelope shows name of Project being bid.
13. Bid envelope shows name of Prime Contract being bid, if applicable.
14. Bid envelope shows time and day of Bid Opening.
15. Verified that the Bidder can provide executed Performance Bond and Labor and Material Bond.
16. Verified that the Bidder can provide Certificates of Insurance in the amounts indicated.
17. Bidders shall submit (3) three copies of the complete bid including the following:
    a. Affidavit of Compliance with Prevailing Wage

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b. Annual Worker Eligibility Verification Affidavit

END OF DOCUMENT 004393

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
Project information.
Work covered by Contract Documents.
Work under separate contracts.
Access to site.
Work restrictions.
Coordination with Owner for installation of equipment
Specification and drawing conventions.
Miscellaneous provisions.

1.2 PROJECT INFORMATION

A. Project Identification:
Jefferson County Animal Care Facility

B. Project Location:
4848 State Route 30, House Springs, MO

C. Owner:
Jason Jonas
County of Jefferson
Jefferson County Director
Department of Public Works
729 Maple Street
Hillsboro, MO 63050

D. Architect:
Warren Freedenfeld, AIA
Rauhaus Freedenfeld & Associates
97 Broadway
Boston, MA 02116

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:
Site excavation of adjacent hillside.
Remodel and Expansion of Existing Building to increase size from 10,033 sf to approximately 21,000sf. Remodel and Expansion is to provide a Code Compliant facility for Animal Care.
Exterior Landscaping and Extension of Existing Fire Lane

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B. Type of Contract.
Project will be constructed under a single prime contract.
Contracts for this Project include the following:

a. Jefferson County - Standard Form of Agreement Between Owner and Contractor.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited by Owner's use of portions of the facility.

B. Use of Site: Limit use of Project site to work in areas. Do not disturb portions of Project site beyond areas in which the Work is indicated.
Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.5 COORDINATION WITH OCCUPANTS

A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
Jefferson County Department of Public Works will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

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B. Existing Utility Interruptions: Do not interrupt utilities serving adjacent structures and facilities unless permitted under the following conditions:
Notify the Public Utility not less than seven days in advance of proposed utility interruptions along with an estimated time frame for the disruption of service.
Interruption of existing utility services shall not be performed during regular business hours unless prior agreement has been obtained from the City of Milton.

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to adjacent properties and structures.
Notify Owner not less than three days in advance of proposed disruptive operations.
Note City ordinances regarding noise and hours of the day construction is permitted.

D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 011000

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MEP, CIVIL & STRUCTURAL ENGINEERING DESIGN CRITERIA & SPECIAL RESPONSIBILITIES FOR ANIMAL CARE FACILITIES

Revised: 09/20/18: WF, EN, MH

DEFINITIONS

OWNER	Jefferson County Animal Care Facility Jefferson County Department of Public Works, Hillsboro, MO
ARCHITECT	The Architect is Rauhaus Freedenfeld & Associates (RFA)
CONTRACTOR	The construction firm that will build the Project
CONSULTING ENGINEER	An Engineer that works under the direct supervision of the Architect and is paid directly by the Architect or by the Owner.
DESIGN/BUILD ENGINEER	An Engineer that works under the direct supervision of the Contractor and is paid directly by the Contractor

1. GENERAL:

1.1 RFA has compiled the following design criteria for animal care projects. If Consulting Engineers or Design/Build Engineers have suggestions they feel will add to the desirability, efficiency, functionality and/or usability of the facility, RFA is interested in discussing any of those suggestions early in the design process and will consider incorporation and implementation.

1.2 All Engineers shall be responsible for acquiring full knowledge of existing conditions that pertain to their respective disciplines. Each Engineer shall be responsible for obtaining information regarding site conditions such as utility services, condition of existing paving, existing site drainage systems, existing parking & parking requirements, site lighting, utility company requirements, zoning requirements and any existing “as built” information available from Local Inspectional Services, Public Works or Building Inspector offices.

1.3 If the project involves existing building renovation or alteration, than the Engineer shall visit the building to become familiar with existing conditions, document or record existing conditions, services, equipment and systems and evaluate same for possible reuse, removal or replacement. The Engineer shall contact the Owner directly to arrange access to building. Existing conditions information shall be compiled in writing or on drawings and distributed to the Architect.

1.4 RFA or Owner will distribute project specific animal care and office equipment information to Engineers for their use. Where possible, said information will include lighting, power and plumbing requirements and other equipment product data. When specific product documentation is not available, Engineer shall work with Owner and Architect as required to develop a basis of design solution for required equipment.

1.5 All Engineers shall provide designs that comply with all applicable Accessibility, Energy Conservation and Life Safety Codes and Requirements.

1.6 RFA will establish drawing sheet size and title block layout and distribute AutoCAD or Revit base sheet floor plans to Engineers for their use.

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1.7 All Engineers shall provide full 3-part Specifications for inclusion in the RFA Project Manual, or full Specifications on their Drawings. If a 3-part Specification is used, then RFA will distribute a Specification section template for use by Engineers.

1.8 When Engineering is being provided by Consulting Engineers or by "Design/Build" Engineers, documents shall be stamped (sealed), and signed by an Engineer licensed or registered in the state where the project is located.

1.9 Engineers shall comply with all applicable, local Zoning & Building Ordinances, Rules & Regulations and local, state & national Codes.

1.10 All Engineers shall coordinate and integrate with all utility company requirements and equipment.

1.11 All Engineering Construction Documents shall be issued on RFA's title block sheets.

1.12 The Engineers shall comply with all required building energy use modeling and all applicable Codes and Ordinances, including Reporting Documentation, such as COM Check.

1.13 RFA and its Consulting Engineers are responsible environmental stewards. RFA encourages all design team members to actively engage in a sustainable design process. However, LEED Design is not required unless specifically directed by RFA.

1.14 All Engineers shall make Site Visits at the appropriate time during Construction in order to check conformance with the Construction Documents.

2. HVAC DESIGN:

2.1 There the following guidelines are applicable for animal care facilities HVAC Design:

2.1.1 ASHRAE Handbook – Applications Chapter 16

2.1.2 ASHRAE Handbook Standard 170, Ventilation of Health Care Facilities

2.1.3 Animal Welfare Act – USC Title 7 Sections 2131-2159

2.1.4 Code of Federal Regulations – Title 9 Animals and Animal Products (9CFR)

2.1.5 National Institutes of Health – 2008 Design Requirements Manual for Biomedical Laboratories and Animal Research Facilities (Related to Infectious Isolation)

2.1.6 Guidelines for Laboratory Design – Health and Safety Considerations 4th Edition

2.1.7 In addition to those standards, RFA has developed the following criteria that should supplement locally adopted, applicable, national and international standards and shall be included in the Project.

2.2 Unless otherwise directed by RFA, the HVAC system shall be designed as 3 separate zones.
Zone 1 includes "Outpatient" areas such as Reception, Waiting Areas, Exam Rooms, and associated communicating rooms or spaces.
Zone 2 includes all "Inpatient" areas such as Surgery, Treatment and X-Ray.
Zone 3 includes all animal housing areas such as Intake, Adoption, Hospital Wards, Isolation Areas, Boarding Wards, etc.

Traditional criteria that govern HVAC zoning, such as solar orientation, fenestration, insulation values, etc., must be additionally considered when HVAC zones are established. RFA shall provide an HVAC Zone Diagram as a basis for the system design.

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2.3 Relative to abutting rooms, Surgery shall be designed for positive pressure. Relative to abutting rooms, Isolation and animal housing areas shall be designed for negative pressure. In addition, air from the Surgery shall not be mixed or reintroduced into the supply air for other parts of the building. This is to eliminate the build-up or cross-contamination of anesthetic gases.

2.4 Isolation and animal housing area air shall not be mixed with or reintroduced into the supply air for other parts of the building. These rooms shall have a minimum of 12 air changes per hour and use easily maintained energy-recovery airside economizers to cool, heat and ventilate indoor spaces with 100% outside air as required by applicable Energy Codes. Cage & Run Wards and Boarding Areas shall have supplemental, independent exhaust systems controlled by a wall switch. Fan motors shall be variable frequency drive (VFD) where required by applicable Codes.

2.5 All filters shall be high efficiency (HEPA) type filters.

2.6 Ambient temperatures within conditioned and or occupied spaces shall be maintained between 65 and 75 degrees Fahrenheit unless more restrictive requirements are dictated by the Owner and/or Code. Relative humidity shall be maintained between 35 and 65 percent unless more restrictive requirements are dictated by the Owner and/or Code.

2.7 Animal Grooming, Bathing, Drying and Aquatic Rehabilitation areas or rooms that have higher levels of heat and moisture generation, shall have higher than normal ventilation air changes as required by applicable Code and by the ASHRAE Handbook.

2.8 Provide independent wall switched ducted exhaust fans at individual Exam Rooms, as indicated in the Project Documentation.

2.9 Provide CO2 monitoring controls to adjust the quantity of fresh air on ventilation systems in densely (animal) occupied rooms such as hospital wards and boarding wards.

2.10 Assess available energy sources for HVAC (natural gas, propane, oil, electricity), verify required loads and make recommendations to RFA.

2.11 Size and locate roof top HVAC equipment as soon as possible. Distribute product data, including dimensions, accessories and weights to RFA as soon as possible for RFA's distribution to the Structural Engineer.

2.12 Where soil and or fill conditions indicate radon emitting materials, the Owner will arrange for radon testing. A radon mitigation system may be designed for either new or existing buildings. Coordinate requirements with RFA.

2.13 Include energy conserving high efficiency equipment and systems such as variable speed electronically commutated motors (ECM), airside economizers and heat recovery wheels as required by applicable Code and by the ASHRAE Handbook.

3. ELECTRICAL DESIGN:

3.1 Architectural Reflected Ceiling Plans indicate light fixture locations and general fixture types. The Engineer shall submit recommended fixtures with product data sheets to RFA for approval.

3.2 A material only Allowance for specific decorative lighting fixtures may be required. Coordinate requirements and specifications with the Architect.

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3.3 Provide power outlets throughout the facility as required by applicable Code and the proposed location of equipment within the facility plus convenience outlets and any additional outlets indicated in the Project Documentation.

3.4 Provide surface mounted plug mold, 20A/120V GFI outlets @ 6" OC., at all Reception Desk and Lab Area countertops and mounted 6" above the countertop surfaces.

3.5 Provide a single dimmer wall switched controlled incandescent down light in each Exam Room utilized for ophthalmic examinations. Refer to the Architectural Reflected Ceiling Plans for such locations.

3.6 Provide a minimum of four (4) duplex power outlets in each Surgery Room distributed along the surgery equipment wall and on wall adjacent to each Surgery table. Mount at 60" above finish floor. Each outlet shall be a dedicated 20A/120V circuit.

3.7 Provide 20A/120V ceiling mounted retractable power chord reels above each Treatment and Dentistry table.

3.8 Confirm building service requirements prior to start of work. Coordinate entry points, whether below grade or overhead service, and panel locations with RFA prior to development of drawings. Coordinate electrical service with Civil Engineer.

3.9 Provide design for exterior lighting. Coordinate requirements with Local Zoning Requirements, Civil Engineering Work, Landscape Work, if any and RFA. Submit fixture/pole product data and a Photometric Plan to RFA and the Civil Engineer for submission to local Authorities. Provide modifications as necessary until approved by local jurisdictional agency.

3.10 Confirm any emergency generating requirements with RFA prior to start of Work. Coordinate pad size, location and protection requirements with RFA and Civil Engineer. At a minimum, this is to include all Surgery Rooms and Treatment Areas for emergency lighting and a minimum of two (2) outlets in each area.

3.11 Provide the design for emergency lighting and exit signage.

3.12 Solar energy, PV panel arrays may be a part of the project. This Work is typically "Work by Others". If included, coordinate interface with Vendor and / or Architect. Panels will typically have integrated inverters.

3.13 Switches and switch plates, duplex outlet covers and other typical devices and plates shall be brushed stainless steel. Emergency outlets shall be in RED. Lighting fixtures, unless otherwise specified, shall be white or brushed aluminum. Confirm finish with RFA.

3.14 Provide LED lighting, as first choice, for both interior and exterior locations.

3.15 Design Code required fire detection and alarm systems. Provide CO2 monitoring and alarm systems where required.

3.16 Assess existing and available electrical service. Verify required loads and make recommendations to RFA.

3.17 Coordinate with Owner, IT/Data and Security Consultants to provide power for related equipment at locations acceptable to RFA.

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4. PLUMBING DESIGN:

4.1 Provide fixtures and fittings that minimize undesirable bacteria collecting surfaces. Obtain RFA's written approval for all fixture and fitting selections and specifications.

4.2 Floor drains shall not be used unless specifically directed by the Architect. Plumbing cleanouts shall be installed only at wall surfaces. Floor surface cleanouts shall not be used unless absolutely necessary and where used, shall be located inside a base cabinet. Obtain RFA's written approval of location.

4.3 Provide Backflow Preventers on all plumbing with particular attention to surgical and treatment areas. In addition, provide Trap Primers on all floor drains not tied into an automatic flushing drain system or areas subject to frequent wash down cleaning procedures.

4.4 Where directed, provide wall or ceiling mounted hose reels in run areas at approximately 7'-0"AFF to underside of reel.

4.5 Provide a canine waste removal system for interior runs by either of the following two (2) methods as indicated on the Drawings.

Method #1: Install a flushing floor drain in each run or one shared by two adjacent runs. Provide a wall mounted hand lever or push button operator controls to flush each individual drain.

Method #2: Install a multi run trench drain. Each trench drain will have a single hand operated wall valve connected to a trench jet spray fitting installed at each end of the trench. The trench shall be sloped down from each end to the center where a collector drop box is located and is equipped with a single flushing drain. Provide trap primers where required. Each trench will be equipped with a trench baffle at the center of the collection box that helps to prevent hosed waste from moving from one end of the trench to the other. The baffle, specified by RFA, also directs hosed waste water down into the collector flushing floor drain or flushing p-trap.

4.6 In runs located in Isolation Rooms, drains shall either be individual flushing floor drains (1 drain per run), or shared (1 drain per two runs).

4.7 Where a flushing drain is shared by two runs, it shall be located directly beneath the center of the run divider panel. These flushing drains shall have a baffle, similar to that required above for trench drains, to prevent cross contamination between runs.

4.8 All flushing drains shall be specified without the grate in order to allow solid waste to be hosed into the drain bowl. All trench drains shall be specified without the grate for the same reason. Runs will either receive a dog resting bench or a trench drain cover to prevent animal access to the trench drain.

4.9 All run "floor" surfaces will be sloped to drains and trenches. Where the drain or trench is located at a new concrete slab or slab-on-grade, the run floor will be depressed. Where the run is located at an existing concrete slab or on a wood subfloor with wood framing, a curb will be built up around the run(s) to enable a sloped floor down toward the drain or trench as indicated in the Project Documentation. Refer to Architect's typical details. When drains or trenches are located against exterior walls, careful attention to the placement of the drain or trench and

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associated piping is important to maintain the continuous insulation requirements and associated freeze prevention. Refer to the RFA's details.

4.10 If any exterior runs are indicated to have drains or trench drains, coordinate locations and requirements with RFA. Provide exterior hose bibbs at exterior runs and one on each face of the building.

4.11 Insulate all hot and cold supply piping.

4.12 Typical Medical Piping: Provide outlets at the locations indicated in the schedule below:

LOCATIONS	OXYGEN		NITROGEN	SCAVENGER		LIQUID SUCTION	
	WALL	CLG	WALL	WALL	CLG	WALL	CLG
SURGERY	TBD	●	TBD	TBD	●		TBD
TREATMENT TABLES	●			●		TBD	
DENTISTRY TABLES	●		●	●		●	
ICU/RECOVERY	●						
X-RAY	●			●			

NOTE:

1. The Scavenger System may be work by others. Coordinate with RFA.
2. Coordinate Master Alarm Controls with Electrical Engineers.
3. Refer to additional requirements in Project Documentation.

4.13 Coordinate main drain line and septic or sewer invert with RFA and Civil Engineer.

4.14 Confirm available water pressure and water service capacity prior to start of Work. If pressure is not sufficient, then recommend solutions to RFA.

4.15 If a Fire Protection Sprinkler System is included as part of the Project, then coordinate and size fire protection service requirements. Fire Protection sprinkler system design shall be design/build unless otherwise specifically determined by RFA.

5. CIVIL DESIGN:

5.1 When directed by the Owner or Architect, the Civil Engineer shall make arrangements for and coordinate required surveying (Boundary and Topographic) and shall provide a stamped, (sealed), and signed Site Survey Plan. The Civil Engineer shall coordinate delivery of the Site

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Survey to RFA. Distribution shall include both a PDF version and an AutoCAD or Revit version of the Site Survey Plan.

5.2 Civil Engineer shall acquire full knowledge of existing conditions including site grading, utility services, parking, paving, vehicle circulation, site drainage systems, site lighting, setbacks, easements, right-of-ways and other zoning constraints.

5.3 Civil Engineer shall collect any existing "as built" site information that is available from local Inspectional Services, Public Works or Building Inspectors Offices. Existing site conditions information shall be compiled in writing or on drawings and distributed to RFA.

5.4 Coordinate all overhead and below grade utilities and services with RFA and Engineering Team.

5.5 Coordinate location of building soil drain line and connection to septic or sewer system with the Plumbing Engineer and RFA.

5.6 Review roof drainage systems and collection point locations with RFA and incorporate related underground drainage into the Civil Engineering design.

5.7 Review soil report, water table and subsurface conditions with RFA and determine requirements for any basement wall and/or under slab waterproofing, under slab and foundation drainage course and drainage system. Recommend minimum under slab vapor retarder specifications to RFA for inclusion in Architectural Specifications.

5.8 Meet all site and building entry accessibility requirements per local and national Accessibility Codes.

5.9 Coordinate site lighting with Electrical Engineer and RFA. Submit final design to local authorities for approval.

5.10 Together with RFA, coordinate finished grades around building to meet Code requirements for separation of exterior wall materials from earth and entrance accessibility requirements.

5.11 Together with RFA, finalize pavement options for presentation to Owner. Indicate final decisions on Civil Engineering drawings.

5.12 Coordinate pavement slopes and any drainage systems at exterior runs, if any, with RFA. Coordinate run gate and divider panel layout requirements with RFA.

5.13 Include energy and water resource conservation concepts into the Civil Engineering design where required or appropriate.

5.14 Civil Engineer shall coordinate with Landscape Architect where required. **NOTE:** All Plant Species specified shall be evaluated to prevent any hazards to visiting animals. If the Project Documentation has no specific Landscaping requirements then, at a minimum, the following areas shall be provided with landscaping design elements:

1. Entrance Drive / Monument Sign Area(s) (buffering, focal and decorative elements)
2. Facility Entrance Area (layered shading, buffering and decorative elements)

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3. Parking Lot (shading & buffering elements)

Above referenced minimum landscaping requirements shall be provided to the greatest extent possible with native plant species that do not require irrigation systems.

6. STRUCTURAL DESIGN:

6.1 When directed by the Owner or RFA, the Structural Engineer shall make arrangements for and coordinate required soil borings reports and/or test pit results, and distribute Reports to the Civil Engineer and RFA.

6.2 Within 2 weeks of receiving RFA's Schematic Design Drawings, Engineer shall issue preliminary framing plans to RFA that indicate structural component types, sizes and depths.

6.3 Review RFA's preliminary drawings to identify any areas that require slab depressions. Depressed slabs are typically indicated for the Reception Area floor scale, Entry Vestibule matting, if recessed, and Animal Runs in existing or new construction. At Isolation Room entrance doors, provide a 1/2" deep slab depression for "foot baths". Foot baths will receive resinous epoxy flooring that result in a finished depression of approximately 1/4" deep.

6.4 Coordinate top of foundation wall elevations with Civil Engineer and RFA.

6.5 Zoning usually stipulates maximum building height. Coordinate exact building height with RFA.

6.6 Architectural Drawings will typically include dimensions and elevations of floor levels, tops of framing, open dimensions and partition dimensioning. Coordinate any Structural Drawing dimensioning with Architectural Dimensioning.

6.7 After receipt of HVAC roof top equipment sizes, weights and locations from the HVAC Engineer, RFA will provide such information to the Structural Engineer. If the HVAC system is design/build, then sizes, weights and locations may be approximated and those approximations shall be indicated on the Structural Drawings. Coordinate specific sizes, spacing and configurations of structural members as required with RFA to accommodate room layouts, floor/wall assemblies, etc. and MEP Engineering Consultants to accommodate ductwork, piping, lighting fixtures, etc.

END OF DESIGN CRITERIA

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use facsimile of form provided in Project Manual. Reference Section 012501 – “Request for Substitution.”
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall

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Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

j. Cost information, including a proposal of deduct amount, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. County's Action: If necessary, the County will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. The County will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Approval letter from the County, Change Order, Construction Change Directive, or Supplemental Instructions for minor changes in the Work.

b. Use product specified if County does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 business days prior to time required for preparation and review of related submittals.

1. Conditions: County will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Requested substitution will not adversely affect Contractor's construction schedule.

c. Requested substitution has received necessary approvals of authorities having jurisdiction.

d. Requested substitution is compatible with other portions of the Work.

e. Requested substitution has been coordinated with other portions of the Work.

f. Requested substitution provides specified warranty.

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g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, does not result in an added net cost, and is acceptable to all contractors involved.
h. Notification by the contractor as how the substituted product will impact the completion;
i. Notification by the contractor as to the difference in cost between the substituted product and the listed product;
j. A requirement that the contractor provide a detailed analysis of the difference between the listed product and the proposed product;
k. A requirement that the contractor submit any proposed substitution within a fixed period of time (as few as 14 calendar days) prior to award of contract and provide the following:
    1) product identification, manufacturer literature, samples, names and addresses of similar projects where the substituted product has been used;
    2) and the name and address of the manufacturer's representative; and
    3) that the contractor pay the cost of the design team to review the proposed substitution.

B. Substitutions for Convenience: The County will consider requests for substitution under certain circumstances.
1. Conditions: The County will consider Contractor's request for substitution when the following conditions are satisfied:
    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    b. Requested substitution does not require extensive revisions to the Contract Documents.
    c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    d. Requested substitution will not adversely affect Contractor's construction schedule.
    e. Requested substitution has received necessary approvals of authorities having jurisdiction.
    f. Requested substitution is compatible with other portions of the Work.
    g. Requested substitution has been coordinated with other portions of the Work.
    h. Requested substitution provides specified warranty.
    i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

End of Section 012500

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Jefferson County Missouri
Department of Public Works
729 Maple Street – P.O. Box 100
Hillsboro, MO 63050

Contact: Jason Jonas, P.E. T: 636-797-5369 jjonas@jeffcomo.org

Jefferson County Project No.: PW19B035BLD

REQUEST FOR SUBSTITUTION

RFS#	

Project Name	Jefferson County Animal Care Facility
Date	

This information is being requested by:

Name	
Company	
Address	
Trade	
Phone	
Email	
Specified Product	
Proposed Substitute Product	
Reason for Requesting Substitution	
Reference drawing or specification section	

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. The County may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: The County will issue a description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Work Change Proposal Requests issued by the County are not instructions either to stop work in progress or to execute the proposed change.
   2. Within 14 calendar days after receipt of Proposal Request, submit a quotation of cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
      e. Quotation Form: Use forms acceptable to The County.

B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the County.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

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2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Work Change Proposal Request Form: Use form acceptable to The County.

1.4 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.5 CHANGE ORDER PROCEDURES

A. Upon approval of Contractor’s Change Request, The County will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: The County may issue a Construction Change Directive on AIA Document G714 or County Standard Forms. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 012600

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SECTION 012700 - MEP, CIVIL & STRUCTURAL ENGINEERING DESIGN CRITERIA & SPECIAL RESPONSIBILITIES FOR ANIMAL CARE FACILITIES

DEFINITIONS

OWNER	Jefferson County Animal Care Facility Jefferson County Department of Public Works, Hillsboro, MO
ARCHITECT	The Architect is Rauhaus Freedenfeld & Associates (RFA)
CONTRACTOR	The construction firm that will build the Project
CONSULTING ENGINEER	An Engineer that works under the direct supervision of the Architect and is paid directly by the Architect or by the Owner.
DESIGN/BUILD ENGINEER	An Engineer that works under the direct supervision of the Contractor and is paid directly by the Contractor

1. GENERAL:

1.1 The Architect has compiled the following design criteria for animal care projects. If Consulting Engineers or Design/Build Engineers have suggestions they feel will add to the desirability, efficiency, functionality and/or usability of the facility, The Architect and Owner are interested in discussing any of those suggestions early in the design and submittal process and will consider incorporation and implementation.

1.2 All Engineers shall be responsible for acquiring full knowledge of existing conditions that pertain to their respective disciplines. Each Engineer shall be responsible for obtaining information regarding site conditions such as utility services, condition of existing paving, existing site drainage systems, existing parking & parking requirements, site lighting, utility company requirements, zoning requirements and any existing “as built” information available from Local Inspectional Services, Public Works or Building Inspector offices.

1.3 If the project involves existing building renovation or alteration, than the Engineer shall visit the building to become familiar with existing conditions, document or record existing conditions, services, equipment and systems and evaluate same for possible reuse, removal or replacement. The Engineer shall contact the Owner directly to arrange access to building. Existing conditions information shall be compiled in writing or on drawings and distributed to the Architect.

1.4 The Architect or Owner will distribute project specific animal care and office equipment information to Engineers for their use. Where possible, said information will include lighting, power and plumbing requirements and other equipment product data. When specific product documentation is not available, Engineer shall work with Owner and Architect as required to develop a basis of design solution for required equipment.

1.5 All Engineers shall provide designs that comply with all applicable Accessibility, Energy Conservation and Life Safety Codes and Requirements.

1.6 The Architect will establish drawing sheet size and title block layout and distribute AutoCAD or Revit base sheet floor plans to Engineers for their use.

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1.7 All Engineers shall provide full 3-part Specifications for inclusion in the Architect's Project Manual, or full Specifications on their Drawings. If a 3-part Specification is used, then the Architect will distribute a Specification section template for use by Engineers.

1.8 When Engineering is being provided by Consulting Engineers or by "Design/Build" Engineers, documents shall be stamped (sealed), and signed by an Engineer licensed or registered in the state where the project is located.

1.9 Engineers shall comply with all applicable, local Zoning & Building Ordinances, Rules & Regulations and local, state & national Codes.

1.10 All Engineers shall coordinate and integrate with all utility company requirements and equipment.

1.11 All Engineering Construction Documents shall be issued on the Architect's title block sheets.

1.12 The Engineers shall comply with all required building energy use modeling and all applicable Codes and Ordinances, including Reporting Documentation, such as COM Check.

1.13 The Architect and its Consulting Engineers are responsible environmental stewards. The Architect encourages all design team members to actively engage in a sustainable design process. However, LEED Design is not required unless specifically directed by the Architect.

1.14 All Engineers shall make Site Visits at the appropriate time during Construction in order to check conformance with the Construction Documents.

2. HVAC DESIGN:

2.1 There the following guidelines are applicable for animal care facilities HVAC Design:

2.1.1 ASHRAE Handbook – Applications Chapter 16

2.1.2 ASHRAE Handbook Standard 170, Ventilation of Health Care Facilities

2.1.3 Animal Welfare Act – USC Title 7 Sections 2131-2159

2.1.4 Code of Federal Regulations – Title 9 Animals and Animal Products (9CFR)

2.1.5 National Institutes of Health – 2008 Design Requirements Manual for Biomedical Laboratories and Animal Research Facilities (Related to Infectious Isolation)

2.1.6 Guidelines for Laboratory Design – Health and Safety Considerations 4th Edition

2.1.7 In addition to those standards, the Architect has developed the following criteria that should supplement locally adopted, applicable, national and international standards and shall be included in the Project.

2.2 Unless otherwise directed by the Architect, the HVAC system shall be designed as 3 separate zones.

Zone 1 includes "Outpatient" areas such as Reception, Waiting Areas, Exam Rooms, and associated communicating rooms or spaces.

Zone 2 includes all "Inpatient" areas such as Surgery, Treatment and X-Ray.

Zone 3 includes all animal housing areas such as Intake, Adoption, Hospital Wards, Isolation Areas, Boarding Wards, etc.

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Traditional criteria that govern HVAC zoning, such as solar orientation, fenestration, insulation values, etc., must be additionally considered when HVAC zones are established. The Architect shall provide an HVAC Zone Diagram as a basis for the system design.

2.3 Relative to abutting rooms, Surgery shall be designed for positive pressure. Relative to abutting rooms, Isolation and animal housing areas shall be designed for negative pressure. In addition, air from the Surgery shall not be mixed or reintroduced into the supply air for other parts of the building. This is to eliminate the build-up or cross-contamination of anesthetic gases.

2.4 Isolation and animal housing area air shall not be mixed with or reintroduced into the supply air for other parts of the building. These rooms shall have a minimum of 12 air changes per hour and use easily maintained energy-recovery airside economizers to cool, heat and ventilate indoor spaces with 100% outside air as required by applicable Energy Codes. Cage & Run Wards and Boarding Areas shall have supplemental, independent exhaust systems controlled by a wall switch. Fan motors shall be variable frequency drive (VFD) where required by applicable Codes.

2.5 All filters shall be high efficiency (HEPA) type filters.

2.6 Ambient temperatures within conditioned and or occupied spaces shall be maintained between 65 and 75 degrees Fahrenheit unless more restrictive requirements are dictated by the Owner and/or Code. Relative humidity shall be maintained between 35 and 65 percent unless more restrictive requirements are dictated by the Owner and/or Code.

2.7 Animal Grooming, Bathing, Drying and Aquatic Rehabilitation areas or rooms that have higher levels of heat and moisture generation, shall have higher than normal ventilation air changes as required by applicable Code and by the ASHRAE Handbook.

2.8 Provide independent wall switched ducted exhaust fans at individual Exam Rooms, as indicated in the Project Documentation.

2.9 Provide CO2 monitoring controls to adjust the quantity of fresh air on ventilation systems in densely (animal) occupied rooms such as hospital wards and boarding wards.

2.10 Assess available energy sources for HVAC (natural gas, propane, oil, electricity), verify required loads and make recommendations to the Architect.

2.11 Size and locate roof top HVAC equipment as soon as possible. Distribute product data, including dimensions, accessories and weights to the Architect as soon as possible for the Architect's distribution to the Structural Engineer.

2.12 Where soil and or fill conditions indicate radon emitting materials, the Owner will arrange for radon testing. A radon mitigation system may be designed for either new or existing buildings. Coordinate requirements with the Architect.

2.13 Include energy conserving high efficiency equipment and systems such as variable speed electronically commutated motors (ECM), airside economizers and heat recovery wheels as required by applicable Code and by the ASHRAE Handbook.

3. ELECTRICAL DESIGN:

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3.1 Architectural Reflected Ceiling Plans indicate light fixture locations and general fixture types. The Engineer shall submit recommended fixtures with product data sheets to the Architect for approval.

3.2 A material only Allowance for specific decorative lighting fixtures may be required. Coordinate requirements and specifications with the Architect.

3.3 Provide power outlets throughout the facility as required by applicable Code and the proposed location of equipment within the facility plus convenience outlets and any additional outlets indicated in the Project Documentation.

3.4 Provide surface mounted plug mold, 20A/120V GFI outlets @ 6" OC., at all Reception Desk and Lab Area countertops and mounted 6" above the countertop surfaces.

3.5 Provide a single dimmer wall switched controlled incandescent down light in each Exam Room utilized for ophthalmic examinations. Refer to the Architectural Reflected Ceiling Plans for such locations.

3.6 Provide a minimum of four (4) duplex power outlets in each Surgery Room distributed along the surgery equipment wall and on wall adjacent to each Surgery table. Mount at 60" above finish floor. Each outlet shall be a dedicated 20A/120V circuit.

3.7 Provide 20A/120V ceiling mounted retractable power chord reels above each Treatment and Dentistry table.

3.8 Confirm building service requirements prior to start of work. Coordinate entry points, whether below grade or overhead service, and panel locations with the Architect prior to development of drawings. Coordinate electrical service with Civil Engineer.

3.9 Provide design for exterior lighting. Coordinate requirements with Local Zoning Requirements, Civil Engineering Work, Landscape Work, if any and the Architect. Submit fixture/pole product data and a Photometric Plan to the Architect and the Civil Engineer for submission to local Authorities. Provide modifications as necessary until approved by local jurisdictional agency.

3.10 Confirm any emergency generating requirements with the Architect prior to start of Work. Coordinate pad size, location and protection requirements with the Architect and Civil Engineer. At a minimum, this is to include all Surgery Rooms and Treatment Areas for emergency lighting and a minimum of two (2) outlets in each area.

3.11 Provide the design for emergency lighting and exit signage.

3.12 Solar energy, PV panel arrays may be a part of the project. This Work is typically "Work by Others". If included, coordinate interface with Vendor and / or Architect. Panels will typically have integrated inverters.

3.13 Switches and switch plates, duplex outlet covers and other typical devices and plates shall be brushed stainless steel. Emergency outlets shall be in RED. Lighting fixtures, unless otherwise specified, shall be white or brushed aluminum. Confirm finish with the Architect.

3.14 Provide LED lighting, as first choice, for both interior and exterior locations.

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3.15 Design Code required fire detection and alarm systems. Provide CO2 monitoring and alarm systems where required.

3.16 Assess existing and available electrical service. Verify required loads and make recommendations to the Architect.

3.17 Coordinate with Owner, IT/Data and Security Consultants to provide power for related equipment at locations acceptable to the Architect.

4. PLUMBING DESIGN:

4.1 Provide fixtures and fittings that minimize undesirable bacteria collecting surfaces. Obtain the Architect's written approval for all fixture and fitting selections and specifications.

4.2 Floor drains shall not be used unless specifically directed by the Architect. Plumbing cleanouts shall be installed only at wall surfaces. Floor surface cleanouts shall not be used unless absolutely necessary and where used, shall be located inside a base cabinet. Obtain the Architect's written approval of location.

4.3 Provide Backflow Preventers on all plumbing with particular attention to surgical and treatment areas. In addition, provide Trap Primers on all floor drains not tied into an automatic flushing drain system or areas subject to frequent wash down cleaning procedures.

4.4 Where directed, provide wall or ceiling- mounted hose reels in run areas at approximately 7'-0"AFF to underside of reel.

4.5 Provide a canine waste removal system for interior runs by either of the following two (2) methods as indicated on the Drawings.

Method #1: Install a flushing floor drain in each run or one shared by two adjacent runs. Provide a wall mounted hand lever or push button operator controls to flush each individual drain.

Method #2: Install a multi run trench drain. Each trench drain will have a single hand operated wall valve connected to a trench jet spray fitting installed at each end of the trench. The trench shall be sloped down from each end to the center where a collector drop box is located and is equipped with a single flushing drain. Provide trap primers where required. Each trench will be equipped with a trench baffle at the center of the collection box that helps to prevent hosed waste from moving from one end of the trench to the other. The baffle, specified by RFA, also directs hosed waste water down into the collector flushing floor drain or flushing p-trap.

4.6 In runs located in Isolation Rooms, drains shall either be individual flushing floor drains (1 drain per run), or shared (1 drain per two runs).

4.7 Where a flushing drain is shared by two runs, it shall be located directly beneath the center of the run divider panel. These flushing drains shall have a baffle, similar to that required above for trench drains, to prevent cross contamination between runs.

4.8 All flushing drains shall be specified without the grate in order to allow solid waste to be hosed into the drain bowl. All trench drains shall be specified without the grate for the same reason.

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Runs will either receive a dog resting bench or a trench drain cover to prevent animal access to the trench drain.

4.9 All run "floor" surfaces will be sloped to drains and trenches. Where the drain or trench is located at a new concrete slab or slab-on-grade, the run floor will be depressed. Where the run is located at an existing concrete slab or on a wood subfloor with wood framing, a curb will be built up around the run(s) to enable a sloped floor down toward the drain or trench as indicated in the Project Documentation. Refer to Architect's typical details. When drains or trenches are located against exterior walls, careful attention to the placement of the drain or trench and associated piping is important to maintain the continuous insulation requirements and associated freeze prevention. Refer to the Architect's details.

4.10 If any exterior runs are indicated to have drains or trench drains, coordinate locations and requirements with the Architect. Provide exterior hose bibbs at exterior runs and one on each face of the building.

4.11 Insulate all hot and cold supply piping.

4.12 Typical Medical Piping: Provide outlets at the locations indicated in the schedule below:

LOCATIONS	OXYGEN		NITROGEN	SCAVENGER		LIQUID SUCTION	
	WALL	CLG	WALL	WALL	CLG	WALL	CLG
SURGERY	TBD	●	TBD	TBD	●		TBD
TREATMENT TABLES	●			●		TBD	
DENTISTRY TABLES	●		●	●		●	
ICU/RECOVERY	●						
X-RAY	●			●			

NOTE:

1. The Scavenger System may be work by others. Coordinate with the Architect.
2. Coordinate Master Alarm Controls with Electrical Engineers.
3. Refer to additional requirements in Project Documentation.

4.13 Coordinate main drain line and septic or sewer invert with the Architect and Civil Engineer.

4.14 Confirm available water pressure and water service capacity prior to start of Work. If pressure is not sufficient, then recommend solutions to the Architect.

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4.15 If a Fire Protection Sprinkler System is included as part of the Project, then coordinate and size fire protection service requirements. Fire Protection sprinkler system design shall be design/build unless otherwise specifically determined by the Architect.

5. CIVIL DESIGN:

5.1 When directed by the Owner or Architect, the Civil Engineer shall make arrangements for and coordinate required surveying (Boundary and Topographic) and shall provide a stamped, (sealed), and signed Site Survey Plan. The Civil Engineer shall coordinate delivery of the Site Survey to the Architect. Distribution shall include both a PDF version and an AutoCAD or Revit version of the Site Survey Plan.

5.2 Civil Engineer shall acquire full knowledge of existing conditions including site grading, utility services, parking, paving, vehicle circulation, site drainage systems, site lighting, setbacks, easements, right-of-ways and other zoning constraints.

5.3 Civil Engineer shall collect any existing "as built" site information that is available from local Inspectional Services, Public Works or Building Inspectors Offices. Existing site conditions information shall be compiled in writing or on drawings and distributed to the Architect.

5.4 Coordinate all overhead and below grade utilities and services with the Architect and Engineering Team.

5.5 Coordinate location of building soil drain line and connection to septic or sewer system with the Plumbing Engineer and the Architect.

5.6 Review roof drainage systems and collection point locations with the Architect and incorporate related underground drainage into the Civil Engineering design.

5.7 Review soil report, water table and subsurface conditions with the Architect and determine requirements for any basement wall and/or under slab waterproofing, under slab and foundation drainage course and drainage system. Recommend minimum under slab vapor retarder specifications to the Architect for inclusion in Architectural Specifications.

5.8 Meet all site and building entry accessibility requirements per local and national Accessibility Codes.

5.9 Coordinate site lighting with Electrical Engineer and the Architect. Submit final design to local authorities for approval.

5.10 Together with the Architect, coordinate finished grades around building to meet Code requirements for separation of exterior wall materials from earth and entrance accessibility requirements.

5.11 Together with the Architect, finalize pavement options for presentation to Owner. Indicate final decisions on Civil Engineering drawings.

5.12 Coordinate pavement slopes and any drainage systems at exterior runs, if any, with the Architect. Coordinate run gate and divider panel layout requirements with the Architect.

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5.13 Include energy and water resource conservation concepts into the Civil Engineering design where required or appropriate.

5.14 Civil Engineer shall coordinate with Landscape Architect where required. **NOTE:** All Plant Species specified shall be evaluated to prevent any hazards to visiting animals. If the Project Documentation has no specific Landscaping requirements then, at a minimum, the following areas shall be provided with landscaping design elements:

1. Entrance Drive / Monument Sign Area(s) (buffering, focal and decorative elements)
2. Facility Entrance Area (layered shading, buffering and decorative elements)
3. Parking Lot (shading & buffering elements)

Above referenced minimum landscaping requirements shall be provided to the greatest extent possible with native plant species that do not require irrigation systems.

6. STRUCTURAL DESIGN:

6.1 When directed by the Owner or the Architect, the Structural Engineer shall make arrangements for and coordinate required soil borings reports and/or test pit results, and distribute Reports to the Civil Engineer and the Architect.

6.2 Within 2 weeks of receiving the Architect Schematic Design Drawings, Engineer shall issue preliminary framing plans to the Architect that indicate structural component types, sizes and depths.

6.3 Review the Architect's preliminary drawings to identify any areas that require slab depressions. Depressed slabs are typically indicated for the Reception Area floor scale, Entry Vestibule matting, if recessed, and Animal Runs in existing or new construction. At Isolation Room entrance doors, provide a 1/2" deep slab depression for "foot baths". Foot baths will receive resinous epoxy flooring that result in a finished depression of approximately 1/4" deep.

6.4 Coordinate top of foundation wall elevations with Civil Engineer and the Architect.

6.5 Zoning usually stipulates maximum building height. Coordinate exact building height with the Architect.

6.6 Architectural Drawings will typically include dimensions and elevations of floor levels, tops of framing, open dimensions and partition dimensioning. Coordinate any Structural Drawing dimensioning with Architectural Dimensioning.

6.7 After receipt of HVAC roof top equipment sizes, weights and locations from the HVAC Engineer, the Architect will provide such information to the Structural Engineer. If the HVAC system is design/build, then sizes, weights and locations may be approximated and those approximations shall be indicated on the Structural Drawings. Coordinate specific sizes, spacing and configurations of structural members as required with the Architect to accommodate room layouts, floor/wall assemblies, etc. and MEP Engineering Consultants to accommodate ductwork, piping, lighting fixtures, etc.

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END OF DESIGN CRITERIA

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.

2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
   a. Application for Payment forms with continuation sheets.
   b. Submittal schedule.
   c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to County at earliest possible date but no later than [seven] 7 days prior to the date scheduled for submittal of initial Applications for Payment.

3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments; provide sub-schedules showing values coordinated with each phase of payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

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a. Project name and location.
b. Name of County Agency.
c. County's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of [five] 5 percent of the Contract Sum.
   a. Include separate line items under principal subcontracts for project closeout requirements in an amount totaling [five] 5 percent of the Contract Sum and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include fabricated materials or equipment purchased and stored off-site, but not yet installed.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Owners Project Manager and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

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B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Project Manager will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Each Application for Payment or periodic estimate requesting payment must be accompanied by a certificate from each subcontractor, having a subcontract of more than $100,000.00 stating that he has been paid all amounts due him on the basis of the previous periodic payment to the Contractor, or else stating the amount not so paid and the reason for the discrepancy. In the event of any such discrepancy, the Contractor shall be required to furnish his own written explanation

F. Transmittal: Submit (three) 3 signed and notarized original copies of each Application for Payment to Owner's Project Manager by a method ensuring receipt within 24 hours. All copies shall include waivers of lien and similar attachments if required.

1. Transmit all copies with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waiver for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit conditional final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

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1. List of subcontractors.

2. Schedule of values.

3. Contractor's construction schedule (preliminary if not final).

4. Schedule of unit prices, if any.

5. Submittal schedule (preliminary if not final).

6. List of Contractor's staff assignments.

7. List of Contractor's principal consultants.

8. Copies of building permits.

9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

10. Initial progress report.

11. Report of preconstruction conference.

12. Certificates of insurance and insurance policies.

I. Application for Payment at Substantial Completion: After Owner's Project Manager issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.

2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.

4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."

5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."

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6. AIA Document G707-1994, "Consent of Surety to Final Payment."

7. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 012900

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PARTIAL WAIVER AND SUBORDINATION OF LIEN (SUBCONTRACTOR)

Requisition No: _____
Period Through: _____

PROJECT: Jefferson County Animal Care Facility

OWNER: Jefferson County Animal Control

CONTRACTOR: _____

SUBCONTRACTOR: _____

The undersigned Subcontractor acknowledges receipt from _____ _____ ("Contractor") of $_____, the sum payable under the subcontract between said Contractor and the undersigned Subcontractor, including all amounts due for extras and/or adjustments, if any, for materials furnished and/or labor performed on the above referenced project (the "Project") pursuant to said subcontract.

The status of said subcontract is as follows:

1. Original Subcontract/Purchase Order: $_____
2. Change Orders: $_____
3. Adjusted Subcontract: $_____
4. Amount Previously Paid: $_____
5. This Payment: $_____
6. Retainage held: $_____

In consideration of the receipt of the amount of payment set forth in line #5 above and any and all past payments received from the Contractor in connection with the Project, the undersigned acknowledges and agrees that it has been paid all sums due for all labor, materials and/or equipment furnished by the undersigned to or in connection with the Project and the undersigned hereby releases, discharges, relinquishes and waives any and all claims, suits, liens and rights under any Notice of Contract with respect to the Project Owner and the Contractor on account of any labor, materials and/or equipment furnished to the Project through the date of _____.

The undersigned individual represents and warrants that he is the duly authorized representative of the undersigned, empowered and authorized to execute and deliver this document on behalf of the undersigned and that this document binds the undersigned to the extent that the payment referred to herein is received.

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The undersigned represents and warrants that it has paid in full each and every sub-subcontractor, laborer and labor and/or material supplier with whom undersigned has dealt in connection with the Project and the undersigned agrees as its sole cost and expense to defend, indemnify and keep indemnified the Project Owner and the Contractor against any claims, demands, suits, disputes, damages, costs, expenses (including attorneys fees), liens and/or claims of lien made by such sub-subcontractors, laborers, and labor and/or material suppliers arising out of or in any way related to the Project.

The above represents a true and accurate outline of the status of the subcontract account. This certification is mad by the undersigned for the purpose of inducing Contractor and Project Owner to make the payment received by the undersigned.

Signed under the pains and penalties of perjury this ___ day of _____, 20__.

Subcontractor:
By:

_____
Print Name and Title

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. Coordination drawings.
   2. Requests for Information (RFIs).
   3. Project meetings.

B. Related Requirements:
   1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 DEFINITIONS

A. RFI: Request from Owner or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, email address and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

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B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors where coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup, adjustment and Owner training of systems.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
      a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
      b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to the County indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract. Prepare Project-specific information, drawn accurately to scale.
   2. Compliance: Failure by Contractor to adequately coordinate dimensional requirements will not be deemed justification for reimbursable costs to make necessary corrections of the Work.

B. Coordination Drawing Organization: Organize coordination drawings as follows:
   1. Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
   2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.

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3. Rooftop equipment: reference drawings for dimensions to one corner of each opening in the floors and roof. Contractor shall coordinate required clear opening dimensions as necessary for the actual openings. Care should be taken to minimize opening sizes.
4. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
5. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
6. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
7. Review: The County will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form provided herein.
   1. The County will return RFIs submitted to the County by other entities controlled by Contractor with no response.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date of initiation of RFI.
   4. Name of Contractor, subcontractor or supplier requesting the information.
   5. RFI number, numbered sequentially.
   6. RFI subject.
   7. Specification Section number and title and related paragraphs, as appropriate.
   8. Drawing number and detail references, as appropriate.
   9. Field dimensions and conditions, as appropriate.
   10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   11. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

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C. RFI Forms: Form bound in Project Manual.

D. The County's Action: The County will review each RFI, determine action required, and respond. Allow 7 working days for the County's response for each RFI. RFIs received by the County after 2:00 p.m. will be considered as received the following working day.
   1. The following RFIs will be returned without action:
      a. Requests for approval of submittals.
      b. Requests for approval of substitutions.
      c. Requests for coordination information already indicated in the Contract Documents.
      d. Requests for adjustments in the Contract Time or the Contract Sum.
      e. Incomplete RFIs or inaccurately prepared RFIs.
   2. The County's action may include a request for additional information, in which case the County's time for response will date from time of receipt of additional information.
   3. The County's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
      a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify the County in writing within 10 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly with not less than the following:
   1. Project name.
   2. Name and address of Contractor, subcontractor or supplier.
   3. RFI number including RFIs that were dropped and not submitted.
   4. RFI description.
   5. Date the RFI was submitted.
   6. Date the County's response was received.

F. On receipt of the County's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify the County within two business days if Contractor disagrees with response.
   1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
   2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct weekly meetings and conferences at the Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and the County of scheduled meeting dates and times.

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2. Minutes: Contractor will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and the County, within 3 days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and the County, but no later than 15 days after execution of the Agreement.
   1. Attendees: Authorized representatives of Owner and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Tentative construction schedule.
      b. Phasing.
      c. Critical work sequencing and long-lead items.
      d. Designation of key personnel and their duties.
      e. Procedures for testing and inspecting.
      f. Use of the premises and existing building.
      g. Work restrictions.
      h. Working hours.
      i. Owner's occupancy requirements.
      j. Responsibility for temporary facilities and controls.
      k. Procedures for moisture and mold control.
      l. Procedures for disruptions and shutdowns.
      m. Construction waste management and recycling.
      n. Parking availability.
      o. Office, work, and storage areas.
      p. Equipment deliveries and priorities.
      q. Security.
      r. Progress cleaning.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Progress Meetings: Conduct progress meetings at weekly intervals.
   1. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
      a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to

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ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period with a minimum [two] 2 week detailed look ahead, adjustments to Phasing and Critical Work sequencing and long lead times.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Off-site fabrication.
5) Access.
6) Site utilization.
7) Temporary facilities and controls.
8) Progress cleaning.
9) Quality and work standards.
10) Status of correction of deficient items.
11) Field observations.
12) Status of RFIs.
13) Status of proposal requests.
14) Pending changes.
15) Status of Change Orders.

3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - **PRODUCTS** (Not Used)

PART 3 - EXECUTION (Not Used)

End of Section 013100

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Jefferson County Missouri
Department of Public Works
729 Maple Street – P.O. Box 100
Hillsboro, MO 63050

Jefferson County Project No.: PW19B035BLD

Contact: Jason Jonas, P.E. T: 636-797-5369 jjonas@jeffcomo.org

REQUEST FOR INFORMATION

Project Name	**Jefferson County Animal Care Facility**
Date	

This information is being requested by:

Name	

RFI#	

Company	
Address	
Trade	
Phone	
Fax	
Question:	
Response:	
Reference drawing or specification section:	

Contact this office via email to receive an electronic version of this form.

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's construction schedule.
   2. Construction schedule updating reports.
   3. Daily construction reports.
   4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
   1. PDF electronic file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

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B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontractors, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
   1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
   3. Startup and Testing Time: Include no fewer than [fifteen] 15 days for startup and testing.
   4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for County or Engineer's administrative procedures necessary for certification of Substantial Completion.
   5. Punch List and Final Completion: Include not more than [thirty] 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
   1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
   2. Work Restrictions: Show the effect of the following items on the schedule:
      a. Coordination with existing construction.
      b. Limitations of continued occupancies.
      c. Uninterruptible services.
      d. Partial occupancy before Substantial Completion.
      e. Use of premises restrictions.
      f. Provisions for future construction.
      g. Seasonal variations.
      h. Environmental control.

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3. Work Stages: Indicate important stages of construction for each major portion of the Work.

D. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within (thirty) 30 days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in [ten] 10 percent increments within time bar.

C. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

D. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.

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6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.3 REPORTS

A. Daily Construction Reports: Prepare and maintain a daily construction report recording the following information concerning events at Project site:
   1. List of subcontractors at Project site.
   2. List of separate contractors at Project site.
   3. Approximate count of personnel at Project site.
   4. Equipment at Project site.
   5. Material deliveries.
   6. High and low temperatures and general weather conditions, including presence of rain or snow.
   7. Accidents or observed safety concerns.
   8. Meetings and significant decisions.
   9. Unusual events.
   10. Stoppages, delays, shortages, and losses.
   11. Meter readings and similar recordings.
   12. Emergency procedures.
   13. Orders and requests of authorities having jurisdiction.
   14. Change Orders received and implemented.
   15. Construction Change Directives received and implemented.
   16. Services connected and disconnected.
   17. Equipment or system tests and startups.
   18. Partial completions and occupancies.
   19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update and distribute updated schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

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3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to County or Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

End of Section 013200

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.

2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require the County's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require the County's responsive action.

1. Submittals may be rejected for non-compliance with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule.

1. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates.

2. Include additional time required for making corrections or revisions to submittals noted by the County and additional time for handling and reviewing submittals required by those corrections.

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1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Owner's Digital Data Files: Electronic copies of digital data files of the Floor and Ceiling Plans (only) will be provided by the County for Contractor's use in preparing submittals.

1. The County will furnish Contractor one set of digital data drawing files of the Floor and Ceiling Plans for use in preparing Shop Drawings.
   a. The County makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
   b. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual. Reference 013301-1 - Electronic Data Licensing Agreement.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
   a. The County reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review as identified below, including time for resubmittals, as follows. Time for review shall commence on the County's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The County will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 15 calendar days for review of each resubmittal.

D. Submittals: Submitted shop drawings shall be drawn to scale.

1. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. All submitted plans are to be drawn and coordinated or noted with work of other trades where possible.

2. If submitted plans are not coordinated with other trades, the contractor and or sub-contractor shall, to the best of his ability, identify and highlight areas of the work that installation with other trades poses a potential conflict.

E. Paper Submittals: (*Applies only to structural steel, joists, deck and metal fabrications or engineered wood trusses)* Place a permanent label or title block on each submittal item for identification.

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1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 3” x 3” on label or beside title block to record Contractor's review and approval markings and action taken by the County or Professional Engineer.
3. Include the following information for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name of Contractor.
   d. Name of subcontractor.
   e. Name of supplier.
   f. Name of manufacturer.
   g. Submittal number or other unique identifier, including revision identifier.
      1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
   h. Number and title of appropriate Specification Section.
   i. Drawing number and detail references, as appropriate.
   j. Location(s) where product is to be installed, as appropriate.
   k. Other necessary identification.
4. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. The County will discard submittals received from sources other than Contractor.
   a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
      1) Project name.
      2) Date.
      3) Destination (To:).
      4) Source (From:).
      5) Name and address of the County.
      6) Name of firm or entity that prepared submittal.
      7) Names of subcontractor, manufacturer, and supplier.
      8) Category and type of submittal.
      9) Specification Section number and title.
      10) Drawing number and detail references, as appropriate.
      11) Indication of full or partial submittal.
      12) Transmittal number.
      13) Remarks.
      14) Signature of transmitter
      15) Contractor’s stamp and signature indicating his review and approval.

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F. Electronic (Digital) Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.
   a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
   b. The project identifier for this project is: "HCAB"

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by the County or associated design professional.
   a. Provide a space approximately 3" x 3" to record Contractor's review and approval markings and action taken by the County or Professional Engineer.
   b. Should pre-printed manufacturer's information not provide adequate space, this may appear on a separate cover sheet for the submittal that identifies the following:
      1) Project Name
      2) Name of firm or entity that prepared submittal
      3) Names of subcontractor, manufacturer and supplier
      4) Category and type of submittal
      5) Specification Section Title
      6) File name using project identifier and Specification Section Number

4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
   a. Project name.
   b. Date.
   c. Name and address of the County.
   d. Name of firm or entity that prepared submittal.
   e. Names of subcontractor, manufacturer, and supplier.
   f. Category and type of submittal.
   g. Submittal purpose and description.
   h. Specification Section number and title.
   i. Specification paragraph number or drawing designation and generic name for each of multiple items.
   j. Drawing number and detail references, as appropriate.
   k. Location(s) where product is to be installed, as appropriate.
   l. Related physical samples submitted simultaneously and directly under separate cover with the required Transmittal Form.
   m. Indication of full or partial submittal.
   n. Transmittal number, numbered consecutively.
   o. Submittal and transmittal distribution record.

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p. Other necessary identification.
q. Remarks.
r. Contractor's stamp and signature indicating his review and approval.

5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.

G. Options: Identify options requiring selection by the County.

H. Deviations: Identify deviations from the Contract Documents on submittals with yellow highlighter. Failure to flag or highlight deviations from the Contract Documents may result in the work or items being replaced at the Contractor's expense.

I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with approval notation from the County's action stamp.

J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from the County's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Submit electronic submittals via email as PDF electronic files.
   a. The County will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
   a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.

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B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams showing factory-installed wiring and points of connection to building systems.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.

6. Submit Product Data in the following format:
   a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer, if specified.

2. Submit Shop Drawings in the following format:
   a. PDF electronic file.
   b. Three opaque (bond) copies of each structural steel, joists, deck and metal fabrications submittal. The County will return one copy.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

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1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on back side of Samples that includes the following:
   a. Generic description of Sample.
   b. Product name and name of manufacturer.
   c. Sample source.
   d. Number and title of applicable Specification Section.
3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The County will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three sets of Samples. The County will retain two Sample sets; remainder will be returned.
      1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:
   a. PDF electronic file.

F. Coordination Drawings Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures.

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I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of the County and Owner, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

U. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."

V. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before

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installation of product, for compliance with performance requirements in the Contract Documents.

W. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

X. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the County.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit PDF electronic file, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to the County.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

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C. Approval Stamp: Stamp each submittal on its front page or sheet with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 OWNER/COUNTY'S ACTION

A. General: The County will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: The County will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Informational Submittals: The County will review each submittal and will not return it, or will return it if it does not comply with requirements. The County will forward each submittal to appropriate party.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

End of Section 013300

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   2. Requirements for Contractor to provide quality-assurance and quality-control services required by the Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Requirements:
   1. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by the County.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
   1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

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D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of [five] 5 previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to the County for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the County for a decision before proceeding.

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1.4 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates, times and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and re-inspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work. Submit all associated documentation to the County for recording and transmission to the Owner.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

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C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction.
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
      c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
      d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
   2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to the County, with copy to Contractor.

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Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   1. Build mockups in location and of size indicated or, if not indicated, as directed by the County.
   2. Notify the County (seven) 7 days in advance of dates and times when mockups will be constructed.
   3. Demonstrate the proposed range of aesthetic effects and workmanship.
   4. Obtain the County's approval of mockups before starting work, fabrication, or construction.
      a. Allow (seven) 7 days for initial review and each re-review of each mockup.
   5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   6. Demolish and remove mockups when directed unless otherwise indicated.

K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 33.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
      a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
   2. Notify testing agencies at least (twenty-four) 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with the County and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify the County and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. Delivery of samples to testing agencies.
   6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

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1.7 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
   2. Notifying the County and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   3. Submitting a certified written report of each test, inspection, and similar quality-control service to the County with copy to Contractor and to authorities having jurisdiction.
   4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
   5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   6. Retesting and re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date, time and test or inspection that was conducted.
   2. Description of the Work tested or inspected.
   3. Weather conditions at the time of test.
   4. Date test or inspection results were transmitted to the County.
   5. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for County's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as

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invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

End of Section 014000

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:
   1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the County, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Jefferson County's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services, including backflow preventers and other components as required for construction operations.

C. Electric Power Service from Existing System: Electric power from the Local Utility's existing system is available for use with metering and with payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, utility hookups, staging areas, crane set-up locations and parking areas for construction personnel.

B. Erosion and Sedimentation Control Plan(s): Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Project Identification and Temporary Signs: Show fabrication and installation details. Plans, elevations, details, layouts, typestyles, graphic elements, and message content are to be developed by the County and issued for fabrication.

D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

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E. Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
   1. Locations of dust-control partitions at each phase of work.
   2. HVAC system isolation schematic drawing.
   3. Waste-handling procedures.
   4. Other dust-control measures.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails and fabric screening.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

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B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner/County and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.

C. Non-sewered, chemical Construction Portable Restroom(s) with a handwashing facility.

D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
   1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
   2. Sewer and Drainage temporary connections are limited to construction related activities only. Temporary Construction Portable Toilets and handwashing are to remain.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Water Service: Connect to Jefferson County's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

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E. Sanitary Facilities: Provide non-sewered temporary chemical toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities and the following regulations:
   1. OSHA standards for construction (1926.51).
   2. ANSI Z4.3 – Sanitation – Nonsewered Waste-Disposal Systems.
   3. International Plumbing Code Section 311.1
   4. Toilets: Use of Owner's existing toilet facilities will not be permitted.

F. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

H. Electric Power Service: Connect to Local Utility's existing electric power service. Maintain equipment in a condition acceptable to provider.

I. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
   1. Connect temporary service to Local Utility’s existing power source, as directed by Owner.

J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install, maintain and operate temporary lighting that fulfills security and protection requirements without operating entire system.

K. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
   1. Provide additional telephone lines for the following:
      a. Provide a dedicated telephone line for each facsimile machine in each field office.
   2. At each telephone, post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
      d. Contractor's emergency after-hours telephone number.
      e. Owner's Project Manager office.
      f. Engineers' offices.
      g. Owner's office.
      h. Principal subcontractors' field and home offices.
   3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

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L. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by the County / Owner to access project electronic documents and maintain electronic communications. Provide also:
   1. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
   2. Internet Service: Broadband wireless modem, router and ISP, equipped with hardware firewall.
   3. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
   2. Maintain support facilities until the County schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations.
   1. Provide dust-control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
   1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
   2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
   3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
   4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary, off-site parking areas for construction personnel.

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F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide two 48” x 96” project identification signs as indicated. Unauthorized signs are not permitted.
   1. Identification Signs: Provide Project identification signs as indicated directed by the County.
   2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
      a. Provide temporary, directional signs for construction personnel and visitors.
   3. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings, requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

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E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
   1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
   2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
   3. Insulate partitions to control noise transmission to occupied areas.
   4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
   5. Protect air-handling equipment.
   6. Provide walk-off mats at each entrance through temporary partition. Replace weekly or as needed to maintain a clean condition in the Owner-occupied spaces.

L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
   1. Prohibit smoking in all interior areas and within 20 feet of exterior doors and operable windows.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

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3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Discard or replace water-damaged and wet material.
4. Discard, replace, or clean stored or installed material that begins to grow mold.
5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

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D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

End of Section 015000

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SECTION 015639 - TREE PROTECTION

PART 1 - GENERAL

1.1 SCOPE

A. Drawings and general provisions of the Contract, including General Conditions Supplemental General Conditions, and Division 1 Specifications apply to this section.

B. The tree canopy/tree root zones of trees designated to be preserved shall be protected during the entire construction process.

C. Tree trunks and branches shall not be damaged by equipment or workers. Tree roots shall be protected from soil compaction, damage by trenching or excessive grade changes, and hazardous materials or waste products.

1.2 SUBMITTALS

A. Tree Protection Map, shall be prepared which identifies all areas affected by the project. The Tree Protection Map must show the location, species and size of all existing trees and landscape that may be negatively impacted by the project. The map must indicate which trees and shrubs are to be removed, and which ones are to remain. The plan shall include protection measures for all tree and landscape impacts, including all utility connections for the project or new facility.

1.3 TREE CANOPY/TREE ROOT PROTECTION ZONES

A. Prior to the start of any site work the contractor will erect fencing around trees which are to be preserved and sensitive root zones which are to be protected within the construction site.

B. The Contractor shall meet with the Owner’s representative and the County prior to beginning any site work to review and verify all work procedures, trailer location, stockpile and staging areas, access and haul routes, and equipment operation methods with respect to the required tree canopy/tree root protection measures.

C. Trees indicated on the plan to remain shall be protected from injury to their branches, trunks, and root zones during the entire construction period. Protection of tree canopy/tree root zones shall be by the placement of temporary fencing as outlined.

D. No removal or encroachment into tree protection enclosures shall be permitted unless coordinated with the County / Owner.

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E. The Contractor shall be responsible for installation and maintenance of all tree protection fencing. Protective fencing shall remain undisturbed until all site work has been completed. The contractor shall remove fencing at completion of project.

F. If protective fencing is damaged, the contractor shall immediately execute the necessary repairs to reestablish the protective fencing to the original configurations.

G. The Contractor shall be held liable for any damages to protected trees and root zones caused by unauthorized intrusions into the protected areas during construction activity.

H. Any pruning of protected trees that may be required during the course of construction shall be performed by a professional Arborist. Coordinate pruning requests with the County and Owner.

I. Erosion control devices shall be installed as per contract drawings with particular emphasis on preventing siltation and/or erosion from occurring within the tree root protection zone.

PART 2 - PRODUCTS

2.1 PROTECTIVE FENCING

A. Protective fencing shall be 6’ high chain link fencing. Support posts for chain link fencing shall be metal posts with a minimum of 2” diameter and full height of fencing. Use 9 gauge top and bottom wires between posts to support chain link fencing. Attach fencing to posts and top and bottom wires with 9 gauge wire ties.

2.2 GEOTEXTILE FABRIC

A. Filter fabric shall meet the requirements for MoDOT Class 1 woven engineering fabric.

2.3 MULCH

A. Coarse chipped or ground wood mulch shall be approved prior to application.

PART 3 - EXECUTION

3.1 GENERAL

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A. The Contractor shall locate utilities prior to installing chain link fence support posts into the ground.

B. Trees to be removed that have branches extending into the canopy of trees to be preserved shall be removed by a certified Arborist and not by a demolition or construction contractor. The certified Arborist shall remove the tree in a manner that causes no damage to the protected trees and landscape to remain after construction is completed.

C. Trees to be removed shall be felled so as to fall away from protective zones and to avoid pulling and breaking of tree roots indicated on the plan to remain.

D. Any brush clearing required within or around the tree canopy protection zone shall be accomplished with hand operated equipment.

E. The Contractor shall be held liable for damages incurred to any tree branches that extend over protective fencing and to any trees or other plant material located on the site and indicated on the plan to remain. The Contractor shall notify the County / Owner when any overhanging branches or other plant material is interfering with or risks damage due to construction activity.

F. If work causes an existing tree to be removed that is not shown on plans as planned demolition, the County / Owner shall be consulted with to evaluate and determine future viability of the existing tree(s) located within the area(s) of proposed construction excavation. Final evaluations shall be coordinated with the County / Owner to determine if tree should remain, be relocated, or be removed if unable to survive encroachment of new revised design and construction.

3.2 SCOPE OF WORK WITHIN OR AROUND TREE ROOT PROTECTION ZONE

A. Any grading, construction, demolition, remedial measures or other work that is expected to encounter tree roots shall be made in consultation with the County / Owner.

B. No machine digging shall take place within a radius of one and one-half foot for each 1 inch diameter at breast height (DBH) of the tree. DBH is defined as the diameter of the trunk measured at 54 inches above grade.

C. Any roots 2 inches in diameter or less that sustain damage during construction shall be exposed to sound tissue and cleanly pruned close to the tree side of the trench. Clean cuts shall be made at all times.

D. For construction projects requiring access or haul roads that must pass over the root area of trees to be retained, a roadbed shall be installed using 4 inches (minimum) of mulch or wood chips covered with approved logging mats. Approval shall be given by the County / Owner. The roadbed shall be replenished and maintained as necessary to provide desired root zone protection. For projects requiring materials storage within the root area of trees to be retained or protected, this area shall be constructed using an approved geotextile base covered with 4 inches (minimum) of coarse wood mulch or chips. The area shall be replenished as necessary to maintain a 4 inch (minimum) depth.

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E. No material shall be stored or piled within a radius of 2 feet for each 1 inch DBH (minimum) of the designated tree root zone or as directed by the County / Owner. No gasoline, fuel oil, harmful chemicals, etc., or other deleterious materials shall be stored, spilled or deposited on the ground with in this limit.

F. There shall be no vehicular traffic or parking permitted under the drip line/canopy of any tree to be retained or protected within the construction site unless approved tree root protection measures have been installed.

G. Foot traffic shall be kept to a minimum under the drip line/canopy. If temporary foot traffic must be directed over the root zone of trees to be retained or protected, a pathway shall be installed using an approved geotextile base covered with 3 inches (minimum) or mulch or wood chips. The pathway material shall be replenished as necessary to maintain a 3 inch (minimum) depth.

H. Installation of curbs and sidewalks shall be completed in a manner least damaging to trees and tree root systems. An approved geotextile fabric shall be considered a viable alternative to the specified sub-base in sensitive root zones. When unique site conditions not addressed in the contract drawings result in the opportunity for an alternative solution or a potential modification to the plan, the Contractor may present a proposal to the County / Owner.

3.3 LIABILITY

A. The Contractor shall be held liable for any damage to protected trees. A dollar value shall be determined by following criteria contained in the A Guide for Plant Appraisal. (Council of Tree and Landscape Appraisal, Latest Edition).

B. The Contractor shall be held liable for all remedial measures required to treat broken limbs, or damaged trees and roots, or for unauthorized removal of existing trees or plant material, etc. All tree surgery and remedial treatments will be accomplished by a certified arborist.

END OF SECTION 015639

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by the County through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
4. Where a brand name or equal product is identified, the specifications will list the salient functional, physical, or other characteristics essential to the Project. An alternative product need not be identical to the specified one or comply with every detail of the specifications but, rather, it need only provide all of the essential functions specified and be suitable to the actual needs.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

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1.3 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. The County's Action: If necessary, the County will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. The County will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of County's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if the County does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

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C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

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2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," the County will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

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a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match the County's sample," provide a product that complies with requirements and matches the County's sample. The County's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by the County from manufacturer's full range" or similar phrase, select a product that complies with requirements. The County will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: The County will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, the County may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical

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properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.

2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017300 – EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. Installation of the Work.
   4. Cutting and patching.
   5. Coordination of Owner-installed products.
   6. Progress cleaning.
   7. Starting and adjusting.
   8. Protection of installed construction.

B. Related Requirements:
   1. Section 011000 "Summary" for limits on use of Project site.
   2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
   3. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.2 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
   1. Structural Elements: When cutting and patching structural elements, notify the County of locations and details of cutting and await directions from the County before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
   2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
   3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

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4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in the County's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the County for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

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3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and/or Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to County according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify the County promptly.

B. General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish limits on use of Project site.
   3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   4. Inform installers of lines and levels to which they must comply.
   5. Check the location, level and plumb, of every major element as the Work progresses.
   6. Notify the County when deviations from required lines and levels exceed allowable tolerances.
   7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

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E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by the County.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
   1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

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H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the County.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Temporary Support: Provide temporary support of work to be cut.

C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

D. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

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2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

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1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space. Vacuum stud tracks before closing up partitions and walls.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

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B. Comply with manufacturer's written instructions for temperature and relative humidity.

End of Section 017300

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.
   5. Repair of the Work.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
   2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
   3. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.
   1. Certificate of Occupancy or Temporary Certificate of Occupancy for completed work per phase of construction.

B. Contractor’s Punch List of remaining work,

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items (Punch List): Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the corrective work required or incomplete work, value of each item on the list and reasons why the Work is incomplete.
   1. Submit electronically in Microsoft Excel format, or other format approved by the County.

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2. List rooms in order by room number. Include room name and work remaining to be completed or corrected.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 7 days after requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work area and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number where applicable.
      a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner’s signature for receipt of submittals.
   5. Submit test/adjust/balance records.
   6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Advise Owner of pending insurance changeover requirements.
   2. Advise Owner's personnel of changeover in security provisions.
   3. Complete startup and testing of systems and equipment.
   4. Perform preventive maintenance on equipment used prior to Substantial Completion.
   5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
   6. Advise Owner of changeover in heat and other utilities.
   7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
   8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   9. Complete final cleaning requirements, including touchup painting.
   10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 7 days prior to date the work will be completed and ready for final inspection and

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tests. On receipt of request, the County will either proceed with inspection or notify Contractor of unfulfilled requirements. The County will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the County, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.5 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
   1. List of Incomplete Items: Submit certified copy of the County's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the County’s agent.
   2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
   3. Submit pest-control final inspection report and warranty.
   4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, the County will either proceed with inspection or notify Contractor of unfulfilled requirements. The County will review Contractor’s Final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.6 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and numerical identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
   1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
   2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
   3. Submit list of incomplete items in the following format:
      a. MS Excel electronic file, or other format approved by the County. The County will return annotated copy.

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1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of the County for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
   2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
   3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
   4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
   1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

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1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
        1) Do not use razor blades to clean glass surfaces.
    k. Remove all labels that are not permanent.
    l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    p. Leave Project clean and ready for occupancy.
2. Re-clean areas affected by remedial work.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

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B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
   1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
   4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters or ballasts in fluorescent and mercury vapor fixtures, and failing drivers in LED fixtures to comply with requirements for new fixtures.

End of Section 017700

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SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. The County and Associated Design Professionals will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to the County or by uploading to web-based project software site. Enable reviewer comments on draft submittals.
2. Submit three paper copies. The County will return two copies.

C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least **15** days before commencing demonstration and training. The County will return copy with comments.

1. Correct or revise each manual to comply with County's comments. Submit copies of each corrected manual within **15** days of receipt of the County's comments and prior to commencing demonstration and training.

D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

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1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of one hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.

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5. Name and contact information for Contractor.
6. Name and contact information for County's Project Manager.
7. Names and contact information for major consultants to the County that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.5 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

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E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.

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4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

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1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.

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4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings in AutoCAD and PDF electronic format.
   2. Record Product Data.
   3. Record Drawings in Hard Copy and PDF electronic format.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit copies of record Drawings as follows:
      a. Final Submittal:
         1) Submit PDF electronic files of scanned record prints and one set of prints.
         2) Print each drawing, whether or not changes and additional information were recorded.
            a) Where drawing contains information in color, print the sheet in color.

B. Record Product Data: Submit one paper copy and annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Record data as soon as possible after obtaining it.
      c. Record and check the markup before enclosing concealed installations.
   2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

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3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with the County. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: DWG Version, Microsoft Windows operating system and
3. Format: Annotated PDF electronic file with comment function enabled.
4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
5. Refer instances of uncertainty to the County for resolution.
6. The County will furnish Contractor one set of digital data files (at the end of the work) of the Contract Drawings for use in recording information.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of the County.
    e. County Project Number.
    f. Name of Contractor.

2.2 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file and paper copy.

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2.3 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file(s) and paper copies of marked-up miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for the County's reference during normal working hours.

End of Section 017839

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SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training video recordings.

1.2 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
   1. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc or similar digital storage device.

1.3 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.4 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the County.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

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B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
   1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
      a. System, subsystem, and equipment descriptions.
      b. Performance and design criteria if Contractor is delegated design responsibility.
      c. Operating standards.
      d. Regulatory requirements.
      e. Equipment function.
      f. Operating characteristics.
      g. Limiting conditions.
      h. Performance curves.
   2. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Operations manuals.
      c. Maintenance manuals.
      d. Project record documents.
      e. Identification systems.
      f. Warranties and bonds.
      g. Maintenance service agreements and similar continuing commitments.
   3. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   4. Operations: Include the following, as applicable:
      a. Startup procedures.
      b. Equipment or system break-in procedures.
      c. Routine and normal operating instructions.
      d. Regulation and control procedures.
      e. Control sequences.
      f. Safety procedures.
      g. Instructions on stopping.
      h. Normal shutdown instructions.
      i. Operating procedures for emergencies.
      j. Operating procedures for system, subsystem, or equipment failure.
      k. Seasonal and weekend operating instructions.
      l. Required sequences for electric or electronic systems.
      m. Special operating instructions and procedures.
   5. Adjustments: Include the following:
      a. Alignments.
      b. Checking adjustments.
      c. Noise and vibration adjustments.
      d. Economy and efficiency adjustments.

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6. Troubleshooting: Include the following:
    a. Diagnostic instructions.
    b. Test and inspection procedures.
7. Maintenance: Include the following:
    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.
8. Repairs: Include the following:
    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
    1. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
    1. Schedule training with Owner with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

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3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Owner.

C. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

End of Section 017900

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SECTION 02200 - BUILDING EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is complimentary to the Civil Drawings and associated sheet specifications.
   1. Any conflicts are to be reported to the Project Civil Engineer for interpretation.

B. This Section includes the following:
   1. Preparing subgrades for footings and slabs-on-grade within the building footprint.
   2. Excavating and backfilling for buildings and structures.
   3. Drainage course for slabs-on-grade.
   4. Excavating and backfilling for utility trenches within the building footprint.
   5. The requirements of this section shall be used in conjunction with the geotechnical report.
   6. Removal of unsuitable soils and replaced with structural fill.

1.2 DEFINITIONS

A. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

B. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

C. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

D. Unsuitable Soils: Silt and/or clay material that is moisture sensitive.

E. Clean Granular Fill:
   1. 8” of material to be used below slabs-on-grade.
   2. 12” minimum of material to be used below exterior aprons.

F. Structural Fill:
   1. Material to be used at locations of unsuitable soils below slabs-on-grade and footings.
   2. Material to be used as backfill against unbalanced foundation/retaining walls.

1.3 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by the County and then only after arranging to provide temporary utility services according to requirements indicated.

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PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils
1. Clean Granular Fill.
2. Structural Fill.

TABLE A

Note: Table to be utilized in conjunction with Geo-technical Report.

Percent Fines By Weight		
Sieve Size	**Clean Granular Fill**	**Structural Fill**
5”	---	100
3”	100	---
¾”	60 – 90	60 – 100
No. 4	30 – 65	20 – 75
No. 200	2 – 8	0 – 10

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

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3.2 EXCAVATION

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1 If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1 Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.4 EXCAVATION FOR UTILITY TRENCHES WITHIN THE BUILDING FOOTPRINT

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.

1 Clearance: 12 inches (300 mm) each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1 Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.

3.5 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and footings with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the County, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation

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of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when Approved by the County.

1. Fill unauthorized excavations under other construction or utility pipe as directed by the County.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 UTILITY TRENCH BACKFILL WITHIN THE BUILDING FOOTPRINT

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section "Cast-in-Place Concrete."

D. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.

E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

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3.9 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.10 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 10-12 inches (250-300 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches (150 mm) in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under structures, building slabs, footings, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
   2. For utility trenches within the building footprint, compact each layer of initial and final backfill soil material at 95 percent.

3.11 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Grading Within Building Footprint: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: General contractor shall engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing. The testing agency shall submit a field report to the engineer of record and the local building inspector for each inspection performed.
   1. A testing agency is to perform periodic site visits and submit a field report to the structural engineer of report and the local building inspector.
   2. A testing agency is to submit a report detailing the testing of the moisture content and the compaction of the structural fill from each lift placement.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with

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subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by the County.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.13 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 022000

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SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Exterior and Interior non-load-bearing wall framing.
   2. Ceiling joist framing.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: As follows:
      a. Dead Loads: Weights of materials and construction – See Architectural Drawings.
      b. Wind Loads: As per Missouri State Building Code (Current Edition).
      c. Seismic Loads: Missouri State Building Code (Current Edition).
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Wall Framing: Horizontal deflection of 1/360 of the wall height.
      b. Interior Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft.
      c. Ceiling Joist Framing: Vertical deflection of 1/240 of the joist span.
   3. Structural engineer responsible for the design of the cold-formed metal framing must engineer the necessary design of the exterior wall diaphragm – See Architectural Drawings for exterior wall construction.

1.3 SUBMITTALS

A. Product Data: For each type of product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
   1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer registered in the State of Missouri responsible for their preparation.

C. Welding certificates.

D. Qualification data.

E. Product test reports.

F. Research/evaluation reports.

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1.4 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.

B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."

C. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
   1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
   2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

E. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: ST33H
   2. Coating: G60

2.2 EXTERIOR WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 18 gage for 6" studs, 14 gage for 8” studs (up to 27’ in height), 14 gage for 10” studs (up to 27’ in height), and 18gage for 10” (up to 13’ in height).
   2. Flange Width: 1-5/8 inches.
   3. Depth: Varies, 6 inches up to 10 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: to match steel stud thickness.
   2. Flange Width: 1-5/8 inches.

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3. Depth: Match wall stud depth.

2.3 INTERIOR WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 20 gage.
   2. Flange Width: 1-5/8 inches.
   3. Depth: 3 5/8 inches minimum (brace as required above ceiling for full height walls).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and same minimum base-metal thickness as steel studs.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: to match steel stud thickness.
   2. Flange Width: 1-5/8 inches.
   3. Depth: Match wall stud depth.

2.4 CEILING JOIST FRAMING

A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 20 gage minimum (20 gage for 10” ceilings joists over vestibule).
   2. Flange Width: 1-5/8 inches.
   3. Depth: Varies, 3-5/8 inches minimum (10” over vestibule).

B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: to match steel stud thickness.
   2. Flange Width: 1-5/8 inches.
   3. Depth: Match joist depth.

2.5 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members, unless otherwise indicated.

B. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

C. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

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D. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

E. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

F. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

C. Install framing members in one-piece lengths.

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D. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

F. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

H. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
1. Anchor Spacing: To match stud spacing.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
1. Stud Spacing: 16 inches maximum.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

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G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
   1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
   2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

   1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced 48 inches (1220 mm). Fasten at each stud intersection.
   1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
   2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud- track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 CEILING JOIST FRAMING INSTALLATION

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Contract Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
   1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
   2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
   1. Joist Spacing: 16 inches.

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D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.

E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.
   1. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at intervals indicated **on** Contract Drawings. Fasten bridging at each joist intersection as follows:
   1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
   2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and joist- track solid blocking of width and thickness indicated. Fasten flat straps to bottom flange of joists and secure solid blocking to joist webs.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and the County.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold- formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

End of Section 054000

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Miscellaneous interior galvanized and/or primed steel framing and supports as indicated or required for the completion of this construction project.
   2. Galvanized steel surgery light support assemblies as indicated on Drawings.

B. This specification section may supplement specification and drawing information indicated on Structural Engineering Documents. If discrepancies between this Specification Section, Architectural Drawings and Structural Documents exist, indications on the Structural Documents shall govern.

1.2 ACTION SUBMITTALS

A. Shop Drawings: Project specific fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications. Show anchorage, support and accessory items.
   1. Delegated-Design Submittal: For fabrications where required by authorities having jurisdiction:
      a. Include structural analysis signed and sealed by the qualified professional Engineer responsible for their preparation.

1.3 DELIVERY, HANDLING & STORAGE

A. Protect products, fabrications and finishes from damage during delivery and storage. Store as required by manufacturer and/or fabricator to protect finishes. Do not install damaged products, fabrications or finishes. Replace damaged materials.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Where required by authorities having jurisdiction and not designed by the Project Structural Engineer, engage a qualified professional engineer to design fabrications.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Metals: Provide sizes weights, shapes and fabrications as indicated and required for applications:
   1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

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2. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
3. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
4. Aluminum Extrusions: ASTM B 221, (ASTM B221M) Alloy 6063-T6 unless otherwise specified.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use or zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, Select fasteners for type, grade, and class required for applications and structural loads.
   1. Provide stainless-steel fasteners for fastening aluminum.
   2. Provide stainless-steel fasteners for fastening stainless steel.
   3. Provide galvanized steel fasteners for galvanized steel or galvalume.

B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47Mmalleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Locations and Where Stainless Steel Is Indicated: Alloy Group 1 or Group 2 stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FERROUS METAL FINISHES

A. Shop-finish metal fabrications after assembly. Where field assembly or field welding is required, touch up welds and/or fasteners with specified galvanized or painted coating.

B. Unless indicated to be galvanized, provide shop priming and field finish painting as specified in Section 099123 “Painting”.

2.6 GALVANIZING

A. Shop Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

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2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Where wood nailers are attached to structural steel with bolts or lag screws, drill or punch holes at 24 inches (600 mm) oc., as indicated, or required by loads imposed.

2.8 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) oc.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

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2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.
1. Confirm that receiving substrates meet structural requirements prior to installation.
2. Prior to installation, contact the County if exposed substrates do not meet requirements.
3. Install fasteners in locations and patterns indicated on final reviewed Shop Drawings.
4. Allow for thermal expansion.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

B. Finished Assemblies and Surfaces: Clean, adjust and protect from damage.

END OF SECTION 055000

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SECTION 055213 – METAL PIPE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe railings.

B. Related Requirements:

1. Section 055113 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Steel Pipe and Tube Railings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Chicago Metal Rolled Products. Co.

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b. Builders Stair Supply, Inc.
c. Foreman Fabricators, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill of Guards:
a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

2.3 METALS, GENERAL

A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.

2.4 STEEL AND IRON

A. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

B. Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.5 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.

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B. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting.

E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

F. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

G. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

H. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.

I. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.

J. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.7 FABRICATION

A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

B. Form work true to line and level with accurate angles and surfaces.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

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1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

D. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

E. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

F. Form changes in direction by bending or by inserting prefabricated elbow fittings.

G. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

H. Close exposed ends of railing members with prefabricated end fittings.

I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

2.8 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior indicated steel railings, including hardware, after fabrication.
2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
3. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.

B. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
1. Do not apply primer to galvanized surfaces.

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PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
   1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with [nonshrink, nonmetallic grout] [or] [anchoring cement], mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

3.3 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:

   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.
   3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.

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4. For steel-framed partitions, use hanger or lag bolts set into [fire-retardant-treated]wood backing between studs. Coordinate with stud installation to locate backing members.
5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055213

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes Base Contract Work:
   1. Concealed wood blocking and nailers where required for equipment installation.
   2. Plywood backing panels.
   3. Preservative-treated, (PT) dimensional lumber where indicated or required by AHJ.
   4. Fire retardant wood where specified and required by AHJ.
   5. Framing connectors as specified in this Section, or as required for Work.

B. Related Requirements:

   1. Section 064113 “Plastic Laminate Faced Architectural Cabinets” for requirements for wood support blocking.
   2. Section 102800 “Toilet, Bath and Laundry Accessories” for accessories requiring concealed blocking.
   3. Section 104416 “Fire Extinguishers” for mounting brackets requiring concealed blocking.
   4. Section 117990 “Veterinary Office Equipment” for associated equipment anti-tip devices and wall anchorage.

C. This specification section supplements specification and drawing information indicated on Structural Engineering Documents. If discrepancies between this Specification Section, Architectural Drawings and Structural Documents exist, indications on the Structural Documents shall govern.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

1.3 HANDLING AND STORAGE

A. Handle and lift wood products as indicated on bulk packaging. Store as indicated and required by manufacturer, up of the ground and keep covered from moisture until time of use.

B. Protect from theft and damage.

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PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or if allowed by authorities, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent, unless otherwise indicated.

C. Provide sizes and dimensions indicated or if not indicated, as required for span, load conditions.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER – (PT)

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following, where applicable:

1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with equipment.
2. Wood plates that are installed over concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated and/or required by AHJ., use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

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B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
   2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not required.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment, to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following, where applicable:

   1. Plywood backing panels.
   2. Framing or blocking; where required as a component of a fire resistant rated assembly.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

   1. Blocking.
   2. Nailers.

B. Provide treated lumber where indicated and/or required by project conditions or authorities having jurisdiction.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

   1. Where rough carpentry is in contact with pressure-preservative treated, fire retardant treated or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

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B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

D. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.7 METAL FRAMING CONNECTORS

A. Provide types gages and configurations as indicated on drawings or required by conditions.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
   1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

   1. Use for wood-preservative-treated lumber and where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

D. Metal Framing Connectors: Install metal framing connectors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking or other metal surfaces, install continuous flexible flashing separator between wood and substrates.

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H. Where non-wood-preservative-treated wood, including any engineered lumber or rim joists, is installed on or against concrete, provide a waterproof separation barrier approved by the County.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

3.2 PLYWOOD BACKING PANEL INSTALLATION

A. Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Do not use materials with defects that impair quality of the plywood or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

D. Securely attach to substrate by fastening as indicated or in compliance with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.

3.3 PROTECTION

A. Protect rough carpentry from weather where indicated to be concealed. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified limits, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

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SECTION 061516 - WOOD ROOF DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes solid-sawn and glued-laminated wood roof decking

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
   1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each regional material.
   2. Environmental Product Declaration: For each product.
   3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   4. Product Data: For laminating adhesives, indicating that product contains no urea formaldehyde.

1.3 INFORMATIONAL SUBMITTALS

A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

PART 2 - PRODUCTS

2.1 WOOD ROOF DECKING, GENERAL

A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Regional Materials: Wood products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site. If materials are transported by rail or water, the distance transported by rail or water shall be multiplied by 0.25 to determine the distance to Project site.

C. Certified Wood: Wood products shall be made from certified wood tracked through a chain-of-custody process. Certified wood documentation shall be provided by sources certified through a forest certification system with principles, criteria, and standards developed using

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ISO/IEC Guide 59 or the World Trade Organization's "WTO Agreement on Technical Barriers to Trade."

2.2 GLUED-LAMINATED WOOD ROOF DECKING (BASIS OF DESIGN)

A. Manufacturers:
   1. Boise Cascade Corp.
   2. Disdero Lumber company
   3. Timberweld
   4. Universal Forest Products, Inc.
   5. Unit Structures, LLC
   6. Or equal and approved

B. Face Species: Douglas fir-larch or Douglas fir-larch (North), Southern pine.

C. Roof Decking Nominal Size: 2 by 6.

D. Face Grade: Custom or Supreme: Clear face is required. Occasional pieces may contain a small knot or minor characteristic that does not detract from the overall appearance.

E. Face Grade: Decorative: Sound knots and natural characteristics are allowed, including chipped edge knots, short end splits, seasoning checks, and some pin holes. Face knot holes, stains, end slits, skips, roller splits, and planer burns are not allowed.

F. Face Grade: Service: Face knot holes, stains, end splits, skips, roller splits, planer burns, and other non-strength-reducing characteristics are allowed. Strength-reducing characteristics are not allowed.

G. Moisture Content: Provide wood roof decking with 15 percent maximum moisture content at time of dressing.

H. Face Surface: Smooth.

I. Edge Pattern: Beaded edge.

J. Laminating Adhesive: Wet-use type complying with ASTM D 2559.
   1. Adhesives: Do not use adhesives that contain urea formaldehyde.

2.3 SOLID-SAWN WOOD ROOF DECKING (ALTERNATE)

A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.

B. Roof Decking Species: Balsam fir, Douglas fir-larch, Douglas fir-larch (North), hem-fir, hem-fir (North), southern pine, spruce pine-fir (North), western hemlock, or western hemlock (North).

C. Roof Decking Species: Douglas fir-larch or Douglas fir-larch (North), Eastern spruce or Southern pine.

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D. Roof Decking Nominal Size: 2 by 6 (2 S2S CM EV1S Decking).

E. Roof Decking Grade: Select(ed) Decking or Select Dex

F. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.

G. Moisture Content: Provide wood roof decking with [15] [19] percent maximum moisture content at time of dressing.

H. Face Surface: Smooth.

I. Edge Pattern: Beaded edge.

2.4 ACCESSORY MATERIALS

A. Fastener Material: Hot-dip galvanized steel.

B. Sealants: Latex, complying with applicable requirements in Section 079200 "Joint Sealants" and recommended by sealant manufacturer and manufacturer of substrates for intended application.
   1. Manufacturers:
      a. Bostik, Inc.
      b. Pecora Corporation
      c. Tremco Incorporated
      d. Or equal and approved.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install solid-sawn wood roof decking to comply with AITC 112.
   1. Locate end joints for combination simple and two-span continuous lay-up.

B. Install laminated wood roof decking to comply with manufacturer's written instructions.

   1. Locate end joints for combination simple and two-span continuous lay-up.
   2. Nail each course of glued-laminated wood roof decking at each support with one nail slant nailed above the tongue and one nail straight nailed through the face.
      a. Use 12d nails for 2-by-6 and 2-by-8 roof decking.

   3. Slant nail each course of glued-laminated wood roof decking to the tongue of the adjacent course at 30 inches (750 mm) o.c. and within 12 inches (300 mm) of the end of each unit. Stagger nailing 15 inches (380 mm) in adjacent courses.
      a. Use 16d nails for 5-by-6 and 5-by-8 roof decking.

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C. Anchor wood roof decking, where supported on walls, with bolts as indicated.

D. Apply joint sealant to seal roof decking at exterior walls at the following locations:
   1. Between tongues and grooves of roof decking over exterior walls and supports at exterior walls.

3.2 PROTECTION

A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

END OF SECTION 061516

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Combination wall sheathing, water resistive barrier and air barrier..
2. Combination roof sheathing and roof underlayment.
3. Self-adhering flexible flashing.

B. Related Requirements:
1. Section 061000 "Rough Carpentry".
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.
3. Section 072700 "Air Barriers".

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. For panels with integral water resistive barrier, include data on air/-moisture-infiltration protection based on testing according to referencing standards.
2. Alternate / Permitted substitution: Reference Section 072113 Continuous Insulation Wall Panels

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Capable of demonstrating that all wood procurement operations are conducted in accordance with procedures and policies of the Sustainable Forestry Initiative (SFI) Program.

B. Code Compliance: Comply with requirements of the following:
1. International Code Council (ICC), ICC-ESR1473 (ZIP System Roof Sheathing).
2. International Code Council (ICC), ICC-ESR1474 (ZIP System Wall Sheathing).
3. International Code Council (ICC), ICC-ESR2227 (ZIP System Tape).

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4. Florida Building Code Compliance: Provide sheathing complying with Florida Building Code product and installation requirements for locations outside of high velocity wind zone.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Outdoor Storage: Comply with manufacturer's recommendations.
   1. Set panel bundles on supports to keep off ground.
   2. Cover panels loosely with waterproof protective material.
   3. Anchor covers on top of stack, but keep away from sides and bottom to assure adequate air circulation.
   4. When high moisture conditions exist, cut banding on panel stack to prevent edge damage.

1.6 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of sheathing system that fail due to manufacturing defects within specified warranty period.
   1. Construction Period Warranty: Manufacturer shall warrant the panels and tape for weather exposure for a period of 180 days from installation.
   2. System Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory.”

2.2 WOOD PANEL PRODUCTS

A. Oriented Strand Board: DOC PS 2-10.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated. Thickness shall satisfy minimum and maximum requirements for referenced performance category.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 COMBINATION WALL SHEATHING, WATER-RESISTIVE BARRIER, AND AIR BARRIER

A. Oriented-Strand-Board Wall Sheathing: With integral water-resistive barrier, Exposure 1 sheathing.

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1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System Roof and Wall Sheathing or a comparable product
2. Span Rating, Panel Grade and Performance Category: Not less than 40/20 Structural 1; 5/8 Performance Category.
3. Edge Profile: Square edge.
4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-inches (406 mm) and 24-inches (610 mm) on centers spacings.
5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1474.
6. Factory laminated integral water-resistive barrier facer.
7. Perm Rating of Integral Water-Resistive Barrier: 12-16 perms.
8. Assembly maximum air leakage of 0.0072 cfm/sq. ft. (0.037 L/s x sq. m) infiltration and 0.0023 cfm/ sq. ft. (0.012 L/s x sq. m)exfiltration at a pressure differential of 1.57 (psf 75 Pa).
9. Exposure Time: Designed to resist weather exposure for 180 days.

2.4 COMBINATION ROOF SHEATHING AND ROOF UNDERLAYMENT

A. Oriented-Strand-Board Roof Sheathing: With integral water-resistive barrier, Exposure 1, Structural I sheathing.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Huber Engineered Woods LLC; ZIP System Roof and Wall Sheathing or a comparable product.
   2. Span Rating, Panel Grade and Performance Category: Not less than 40/20; Structural 1; 5/8 Performance Category.
   3. Edge Profile: Tongue and groove.
   4. Provide fastening guide on top panel surface with pre-spaced fastening symbols for 16-inches (406 mm) and 24-inches (610 mm) on center spacings.
   5. Performance Standard: DOC PS2-10 and ICC-ES ESR-1473.
   6. Factory laminated integral roofing underlayment facer.
   7. Exposure Time: Designed to resist weather exposure for 180 days.

B. Panel Edge Clips: Provide panel edge clips approved for application in accordance with code approvals and panel manufacturer's written instructions.

2.5 FASTENERS

A. General: Provide fasteners of size and type that comply with requirements specified in this article by the authority having jurisdiction, International Building Code, International Residential Code, Wood Frame Construction manual, and National Design Specification.

2.6 MISCELLANEOUS MATERIALS

A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, proprietary seam tape consisting of polyolefin film with acrylic adhesive.
   1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System Seam and Flashing Tape or a comparable product.

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2. Thickness: 0.012 inch (0.3 mm).
3. Width: 6 inch (152.4 mm).
4. Code Compliance: Comply with requirements of authorities having jurisdiction and ICC Evaluation Service, Inc. "AC148 - Acceptance Criteria for Flexible Flashing Materials."
5. International Code Council (ICC), ICC-ES ESR2227 (ZIP System Tape).
6. American Architectural Manufacturer's Association; AAMA 711.

B. Huber' ZIP System Liquid Flash works in conjunction with or in place of ZIP System Tape to permanently flash and seal building penetrations and panel seams.

C. Liquid-Applied Flashing Membrane: Gun-grade, cold-applied, silyl-terminated polyether (STPE) liquid flashing membrane compatible with sheathing/weather barrier and self-adhering seam and flashing tape, and tested as part of an assembly meeting performance requirements. Follow manufacturer's recommendation for integration with ZIP System Tape.
1. Basis-of-Design Product: Subject to compliance with requirements provide Huber Engineered Woods; ZIP System Liquid Flash or a comparable product..
2. Hardness, Shore A, ASTM C 661: 40 to 45
3. Total Solids: 99 percent
4. Tensile Strength, ASTM D412: 75 psi (517 kPa)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:
1. ICC-ES 1539 or NES NER-272 for power-driven fasteners.
2. Chapter 23 in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

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3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in American Wood Council, "ASD/LRFD Manual for Engineered Wood Construction," 2012 edition for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:
   1. Wall and Roof Sheathing:
      a. Nail or staple to wood framing.
      b. Screw to cold-formed metal framing.
      c. Space panels 1/8 inch (3 mm) apart at edges and ends.
      d. Install fasteners 3/8 inch (9.5 mm) to 1/2 inch (12.7 mm) from panel edges.
      e. Space fasteners in compliance with requirements of authority having jurisdiction.

3.3 SHEATHING JOINT TREATMENT

A. Seal sheathing joints according to sheathing manufacturer's written instructions.
   1. Apply ZIP System proprietary seam tape to joints between sheathing panels.
   2. Utilize ZIP System tape gun or hard rubber roller provided by manufacturer to ensure tape is completely adhered to substrates.
   3. When using ZIP System Liquid Flash to seal sheathing joints, follow manufacturer's recommendations for sealing panel seams.

3.4 FLEXIBLE OR LIQUID APPLILED FLASHING INSTALLATION

A. Apply ZIP System Tape flexible flashing or ZIP System Liquid Flash liquid applied flashing membrane where indicated to comply with manufacturer's written instructions.
   1. After flexible flashing tape has been applied, roll surfaces with a hard rubber to ensure that flashing is completely adhered to substrates.
   2. Width for Flexible Flashing: 6 inch (154.4 mm).
   3. Apply liquid-applied flashing membrane at penetrations, gaps, and cracks to form continuous weathertight surface. Apply liquid membrane according to manufacturer's written instructions. Follow manufacturer's recommendation for integration with ZIP System Tape.

END OF SECTION 061600

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SECTION 061753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood floor trusses.

1.2 ALLOWANCES

A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

1.3 ACTION SUBMITTALS

A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

B. Evaluation Reports: For the following, from ICC-ES:

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1. Metal-plate connectors.
2. Metal truss accessories.

1.5 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to the County and authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

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1. Provide dry lumber with 15 percent maximum moisture content at time of dressing.

B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 METAL CONNECTOR PLATES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:

1. Alpine Engineered Products, Inc.; a division of ITW Building Components Group, Inc.
2. Cherokee Metal Products, Inc.; Masengill Machinery Company.
3. CompuTrus, Inc.
4. Eagle Metal Products.
5. Jager Building Systems, Inc.
6. MiTek Industries, Inc.
7. Robbins Engineering, Inc.

B. General: Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

2.5 METAL FRAMING ANCHORS AND ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.

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B. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

2.6 FABRICATION

A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

F. Securely connect each truss ply required for forming built-up girder trusses.

G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing to comply with Section 061000 "Rough Carpentry."

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2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

H. Install wood trusses within installation tolerances in TPI 1.

I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

J. Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION 061753

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SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior wood and primed hardboard trim.

1.2 DEFINITIONS

A. MDO: Plywood with a medium-density overlay on the face.

B. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

B. Samples: For each exposed product and for each color and texture specified.

1.4 WARRANTY

A. Manufacturer's Warranty for Hardboard Siding Soffits and Trim: Manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Factory-Applied Finish: Five years from date of Substantial Completion.
2. Warranty Period for Siding Soffits and Trim (Excluding Finish): 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

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1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
2. For exposed lumber, mark grade stamp on end or back of each piece.

B. Softwood Plywood: DOC PS 1.

C. Hardboard: ANSI A135.4.

2.2 EXTERIOR TRIM

A. Lumber Trim for Unfinished Applications:
1. Species and Grade: Hem-fir; pressure-preservative treated; NLGA, WCLIB, or WWPA 1 Common.
2. Species and Grade: Southern pine; pressure-preservative treated; SPIB C & Btr.
3. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
4. Finger Jointing: Not allowed.
5. Face Surface: Surfaced (smooth).

B. Lumber Trim for Painted Finish:
1. Species and Grade: Hem-fir; NLGA, WCLIB, or WWPA Prime or D finish.
2. Species and Grade: Eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NeLMA, NLGA, WCLIB, or WWPA D Select (Quality).
3. Species and Grade: Northern white cedar; NeLMA or NLGA D Select.
4. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
5. Finger Jointing: Not allowed.
6. Face Surface: Surfaced (smooth).
7. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.

C. Moldings for Unfinished Applications: MMPA WM 4, N-grade wood moldings, without finger jointing, made from kiln-dried stock to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
2. Pattern: Match existing molding.

D. Moldings for Painted Finish: MMPA WM 4, P-grade wood moldings, made from kiln-dried stock to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
2. Finger Jointing: Not allowed.
3. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.
4. Pattern: Match existing molding.

E. MDO Trim: Exterior Grade B-B MDO plywood.

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F. Primed Hardboard Trim: ANSI A135.6, primed with manufacturer's standard exterior primer. Recommended by manufacturer for exterior use.

2.3 LUMBER SOFFITS

A. Provide kiln-dried lumber siding complying with DOC PS 20.

B. Species and Grade: Spruce-pine-fir; NeLMA, NLGA, WCLIB, or WWPA 1 Common.

C. Species and Grade: Hem-fir; NLGA, WCLIB, or WWPA Prime or D finish.

D. Species and Grade: Eastern white pine, eastern hemlock-balsam fir-tamarack, eastern spruce, or white woods; NeLMA, NLGA, WCLIB, or WWPA D Select (Quality).

E. Species and Grade: Southern pine; SPIB C & Btr.

F. Pattern: To match existing.

2.4 PLYWOOD SOFFITS

A. Where indicated on drawings.

B. Manufacturers:
1. Georgia Pacific Gypsum LLC or equal and approved.

C. Plywood Type: Exterior, Grade A-C.

1. Face Grade: 303-OC.
2. Face Grade: 303-6 W.

D. Thickness: As indicated.

E. Face Species: Southern pine or Douglas fir.

F. Pattern: Plain.

G. Surface: Smooth.

2.5 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

1. For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails unless otherwise indicated.
2. For pressure-preservative-treated wood, provide stainless steel or hot-dip galvanized-steel fasteners.

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3. For applications not otherwise indicated, provide stainless steel orhot-dip galvanized-steel fasteners.

B. Flashing: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

C. Insect Screening for Soffit Vents: Aluminum, 18-by-16-inch (1.6-by-1.4-mm) black mesh.

D. Continuous Soffit Vents: Aluminum hat channel shape with perforations, 2 inches (51 mm) wide and in lengths not less than 96 inches (2438 mm).

1. Net-Free Area: sq. in./linear ft. (280 sq. cm/m).
2. Finish: White paint.

E. Sealants: Latex, complying with ASTM C 834 [Type OP, Grade NF] <Insert type and grade> and applicable requirements in Section 079200 "Joint Sealants," and recommended by sealant and substrate manufacturers for intended application.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.

1. Cut to required lengths and prime ends.
2. Comply with requirements in Section 099113 "Exterior Painting."

3.2 INSTALLATION, GENERAL

A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut exterior finish carpentry to fit adjoining work.
3. Refinish and seal cuts as recommended by manufacturer.
4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

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3.3 STANDING AND RUNNING TRIM INSTALLATION

A. Install flat-grain lumber with bark side exposed to weather.

B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary.

1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

C. Fit exterior joints to exclude water.

1. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint.
2. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

END OF SECTION 062013

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SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim.
2. Shelving and clothes rods.

1.2 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. MDO: Plywood with a medium-density overlay on the face.

C. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber, mark grade stamp on end or back of each piece.

B. Softwood Plywood: DOC PS 1.

C. MDF: ANSI A208.2, Grade 130.

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D. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: As selected by the County from manufacturer's full range.

2.2 INTERIOR TRIM

A. Lumber Trim for Opaque Finish (Painted Finish):

1. Species and Grade: Eastern white pine; NeLMA or NLGA D Select.
2. Species and Grade: Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NLGA or WWPA D Select (Quality).
3. Species and Grade: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA D Select (Quality).
4. Species and Grade: Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPA Superior or C & Btr finish.
5. Species and Grade: Spruce-pine-fir; NeLMA, NLGA, WCLIB, or WWPA 1 Common.
6. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
7. Finger Jointing: Not allowed.
8. Face Surface: Surfaced (smooth).
9. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

B. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."

1. Softwood Moldings: MMPA WM 4, P grade.

   a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
   b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.

2. Finger Jointing: Not allowed.
3. Optional Material: Primed MDF.
4. Base Pattern: As indicated on drawings.

2.3 SHELVING AND CLOTHES RODS

A. Exposed, Closet, Utility Shelving: Made from one of the following materials, 3/4 inch (19 mm) thick:
1. MDF with radiused or solid-wood front edge.
2. MDO softwood plywood with solid-wood edge.
3. Melamine-faced particleboard with applied-PVC front edge.
4. Wood boards as specified above for lumber trim for opaque finish.

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B. Shelf Cleats: 3/4-by-5-1/2-inch (19-by-140-mm) boards with hole and notch to receive clothes rods, as specified above for shelving, lumber trim for opaque finish.

C. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.

D. Adjustable Shelf Brackets: BHMA A156.9, B04112; natural aluminum.

E. Standards for Adjustable Shelf Supports: BHMA A156.9, B04071; powder-coat-finished steel.

F. Adjustable Shelf Supports: BHMA A156.9, B04081 or B04091; powder-coat-finished steel.

G. Clothes Rods: 1-1/2-inch- (38-mm-) diameter, clear, kiln-dried hardwood.

H. Clothes Rods: 1-5/16-inch- (33-mm-) diameter, aluminum tubes.

I. Rod Flanges: Clear, kiln-dried, Douglas fir or southern pine or eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine with clear finish.

J. Rod Flanges: Aluminum.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Low-Emitting Materials: Adhesives shall comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

D. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.

E. Multipurpose Construction Adhesive: Formulation, complying with ASTM D 3498, that is recommended for indicated use by adhesive manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

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3.2 INSTALLATION, GENERAL

A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.
2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.3 STANDING AND RUNNING TRIM INSTALLATION

A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than 24 inches (610 mm) long, except where necessary.
2. Stagger joints in adjacent and related standing and running trim.
3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints.
7. Install trim after gypsum-board joint finishing operations are completed.
8. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
9. Fasten to prevent movement or warping.
10. Countersink fastener heads on exposed carpentry work and fill holes.

3.4 PANELING INSTALLATION

A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.

1. Leave 1/4-inch (6-mm) gap to be covered with trim at top, bottom, and openings.
2. Install with uniform tight joints between panels.
3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.
4. Space fasteners and adhesive as recommended by panel manufacturer.
5. Conceal fasteners to greatest practical extent.

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6. Arrange panels with grooves and joints over supports.

    a. Fasten to supports with nails of type and at spacing recommended by panel manufacturer.
    b. Use fasteners with prefinished heads matching groove color.

3.5 SHELVING AND CLOTHES ROD INSTALLATION

A. Cut shelf cleats at ends of shelves about 1/2 inch (13 mm) less than width of shelves and sand exposed ends smooth.

    1. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled.
    2. Space fasteners not more than Use two fasteners at each framing member or fastener location for cleats 4 inches nominal (89 mm actual) in width and wider.
    3. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing.
    4. Remove adhesive that is squeezed out after fastening shelf cleats in place.

B. Install shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches (900 mm) o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

C. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners not more than 12 inches (300 mm) o.c.

D. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches (900 mm) o.c. and within 6 inches (150 mm) of ends of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

E. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled.

    1. Install shelves, fully seated on cleats, brackets, and supports.
    2. Fasten shelves to cleats with finish nails or trim screws, set flush.
    3. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

F. Install rod flanges for rods as indicated.

    1. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
    2. Install rods in rod flanges.

END OF SECTION 062023

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SECTION 064116 – PLASTIC LAMINATE FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Plastic laminate, (P-Lam), faced architectural cabinets where indicated and scheduled on drawings.
2. Accessory supports and fittings for plastic laminate countertops and solid surfacing fabrications as indicated on drawings.
3. Interior plastic laminate window sills.
4. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.
5. Cabinet hardware.

B. Related Requirements:
1. Section 081416 "Flush Wood Doors" for matching Work of this Section to plastic laminate door faces.
2. Section 123623 "Plastic Laminate Countertops" for plastic laminate tops, countertops and splashes.
3. Section 123661 “Solid Surface Fabrications” for the reception desk tops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products, low pressure melamine decorative laminate, high-pressure decorative laminate, adhesive, ASB edging, solid surfacing and all cabinet hardware and accessories.

B. Shop Drawings: Indicate project specific locations, dimensions, details, plans and elevations of each cabinet, shelf, base, top, countertop metal supports and hardware and other component.
1. Indicate all hardware and attachment devices.

C. Verification Samples:
1. Plastic laminates, for each selected color, pattern, and surface finish.
2. Thermoset decorative panels, for selected color, pattern, and surface finish.
3. ABS edging.

1.3 INFORMATIONAL SUBMITTALS

A. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates or WI Certified Compliance Program certificates.

B. Manufacturer’s standard product warranty where offered.

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1.4 WARRANTY

A. Manufacturer's standard product warranty where offered.
   1. Manufacturer's Warranties shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Certified participant in AWI's Quality Certification Program or Licensee of WI's Certified Compliance Program.

B. Installer Qualifications: Fabricator of products: Certified participant in AWI's Quality Certification Program or Licensee of WI's Certified Compliance Program.

C. Single Source: Provide all architectural cabinetry work from a single Fabricator / Installer.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
   1. Provide labels and certificates from AWI or WI certification program indicating that woodwork, including installation, complies with requirements of grades specified.

B. Grade: Custom, (or better).

C. Type of Construction: Frameless, unless otherwise indicated as Face Frame.

D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

E. Reveal Dimension: 1/8 inch typically, unless otherwise indicated.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

G. Laminate Cladding for Exposed Surfaces:
   1. Horizontal Surfaces: Grade HGL.
   2. Vertical Surfaces: Grade HGS or Grade VGS.
   3. Pattern Direction: Vertically for doors, fixed panels and drawer fronts.

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H. Materials for Semi-exposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Thermoset decorative low pressure laminate panels, (Melamine), or compatible wood species to that indicated for exposed surfaces, finish to match exposewd surfaces.
2. Drawer Sub-fronts, Backs, and Sides: Thermoset decorative low pressure laminate panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative low pressure laminate panels.

I. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Formica Corporation.
2. Wilson Arts International Holdings.
3. Or Equal and Approved.

J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. Up to 4 (four) colors and/or patterns selected by the County from laminate manufacturer's full range.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: Conform to AWS requirements.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
3. Softwood Plywood: DOC PS 1, medium-density overlay.
4. Marine Plywood: DOC PS 1 marine grade plywood.
5. Flexible / Bendable Plywood: For curved surfaces, of thickness required to achieve a smooth curved face veneer.
6. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
a. Color selected by the County from manufacturer’s standard colors.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, cushioned self-closing.

C. Wire Pulls: Back mounted, solid metal, satin stainless steel BHMA 654 finish, 4 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.

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D. Catches: Magnetic catches, BHMA A156.9, where indicated or required for door closure.

E. Shelf Rests:
1. Solid Shelves: Signature Components; Right angle type, 1/4 inch (6.35 mm) pin with hole, Chrome.

F. Glass Shelves, if any indicated: C.R. Lawrence: CLR #GSR600CH, 1/4 inch (6.35 mm) pin Chrome.

G. Drawer Slide: KV 8417; self-closing; full extension; ball bearing; side mounted or approved equal.

H. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

I. Pull-Out Shelf Inserts For Blind Cabinets:
1. Basis of Design Product: Hafele Majic Corner I, for Blind Cabinets Model 446.17.9 Steel, left or right as required for conditions.

J. Door Locks: BHMA A156.11, E07121.

K. Drawer Locks: BHMA A156.11, E07041.

L. Door and Drawer Silencers: BHMA A156.16, L03011.

M. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3.
1. Provide thickness indicated.

N. Exposed Hardware and Metal Component Finishes: Unless otherwise indicated above, for exposed hardware and metal components, provide finish that complies with BHMA A156.18 for BHMA finish number indicated below:
1. Satin Stainless Steel: BHMA 654.

2.4 MISCELLANEOUS MATERIALS

A. Accessory Supports and Fittings: Provide custom fabricated Type 303 or 304 brushed stainless steel supports and fittings.
1. Grind all welds prior to finishing.

B. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber or Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

D. Adhesives: Do not use adhesives that contain urea formaldehyde.

2.5 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

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B. Fabricate components with marine grade plywood where indicated on the Architectural Drawings.

C. Unless otherwise dimensioned or required to fit, fabricate drawers at 20 inches (508 mm) deep with either 1/2 inch (12.70 mm) or 3/4 inch (19.05 mm) thick drawer bottoms.

D. Kerf the back sides of substrates indicated as curved, or fabricate from built up layers of thin substrates or “Wacky Wood” (Flexible and Bendable Plywood) to produce a smooth evenly curved surface for wood veneer or other applied or installed finish materials.

E. Corner Units: Where corner base and/or wall cabinets are indicated, fabricate cabinet units to capture “blind” space at room corners. Provide interior finishes to match regular in-line cabinet interiors.

F. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

G. Fabricate glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual”.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets and other wood components to average prevailing temperature and humidity conditions in installation areas.

B. Prior to fabrication, field verify required dimensions for seat and back cushions.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch (3.175 mm) in 96 (2438.4 mm) inches.

C. Where required, and approved by the County, scribe and cut cabinets to fit adjoining work; refinish cut surfaces, and repair damaged finish at cuts.

D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Anchor all tall cabinets to prevent overturning.

E. Use micro pin nailing for any exposed wood surface fastening. Only where approved by the County and where required by loading or fastening, fasten with approved finishing screws. Countersink and fill flush with woodwork only where approved by the County.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch (3.175 mm) in 96-inch (2438.4 mm) sag, bow, or other variation from a straight line

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2. Fasten wall cabinets with hanging cleats or through back, near top and bottom, and at ends not more than 16 inches (406.4 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (317.5 mm) penetration into wood framing, blocking, or hanging strips.
3. Install reception desk wood and glass components as indicated on returned shop drawings.

G. Install all shelves to approximate levels indicated on drawings, equally spaced inside cabinets.

H. Install all drawers and cabinet doors and adjust to be plumb, square and level to cabinets, and adjacent drawers and doors, and with each other.

I. Install all window sills as indicated on Drawings and adjust to be plumb, square and level with the window frames and adjacent wall surfaces.

J. Protect finished work from damage. Repair any damaged work to a condition acceptable to the County. Replace work where touch up is not accepted.

END OF SECTION 064116

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SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the provision of plastic paneling, (FRP), where indicated and/or scheduled on drawings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Provide shop drawings that indicate all panel dimensions as coordinated with any animal runs, planters, wall dimensions and other associated Work. Include details of mechanically and adhered trim accessories.

C. Samples: For plastic paneling and trim accessories.

1.3 QUALITY ASSURANCE

A. Testing Agency: Acceptable to authorities having jurisdiction and FM Approvals when required for insurance purposes.

PART 2 - PRODUCTS

2.1 PLASTIC PANELING - FRP

A. Provide pre-finished polyester glass reinforced plastic sheets, (FRP), adhered and mechanically fastened.

1. Manufacturers:
   a. Marlite
   b. Symmetrix with Sani-Coat Sealer
   c. Or equal and approved.

2. Physical Characteristics
   a. Fire Rating: Class C.
   b. Surface Finish: “P” Pebbled.
   c. Panel Size: 48 inches wide by height indicated or scheduled; as required for vertical installation.
   d. Thickness: 3/32 inch.
   e. Color: As selected by the County from manufacturer’s full range.

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2.2 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece PVC extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Trim: Extruded PVC.
1. Color: Match panels.

B. Fasteners: Provide mechanical fastening of panels with manufacture’s recommended stainless steel fasteners for indicated substrates.

C. Adhesive: As recommended by plastic paneling manufacturer for water-resistant installation.

D. Sealant: Water-resistant, Mildew-resistant, single-component, neutral-curing silicone or Mildew-resistant, single-component, neutral-curing or acid-curing silicone Latex sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspect substrates to confirm that surfaces will result in a uniform fished FRP surface without substrate telegraphed imperfections or conditions. Start of work signifies acceptance of conditions.

B. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

D. Lay out paneling before installing. Locate panel joints directly behind and centered on any animal run divider panels when run spacing is 48 inches or less. At wider run divider panel spacing and at walls without runs, locate as approved or directed by County.

3.2 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels in a full spread of adhesive.

C. Install panels with both adhesive and fasteners. Space fasteners 8 inches on center.

D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

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E. Coordinate installation with mop basin unit and provide a watertight seal.

F. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

G. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

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SECTION 066510 – SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-surface tops, countertops and back/side splashes where indicated and scheduled on Drawings.

B. Related Requirements:
   1. Division 6 Section “Rough Carpentry” for Blocking.
   2. Section 064116 “Plastic Laminate Clad Architectural Cabinets” for cabinet substrates.
   3. Division 22 Section “Plumbing Fixtures.”

1.2 DEFINITIONS

A. Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.3 ACTION SUBMITTALS

A. Product Data: For materials, including chemical resistance data.

B. Shop Drawings:
   1. Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.
      a. Show full-size details, edge details, thermoforming requirements, attachments, etc.
      b. Show locations and sizes of furring, blocking, including concealed blocking and re-inforcement specified in other Sections.
      c. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

C. Samples:
   1. For each type of product indicated.
      a. Submit minimum 6-inch by 6-inch sample in specified gloss finish.
      b. Cut sample and seam together for representation of inconspicuous seam.
      c. Indicate full range of color and pattern variation.
   2. Approved samples will be retained as a standard for work.

D. Product data:
   1. Indicate product description, fabrication information and compliance with specified performance requirements.

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E. Fabricator/installer qualifications:
   1. Provide copy of certification number.

F. Manufacturer certificates:
   1. Signed by manufacturers certifying that they comply with requirements.

G. Samples: Selection samples from manufacturer's full range of standard colors and textures.

H. Maintenance data:
   1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
      a. Maintenance kit for finishes shall be submitted.
   2. Include in project closeout documents.

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

B. Fabricator/installer qualifications:
   1. Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

C. Applicable standards:
   1. Standards of the following, as referenced herein:
      a. American National Standards Institute (ANSI)
      b. American Society for Testing and Materials (ASTM)
      c. National Electrical Manufacturers Association (NEMA)
   2. Fire test response characteristics:
      a. Provide with the following Class A (Class I) surface burning characteristics as determined by testing identical products per UL 723 (ASTM E84) or another testing and inspecting agency acceptable to authorities having jurisdiction:
         1) Flame Spread Index: 25 or less.
         2) Smoke Developed Index: 450 or less.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation.

B. Store components indoors prior to installation.

C. Handle materials to prevent damage to finished surfaces.

1.6 WARRANTY

A. Provide manufacturer's warranty against defects in materials.

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1. Warranty shall provide material and labor to repair or replace defective materials.
2. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.

1.7 MAINTENANCE

A. Provide maintenance requirements as specified by the manufacturer.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Manufacturers:
1. Subject to compliance with requirements, provide products by one of the following:
a. Corian® surfaces from the DuPont company (basis of design).

2.2 MATERIALS

A. Solid polymer components
1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.

B. Thickness:
1. 3/4 inch nominal.
2. Or as indicated on drawings.

2.3 ACCESSORIES

A. Joint adhesive:
1. Manufacturer’s standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

B. Sealant:
1. Manufacturer’s standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.4 FACTORY FABRICATION

A. Shop assembly
1. Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer’s printed instructions and technical bulletins.
2. Form joints between components using manufacturer’s standard joint adhesive without conspicuous joints.
a. Reinforce with strip of solid polymer material, 2" wide.

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3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.
4. Rout and finish component edges with clean, sharp returns.
    a. Rout cutouts, radii and contours to template.
    b. Smooth edges.
    c. Repair or reject defective and inaccurate work.

B. Configuration: Provide fabrications with the following front edge and backsplash style:
1. Front Edge: Straight, slightly eased at top.
2. Backsplash: Straight, slightly eased at corner.
3. Sidesplash: Matching backsplash.

C. Tops & Countertops: 3/4-inch thick, solid surface material with front edge built up with same material to dimension indicated.

D. Backsplashes: 1/2-inch thick, solid surface material.

PART 3 - EXECUTION

3.1 FABRICATION

A. Shop fabricate to greatest extent possible. Make field seams invisible and non-detectable.

B. Field verify all required dimensions prior to fabrication. Indicate field verified dimensions on submittal shop drawings.

C. Provide field joining of solid surface fabrications, only where approved by the County or their designated Engineer.

D. Provide cutouts for grommets, sinks and any sink soap accessories where indicated or specified. Confirm dimensions and locations by use of templates and information supplied by sink or accessory manufacturer and as indicated on Shop Drawings.

3.2 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop assembly.

B. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
1. Provide product in the largest pieces available.
2. Form field joints using manufacturer’s recommended adhesive, with joints inconspicuous in finished work.
    a. Exposed joints/seams shall not be allowed.
3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
4. Cut and finish component edges with clean, sharp returns.

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5. Rout radii and contours to template.
6. Anchor securely to base cabinets or other supports.
7. Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop.
8. Carefully dress joints smooth, remove surface scratches and clean entire surface.
9. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

C. Where tops or other fabricated pieces are to be field assembled, align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.3 CLEANING & PROTECTION

A. At completion of Work, clean surfaces and protect from damage. Repair or replace any damaged Work as directed by the County or their designated Engineer.

B. Keep components clean during installation.

C. Remove adhesives, sealants and other stains.

END OF SECTION 066510

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SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Modified bituminous sheet waterproofing.
2. Modified bituminous sheet waterproofing, fabric reinforced.
3. Pedestal-supported plaza-deck pavers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1. Include setting drawings showing layout, sizes, sections, profiles, and joint details of pedestal-supported concrete pavers.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

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1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Coatings & Waterproofing Inc.
b. Henry Company.
c. MAPEI Corporation.
d. W.R. Meadows, Inc.

2. Physical Properties:

a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970/D 1970M.
d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836/C 836M.
e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154/E 154M.
f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
g. Water Vapor Permeance: 0.05 perm (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
h. Hydrostatic-Head Resistance: 200 feet (60 m) minimum; ASTM D 5385.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

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2.2 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm), predrilled at 9-inch (229-mm) centers.

G. Protection Course: ASTM D 6506, semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Thickness: 1/8 inch (3 mm) for vertical applications; 1/4 inch (6 mm) elsewhere.
2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection course type.

H. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) per ASTM D 1621, and maximum water absorption by volume of 0.6 percent per ASTM C 272/C 272M.

I. Protection Course: Extruded-polystyrene board insulation, unfaced, ASTM C 578, Type X, 1/2 inch (13 mm) thick.

J. Protection Course: Molded-polystyrene board insulation, ASTM C 578, Type I, 0.90-lb/cu. ft. (15-kg/cu. m) minimum density, 1-inch (25-mm) minimum thickness.

2.3 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, non-biodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve

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laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft. (112 to 261 L/min. per m).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BASF Corporation.
    b. Carlisle Coatings & Waterproofing Inc.

B. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel without Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, non-biodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side of the core, without a polymeric film bonded to the other side; and with a horizontal flow rate through the core of not less than [2.8 gpm per ft. (35 L/min. per m).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BASF Corporation.
    b. Carlisle Coatings & Waterproofing Inc.

2.4 INSULATION DRAINAGE PANELS

A. Insulation: Comply with Section 072100 "Thermal Insulation" for general building insulation, including insulation drainage panels.

B. Unfaced, Wall-Insulation Type VI, Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, provide products the following or equal and approved:

    a. DiversiFoam Products.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

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3.2 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).

D. Horizontal Application: Apply sheets from low to high points of decks to ensure that laps shed water.

E. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

F. Seal edges of sheet-waterproofing terminations with mastic.

G. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150 mm) beyond repaired areas in all directions.

I. Immediately install protection course with butted joints over waterproofing membrane.

1. Molded-sheet drainage panels or Insulation drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.3 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install protection course before installing drainage panels.

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3.4 INSULATION DRAINAGE-PANEL INSTALLATION

A. Install insulation drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.5 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

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SECTION 071416 - COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyurethane waterproofing.
2. Rubber waterproofing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Show locations and extent of waterproofing.
2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1.4 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 SINGLE-COMPONENT POLYURETHANE WATERPROOFING

A. Single-Component, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:

a. BASF Corporation.
b. Carlisle Coatings & Waterproofing Inc.
c. CETCO, a Minerals Technologies company.

2.2 RUBBER WATERPROOFING

A. Two-Component, Reinforced, Rubber Waterproofing: ASTM C 836/C 836M; coal-tar free.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:

a. GCP Applied Technologies

2. Hydrostatic-Head Resistance: 197 feet (60 m).

2.3 AUXILIARY MATERIALS

A. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated.

B. Sheet Flashing: 50-mil- (1.3-mm-) minimum, nonstaining, uncured sheet neoprene.

1. Adhesive: Manufacturer's recommended contact adhesive.

C. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric.

D. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.

E. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; and as recommended by manufacturer for substrate and joint conditions.

1. Backer Rod: Closed-cell polyethylene foam.

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2.4 PROTECTION COURSE

A. Protection Course: ASTM D 6506, semi rigid sheets of fiberglass- or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

    a. Soprema Inc.
2. Thickness: 1/8 inch (3 mm), nominal, for vertical applications; 1/4 inch (6 mm), nominal, elsewhere.
3. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer.

B. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness of 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) according to ASTM D 1621/ C 1621M and maximum water absorption by volume of 0.6 percent according to ASTM C 272/C 272M.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>

C. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on both sides with plastic film, nominal thickness of 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) according to ASTM D 1621/ C 1621M and maximum water absorption by volume of 0.6 percent according to ASTM C 272/C 272M.

1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Owens Corning, Inc.

2.5 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft. (112 to 261 L/min. per m).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:

    a. American Hydrotech, Inc.
    b. BASF Corporation.
    c. Carlisle Coatings & Waterproofing Inc.

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B. Woven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panels consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a woven-geotextile facing with an apparent opening size not exceeding No. 40 (0.43-mm) sieve, laminated to one side of the core and a polymeric film bonded to the other side; and with a horizontal flow rate through the core of not less than 2.8 gpm per ft. (35 L/min. per m).
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. MEL-DRAIN by WR Meadows.

2.6 INSULATION DRAINAGE PANELS

A. Unfaced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

      a. DiversiFoam Products.
      b. Dow Chemical Company (The).
      c. Insulfoam; Carlisle Construction Materials Company.

B. Geotextile-Faced, Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C 578, Type VI, 40-psi (276-kPa) minimum compressive strength; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with a nonwoven-geotextile filter fabric.

   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. T. Clear Corporation, a subsidiary of Fin Pan Inc.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.

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D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.

E. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

F. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471/C 1471M.

G. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

H. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471/C 1471M. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.

I. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.

3.2 WATERPROOFING APPLICATION

A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C 898/C 898M and ASTM C 1471/C 1471M.

B. Unreinforced Waterproofing Applications.

1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a dry film thickness of 90 mils (2.25 mm).

C. Reinforced Waterproofing Applications.

1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of 80 mils (2 mm).

D. Install protection course with butted joints over waterproofing before starting subsequent construction operations.

1. For horizontal applications, install protection course loose laid over fully cured membrane.
2. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.

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3. Thermal insulation specified in Section 072100 "Thermal Insulation" may be used in place of a separate protection course for vertical applications when approved in writing by waterproofing manufacturer.

3.3 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install thermal insulation specified in Section 072100 "Thermal Insulation" protection course before installing drainage panels.

3.4 INSULATION DRAINAGE PANEL INSTALLATION

A. Install drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.5 PROTECTION

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

END OF SECTION 071416

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SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Polyisocyanurate foam-plastic board.
   2. Mineral-wool blanket.
   3. Mineral-wool board.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research reports.

PART 2 - PRODUCTS

2.1 MINERAL-WOOL BLANKETS

A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Johns Manville; a Berkshire Hathaway company.
      b. Rockwool International.

2.2 MINERAL-WOOL BOARD

A. Mineral-Wool Board, Types IA and IB, Unfaced <Insert drawing designation>: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Johns Manville; a Berkshire Hathaway company.

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b. Rockwool International.

B. Mineral-Wool Board, Types IA and IB, Faced <Insert drawing designation>: ASTM C 612, Types IA and IB; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84. Nominal density of 4 lb/cu. ft. (64 kg/cu. m).
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Johns Manville; a Berkshire Hathaway company.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Polyisocyanurate Board, Foil Faced <Insert drawing designation>: ASTM C 1289, foil faced, Type I, Class 1 or 2.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Dow Chemical Company (The).
b. Firestone Building Products.
2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 ACCESSORIES

A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

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B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
   1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm) below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
   1. If not otherwise indicated, extend insulation a minimum of 36 inches (915 mm) in from exterior walls.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

   1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

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2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
    a. Exterior Walls: Set units with facing placed toward exterior of construction.
    b. Interior Walls: Set units with facing placed toward areas of high humidity and where indicated on the drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

END OF SECTION 072100

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SECTION 072113 – CONTINUOUS INSULATION WALL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Continuous insulation wall panels.

B. Vinyl Siding and Soffit

1.2 RELATED SECTIONS

A. Section 054000 - Cold Formed Metal Framing.

B. Section 072600 - Vapor Retarders: Vapor retarder materials over insulation to adjacent insulation.

C. Section 072700 - Air Barriers: Air seal materials over insulation to adjacent insulation.

D. Section 073113 – Asphalt Shingles

E. Section 074633 – Plastic Siding

F. Section 074646 – Fiber Cement Siding (Alternative)

G. Section 092900 - Plaster and Gypsum Board.

1.3 REFERENCES

A. ASTM C 209 – Methods of Testing Insulating Board, Structural and Decorative.

B. ASTM C 518 - Steady State Thermal Transmission By Means Of The Heat Flow Meter Apparatus (R Value)

C. ASTM C 1289 – Specifications for Faced Rigid Cellular Polyisocyanurate Thermal Insulating Board.

D. ASTM D 1621 – Test Methods for Compressive Properties of Rigid Cellular Plastics.

E. ASTM D 2126 - Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

F. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E 96 - Test Method for Water Vapor Transmission of Materials.

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I. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

1.4 SYSTEM DESCRIPTION

A. UL V302 Exterior Wall Exterior Wall Assembly – Steel (or Wood) Stud Construction:
   1. Base Wall System: Base Wall System: Steel Stud, 1 layer minimum 5/8 inch (12.5 mm) thick Type X Gypsum wallboard on interior, installed over steel studs: minimum 3-5/8 inches (91 mm) depth, minimum 20 gauge at a maximum of 16 inches (610 mm) o.c. with lateral bracing every 4 foot (1220 mm) vertically
   2. Approved Exterior Finish:
      a. Vinyl Clapboard Siding.
      b. Alternate: Fiber Cement Board siding. Any standard installation technique can be used.
   3. Wall Panel Assembly Thickness:
      a. 4.2 inches (106 mm) maximum with combustible claddings.
         i. 3.1 inches of polyisocyanurate insulation board.
         ii. 0.44 inches of structural grade oriented strand board.
   4. Stud Cavity:
      a. As indicated on the Drawings.
         i. Provide Min 3-1/2 in. mineral wool batts placed to fill cavity of wall.
   5. Exterior Sheathing:
      a. Reference 072113.1.4.3 Wall Panel Assembly Thickness, 072113.2.2 Board Insulation and 072113.1.4.7 for materials.
   6. Floorline Firestopping:
      a. 4 lbs./cu ft. mineral fiber based safing insulation at each floor line, attached with Z Clips or equivalent
   7. Weather Resistive Membrane Applied to Sheathing: Acceptable products are:
      a. Medium-density, phenolic-impregnated sheet material qualifying as a Grade D weather-resistive barrier in accordance with ICC-ES AC38.
   8. Self-Adhering Seam and Flashing Tape:
      a. Pressure-sensitive, self-adhering, cold-applied, seam tape consisting of polyolefin film with acrylic adhesive, meeting ICC-ES AC148, and tested as part of an assembly meeting performance requirements

1.5 DESIGN REQUIREMENTS

A. Perform work in accordance with all federal, state and local codes.

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B. Physical properties (Foam Core):
   1. Flame Spread Index : ASTM E 84, less than 75
   2. Smoke Developed: ASTM E 84, less than 450.
   3. Compressive Strength: ASTM D 1621; Grade 3, 25psi (172 kPa).
   4. Dimensional Stability: ASTM D 2126, 2 percent linear change (7 days).
   5. Moisture Vapor Permeance: ASTM E 96, less than 1 perm (57.5ng/(Pa•s•m2).
   6. Water Absorption: ASTM C 209, less than 0.1 percent by volume.
   7. Service Temperature: Minus 100 degrees to 250 degrees F (Minus 73 degrees C to 122 degrees C).
   8. Resistance to Mold: ASTM D 3273 Passed (10).

C. Fire Retardant Treated Plywood:
   1. Flame Spread Index : ASTM E 84, less than 25
   2. Smoke Developed: ASTM
   3. E 84, less than 250.

D. Alternate / Permitted Substitution: Reference Section 061600 Sheathing.
   1. Continuous Insulation Xci Ply wall panels shall meet the continuous insulation standards of ASHRAE 90.1-2010, IECC 2015 and IBC Chapter 26. Use of Xci Ply Wall Panels required if exterior siding is changed from vinyl to fiber cement.

1.6 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on wall panels and fasteners to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Manufacturer's Certificate: Certify panels will conform to specified performance requirements.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be a company that regularly manufactures and assembles specified insulation in house with no outside fabrication operations.

B. Pre-Installation Meeting: Convene minimum one week prior to commencing Work of this section. Review installation procedures and coordination required with Related Work and include the following:
   1. Participants: Authorized representatives of the Contractor, County or Engineer, Installer, and Manufacturer.
   2. Review wall assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.
   3. Review continuous insulation wall panels installation methods and procedures related to application, including manufacturer’s installation guidelines.

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4. Review fire-stopping requirements and weather resistive membrane requirements and placement locations.
5. Review field quality control procedures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products off the ground, in dry conditions, under cover and in manufacturer's unopened packaging until ready for installation.

1.9 SEQUENCING

A. Coordinate with the installation of vapor retarders and air seal materials specified is Section 07260 and Section 07270.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Provide weather barrier sheathing products manufactured by Huber Engineered Woods LLC, Charlotte NC; Phone: (800) 933-9220; Website: www.huberwood.com

B. Alternate system: Assembly Minimum Thermal Rating – R19:
1. 3.1 inch polyisocyanurate insulation board
2. 5/8” CDX plywood
3. Water Barrier of high density polyethylene

C. Alternate Manufacturer: Insulating panels shall be XCI products produced by Hunter Panels, 15 Franklin Street, Portland, Maine 04101. Phone: (207) 761-5678 or (888) 746-1114. Fax: (877) 775-1769. E-mail: info@hpanels.com.

D. Requests for substitutions will be considered. Substitutions must contain and be presented as a complete assembly.

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2.2 BOARD INSULATION

A. Basis of Design:
1. Composite Insulating Wall Sheathing: Huber Engineered Woods (ZIP System) - Oriented-strand-board Exposure 1 sheathing 7/16 inch (11.1 mm) thick, with factory-laminated water-resistive barrier exterior facer, and with rigid foam plastic insulating board laminated to interior face.

B. Alternate:
1. Board Insulation Bonded to Plywood: Hunter Panels Xci Ply is a high thermal resistive rigid insulation panel composed of a closed cell polyisocyanurate foam core bonded on both sides to a premium performance coated glass facer and bonded to fire treated plywood on one side.
2. Type: ASTM C 1289, Type V:
   a. Grade 3 (25 psi).
3. Fire Retardant Treated Plywood Thickness:
   a. 5/8 inch.
4. Panel Size:
   a. 4 feet by 8 feet (1220 mm by 2440 mm).
5. Thickness / R Value: based on ASTM C 518 at 75 degrees F (23.9 degrees C)
   a. 3.1 inches (79 mm) / R Value 15.9 with 5/8 inch plywood facing
6. Weather Resistive Membrane Applied to Sheathing.
   a. Medium-density, phenolic-impregnated sheet material qualifying as a Grade D weather-resistive barrier in accordance with ICC-ES AC38.
7. Self-Adhering Seam and Flashing Tape:
   a. Pressure-sensitive, self-adhering, cold-applied, seam tape consisting of polyolefin film with acrylic adhesive, meeting ICC-ES AC148, and tested as part of an assembly meeting performance requirements.

2.3 PANEL FASTENERS

A. Fasteners shall be Panel fasteners approved by the manufacturer. Fasteners are a corrosion resistant type with oversized heads. Length of fasteners shall be as recommended by the panel manufacturer. Coordinate with the requirements of the cladding or wall finish manufacturer. For all locations where Panels will be installed on heavy gauge metal stud framing use HD type fasteners.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until exterior walls have been properly prepared.

B. Verify that all exterior wall assembly construction has been completed to the point where the insulation may correctly be installed.

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C. Verify that mechanical and electrical services in walls have been installed and tested and, if appropriate, verify that adjacent materials and finishes are dry and ready to receive insulation.

D. If wall assembly preparation is the responsibility of another installer, notify the County or their designated Engineer of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and with details on architectural and structural drawings.

B. Install in exterior spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

E. Exposed insulation must be protected from open flame and kept dry at all times.

F. Fasten composite insulation to the substrate framing. Provide base support for the insulation panels as required for the exterior cladding to be installed over the panels. Exterior cladding must be attached through to the framing and as required by the cladding manufacturer. Coordinate with the cladding or wall finish manufacturer for the attachment requirements over insulation panels. Coordinate with the cladding or wall finish manufacturer for the attachment requirements over insulation panels. Contact Hunter Panels for guidance when determining fastening pattern.

G. Install vapor retarders over insulation panels as specified in Section 072727.

H. Exterior wall insulation is not intended to be left exposed for extended periods of time in excess of 45-60 days without adequate protection. If extended exposure is anticipated all exposed foam surfaces including corners, window and door openings, should be taped with a compatible waterproof tape.

I. Install exterior cladding as recommended by the cladding manufacturer and as specified in other sections of this specification.

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3.4 PROTECTION

A. Protect installed products until completion of project.

B. Cover the top and edges of unfinished wall panel work to protect it from the weather and to prevent accumulation of water in the cores of the panels.

C. Do not leave panels exposed to moisture. Wet panels shall be allowed to completely dry prior to application of vapor barrier and/or cladding.

D. Repair or replace damaged products before Substantial Completion.

End of Section 072113

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SECTION 072116 – TAPERED RIGID INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Tapered extruded polystyrene roof board insulation.

B. Related Requirements:
1. Section 075323 – “Ethylene-Propylene- Diene-Monomer (EPDM) Roofing”.
2. Section 076200 – “Sheet Metal Flashing and Trim”.
3. Section 077129 – “Manufactured Roof Expansion Joints”.

1.2 ACTION SUBMITTALS

1.3 Product Data: Submit data on product characteristics, performance criteria, and limitations, including installation instructions

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: The installation work of this Section shall be performed by an experienced roofing contractor approved and certified by the roofing system manufacturer.

B. Each insulation board must be labeled with manufacturer's name, product brand name, ASTM material specification reference, and identification of the third party inspection agency used for building code qualification.

C. Each tapered panel shall be labeled with a code letter to identify its slope and to identify its proper position on the roof. Each panel shall also be marked with an arrow to identify direction of slope.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer’s original packaging.

B. Store and protect products in accordance with manufacturer’s instructions. Store in a dry area and protect from water, direct sunlight, flame, and ignition sources. Do not install insulation that has been damaged or wet.
1. In the event the board insulation becomes wet, wipe dry prior to installation.

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1.7 PROJECT CONDITIONS

A. Roof deck shall be free of ponded water, ice or snow. This precaution is to discourage potential future condensation on the underside of the membrane.

B. Do not expose tapered insulation to surfaces such as vent stacks, pipes or other rooftop appurtenances whose constant temperature is in excess of 165°F. If temperature cycling conditions are anticipated near the maximum recommended use temperature, consult an Owens Corning representative for recommendations regarding system components.

C. When insulation is to be exposed to sunlight for prolonged periods due to job site delays, protect the insulation with a light colored opaque covering. Provisions should be made to prevent wind loss of insulation materials at the job site when partially open units of tapered insulation are on hand.

D. Roofs exposed to reflective vertical surfaces adjacent to the roof, require special consideration. Consult this specification for recommendations regarding system components.

E. Any deteriorated decking shall be repaired or replaced. Existing roof drains must be verified to be open and adequate to promote proper roof drainage.

1.8 WARRANTY

A. A thermal performance warranty shall be issued to the Owner upon completion of the work. Insulation shall be warranted to retain all physical properties and a minimum of 90% of its published R-value for the lifetime of the product.
   1. A single source full roof covering system warranty shall be issued to the Owner upon completion of the work.]

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Manufacturers: Subject to compliance with product criteria, the manufacturers whose products may be incorporated into the work include but are not limited to the following: (Note: Products other than those listed below, must be capable of providing a complete roofing system warranty.)
   1. DiversiFoam Products
   2. Dow Corning Building Solutions
   3. Owens Corning Insulating Systems, LLC
   4. Pactiv Corporation.
   5. Or Equal and Approved.

2.2 MATERIALS

A. Extruded Polystyrene (XPS) Insulation:

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1. Physical Properties: a. Tapered Materials: Tapered Insulation of closed-cell foam panels with continuous as-extruded skin on the face and back surfaces, conforming to the minimum physical requirements of ASTM C-578, Type IV.
2. Fill Materials: closed-cell foam panels with continuous as-extruded skin on the face and back surface.
3. Panel Size, Tapered: Provide ¼" pitch by 4 ft. wide by 8 ft. long.
4. Panel Size, Fill Material: Provide 1/2", 3/4"and 1" thick by 4 ft. wide by 8 ft. long.

B. Insulation Fasteners and Stress Plates: Furnished by membrane manufacturer. FM approved. Fastener head shall be designed to inhibit damage to the membrane. Minimum 3" diameter or square insulation stress plates shall provide for countersunk fastener heads.

C. Thermal Barrier Material (Only if required by existing conditions: Provide one of the following:
1. Gypsum Board: 1/2" (minimum thickness)
2. Rigid Perlite Board: 1/2" (minimum thickness)

D. Overlayment: For dark mechanically attached, or any color fully adhered, or chemically incompatible membranes, provide the following:
1. Flexible glass fiber, nonwoven, non-flammable, corrosion and mildew resistant or other suitable separator (overlayment) sheets shall be used under PVC membranes and other such membranes which contain plasticizing agents. Separator sheet shall have been evaluated and approved by the membrane manufacturer for adequacy as a separator.

E. Membrane Fastening or Adhesion System: Per membrane manufacturer's specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation.
1. Verify that the roof deck drains completely free of water within 48 hours following rainfall.
2. Verify that the dead load carrying capability of the deck is sufficient to support code mandated live loads and dead loads incident on the roof, including the entire roof covering/insulation system.
3. Verify that the roof deck provides adequate support for the insulation.

B. Provide written report listing conditions detrimental to performance of work in this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Any deteriorated roof decking shall be repaired or replaced.

B. A thorough inspection should be required in the case of total tear off.

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C. Steel Roof Decking: Install a thermal barrier between tapered/fill insulation layers and the steel deck in accordance with construction drawings.
   1. Tapered/fill insulation layers may be installed directly over steel roof deck in accordance with the details of UL Roof Deck Construction #457. 2.
   2. Tapered/fill insulation layers in a steel deck application must be underlaid with a thermal barrier as specified by the building code, or, classified by assembly in accordance with UL 1256 or FM 4450. Thermal barriers may be loose-laid or secured to the deck by mechanical fastening depending on design or code requirements Spray insulation to envelop entire area to be insulated and fill voids.

3.3 VAPOR RETARDER

A. Install a vapor retarder in accordance with construction drawings. Place the vapor retarder to insure adequate end and side joint laps. When high relative humidities inside the building or other normal climatic conditions create a condensation point within the insulation board, it may be necessary to install a vapor retarder beneath the insulation or thermal barrier. Although tapered/fill layers of insulation have vapor retarding qualities, the need for more effective vapor retarding layers must be assessed based on the conditions present on each project. Tapered and fill layers of insulation are compatible with most commonly used asphaltic and sheet film vapor retarding materials. See the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals for specific design guidelines.

3.4 INSULATION:

A. Install tapered roof insulation in accordance with the manufacturer's approved shop drawings.

B. Total roof insulation aged thermal resistance shall be R25, achieved in the thicknesses and number of layers as shown in the construction documents. R-value chosen is to be specified based on the intended use of each project and design criteria of each project, and applicable energy conservation codes. Contact an Owens Corning representative for information regarding ASHRAE 90.1 Energy Code minimum requirements for roof insulation if needed.

C. Install thicknesses of fill in accordance with shop drawings prepared by architect or manufacturer’s roofing consultant] and approved by the roofing contractor. Install Tapered insulation over the required base layers, following the directional arrow printed on each panel which indicates direction of slope. Tapered insulation panels are to have a letter code printed on their surface which corresponds with panel layout shown on the approved shop drawings.

D. Insulation joints shall not exceed 1/4” in width. Joints wider than 1/4” shall be filled with the same insulation.

E. Insulation shall be field trimmed to fit tightly around roof protrusions and terminations.

F. Apply only as much Tapered insulation and fill roof insulation as can be covered by the roofing membrane on the same day. Apply roof insulation in parallel rows with end joints staggered. Install side and end joints closely but do not force together. In a two layer application, apply

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second layer panel's parallel to the first layer but with side and end joints staggered in relation to the first layer.

G. Place the insulation board with the printed logo surface down so that the black lettering is not exposed to potential solar heat gain.

H. For mechanically attached and fully adhered roofing systems, in areas where black/dark membranes are used and where "reflected solar energy" is expected to be present, insulation requires protection in addition to cover boards as indicated on the drawings. This includes the following:
   1. Roof areas adjacent to higher walls, particularly walls with reflective surfaces.
   2. Roof areas near large rooftop HVAC units, or near or in between clusters of mechanical equipment.
   3. Roof areas near other structures with reflective cladding (metal or glass); or near higher reflective parapets, all such areas should be considered for additional heat protection.
   4. Such roof areas must be covered with pavers or ballast. Alternatively, black/dark (non-white) membranes must be coated with white reflective topping, and maintained white, to avoid damage due to the intensified heat exposure from reflected sun in such areas.

I. Insulation shall be loosely placed and secured in accordance with membrane manufacturer's requirements. The insulation below the membrane is to be held in place with compatible adhesives, mechanical fasteners in conjunction with the overlayment and/or membrane system. Mechanical fasteners shall be of sufficient number and adequate pattern to resist displacement of insulation by wind uplift forces. When adhering or exposing tapered/fill insulation to hot bitumen, the bitumen must be allowed to cool to between 200°F and 250°F.

END OF SECTION 072116

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SECTION 072119 - FOAMED-IN-PLACE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closed-cell spray polyurethane foam.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research reports.

PART 2 - PRODUCTS

2.1 CLOSED-CELL SPRAY POLYURETHANE FOAM

A. Closed-Cell Spray Polyurethane Foam: ASTM C 1029, Type II, minimum density of 1.5 lb/cu. ft. (24 kg/cu. m) and minimum aged R-value at 1-inch (25.4-mm) thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F (25 mm of 43 K x sq. m/W at 24 deg C).
   1. Manufacturers, subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corporation
      b. Dow Chemical Company
      c. Icynene, Incorporated
   2. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
   3. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

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PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Spray insulation to envelop entire area to be insulated and fill voids.

C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

END OF SECTION 072119

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SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyethylene vapor retarders.
2. Reinforced-polyethylene vapor retarders.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.
2. Section 072113 "Continuous Insulation Wall Panels" for vapor retarders integral with insulation products.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- (0.15-mm-)thick sheet, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

2.2 REINFORCED-POLYETHYLENE VAPOR RETARDERS

A. Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft. (9 kg/100 sq. m), with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

1. Manufacturers:
   a. ISI Building Products
   b. Raven Industries, Inc.,
   c. Reef Industries, Inc.
   d. Or equal and approved.

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PART 3 - EXECUTION

3.1 INSTALLATION OF VAPOR RETARDERS ON FRAMING

A. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.2 INSTALLATION OF VAPOR RETARDERS IN CRAWL SPACES

A. Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches (305 mm) and seal with manufacturers recommended tape. Install second layer over pathways to equipment.

B. Extend vapor retarder over footings and seal to foundation wall or grade beam with manufacturer's recommended tape.

1. Extend vapor retarder vertically minimum 16 inches (406 mm) above top of footing.

C. Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

END OF SECTION 072600

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SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vapor-retarding, fluid-applied air barriers.
   2. Vapor-permeable, fluid-applied air barriers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For air-barrier assemblies.
   1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.
   1. Build integrated mockups of exterior wall assembly as indicated on Drawings incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
      a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
      b. Include junction with roofing membrane, building corner condition and foundation wall intersection.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. (0.2 L/s x sq. m of surface area at 75 Pa), when tested according to ASTM E 2357.

2.2 HIGH-BUILD AIR BARRIERS, VAPOR PERMEABLE

A. High-Build, Vapor-Permeable Air Barrier: Modified bituminous or synthetic polymer membrane with an installed dry film thickness, according to manufacturer's written instructions, of 35 mils (0.9 mm) or thicker over smooth, void-free substrates.
   1. Modified Bituminous Type:
      a. Mar-flex Waterproofing & Building Products
      b. Tremco, Incorporated
      c. Or equal and approved
   2. Synthetic Polymer Type:
      a. GCP Applied Technologies
      b. Henry Company
      c. Tremco Incorporated
      d. Or equal and approved
   3. Physical and Performance Properties:
      a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference; ASTM E 2178.
      b. Vapor Permeance: Minimum 10 perms (580 ng/Pa x s x sq. m); ASTM E 96/E 96M, Desiccant Method, Procedure A.
      c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
      d. Adhesion to Substrate: Minimum 30 lbf/sq. in. (207 kPa) when tested according to ASTM D 4541.
      e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
      f. UV Resistance: Can be exposed to sunlight for 30 days according to manufacturer's written instructions.

2.3 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to

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produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

F. Bridge isolation joint and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.2 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.
   1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
   2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.
   3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
   4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches (75 mm) of

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coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames, with not less than 1 inch (25 mm) of full contact.

D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

E. High-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply air-barrier material in full contact around protrusions such as masonry ties.
   1. Vapor-Permeable, High-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, but not less than 35 mils (0.9 mm), applied in one or more equal coats.

F. Do not cover air barrier until it has been tested and inspected by testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: [Owner will engage] [Engage] a qualified testing agency to perform tests and inspections.

B. Tests: As determined by testing agency from among the following tests:
   1. Air-barrier dry film thickness.
   2. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber depressurization using detection liquids.
   3. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783 or ASTM E 2357.
   4. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.

C. Air barriers will be considered defective if they do not pass tests and inspections.
   1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
   2. Remove and replace deficient air-barrier components for retesting as specified above.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

E. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

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B. Remove masking materials after installation.

END OF SECTION 072726

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SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Asphalt shingles.
2. Underlayment.
3. Ridge vents.
4. Metal flashing and trim.

B. Related Requirements:
1. Section 077200 "Roof Accessories" for ridge vents.

C. Peak windspeeds are as follows:
1. Risk Category I
2. MRI: 100-Year: 96
3. ASCE 7-05 Windspeed: 90 (3-sec peak gust in mph).
4. ASCE 7-93 Windspeed: 70 (fastest mile in mph).
5. Maximum anticipated Windspeed: 120 mph.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Evaluation reports.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

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1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.
   1. Material Warranty Period: minimum 25 years from date of Substantial Completion, prorated, with first five years non-prorated.
   2. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 120 mph (45 m/s) for fifteen years from date of Substantial Completion.
   3. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for five years from date of Substantial Completion.
   4. Workmanship Warranty Period: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance according to ASTM E 108 or UL 790 by Underwriters Laboratories, Inc. or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

2.2 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

A. Three-Tab-Strip Asphalt Shingles: ASTM D 3462/D 3462M, glass-fiber reinforced, mineral-granule surfaced, and self-sealing; with tabs regularly spaced.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Owens Corning.
   2. Strip Size: Manufacturer's standard.
   3. Algae Resistance: Granules resist algae discoloration.
   4. Impact Resistance: UL 2218, Class 4.
   5. Color and Blends: Match County's sample and existing color range.

B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

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2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M and ASTM D 4869/D 4869M, asphalt-saturated organic felts, nonperforated.
   1. Type: Type II.

B. Self-Adhering Sheet Underlayment, Granular Surfaced: ASTM D 1970/D 1970M, minimum of 50-mil- (1.3-mm-) thick sheet; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release backing; cold applied
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Owens Corning.

C. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970/D 1970M, minimum of 40-mil- (1.0-mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. CertainTeed Roofing Corporation.
      b. GAF.
      c. Johns Manville; a Berkshire Hathaway company.
      d. Owens Corning.

D. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 40-mil- (1.0-mm-) thick; with slip-resisting, polymer-film-reinforced or glass-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive; with release backing; cold applied; and evaluated and documented to be suitable for use for intended purpose under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. CertainTeed Corporation.
      b. GAF.
      c. Owens Corning.
   2. Thermal Stability: Stable after testing at 240 deg F (116 deg C) according to ASTM D 1970/D 1970M.
   3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C) according to ASTM D 1970/D 1970M.

2.4 RIDGE VENTS

A. Rigid Ridge Vent: Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent for use under ridge shingles.

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1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. GAF.
   b. Owens Corning.
2. Minimum Net Free Area: 14 square inches per lineal foot.
3. Width: Minimum 11 inches.
4. Thickness: Minimum 1 inch.
5. Features:
   a. Nonwoven geotextile filter strips.
   b. External deflector baffles.

2.5 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.
   1. Shank: Barbed.
   2. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

C. Felt-Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch (25-mm) minimum diameter.

D. Synthetic-Underlayment Fasteners: As recommended in writing by synthetic-underlayment manufacturer for application indicated.

2.6 METAL FLASHING AND TRIM

A. General: Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
   1. Sheet Metal: Stainless steel, Zinc-tin alloy-coated stainless steel or Aluminum, mill finished.
   2. Sheet Metal to be compatible with other existing metal flashing and trim. Provide painted asphaltic coating between dissimilar metals.

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

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B. Single-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Lap sides a minimum of 2 inches (50 mm) over underlying course. Lap ends a minimum of 4 inches (100 mm). Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with roofing nails.
   1. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than 3 inches (75 mm) in direction that sheds water. Lap ends of felt not less than 6 inches (150 mm) over self-adhering sheet underlayment.
   2. Install fasteners at no more than 36 inches (914 mm) o.c.

C. Double-Layer Felt Underlayment: Install on roof deck parallel with and starting at the eaves. Install a 19-inch- (485-mm-) wide starter course at eaves and completely cover with full-width second course. Install succeeding courses lapping previous courses 19 inches (485 mm) in shingle fashion. Lap ends a minimum of 6 inches (150 mm). Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with roofing nails.
   1. Apply a continuous layer of asphalt roofing cement over starter course and on felt-underlayment surface to be concealed by succeeding courses as each felt course is installed. Apply at locations indicated on Drawings for new, disturbed or repaired roofing.
   2. Install felt underlayment on roof sheathing not covered by self-adhering sheet underlayment. Lap edges over self-adhering sheet underlayment not less than 3 inches (75 mm) in direction that sheds water.
   3. Terminate felt underlayment extended up not less than 4 inches (100 mm) against sidewalls, curbs, chimneys, and other roof projections.
   4. Install fasteners at no more than 36 inch (914 mm) o.c.

D. Synthetic Underlayment: Install on roof deck parallel with and starting at the eaves. Lap sides and ends and treat laps as recommended in writing by manufacturer. Stagger end laps between succeeding courses at interval recommended in writing by manufacturer. Fasten according to manufacturer's written instructions. Cover underlayment within period recommended in writing by manufacturer.
   1. Install in single layer on roofs sloped at 4:12 and greater.
   2. Install in double layer on roofs sloped at less than 4:12.

E. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days.
   1. Prime concrete and masonry surfaces to receive self-adhering sheet underlayment.

3.2 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."
   1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

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3.3 ASPHALT-SHINGLE INSTALLATION

A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Install starter strip along lowest roof edge, consisting of an asphalt-shingle strip [with tabs removed] [at least 7 inches (175 mm) wide] with self-sealing strip face up at roof edge.
   1. Extend asphalt shingles [1/2 inch (13 mm)] [3/4 inch (19 mm)] <Insert dimension> over fasciae at eaves and rakes.
   2. Install starter strip along rake edge.

C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with [4-inch (100-mm)] [5-inch (125-mm)] [6-inch (150-mm)] [half-tab] [one-third-tab] [manufacturer's recommended] offset pattern at succeeding courses, maintaining uniform exposure.

E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.

F. Fasten asphalt-shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.
   1. Where roof slope exceeds 21:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails].
   2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots.
   3. When ambient temperature during installation is below 50 deg F (10 deg C) seal asphalt shingles with asphalt roofing cement spots.

G. Woven Valleys: Extend succeeding asphalt-shingle courses from both sides of valley [12 inches (300 mm)] <Insert dimension> beyond center of valley, weaving intersecting shingle-strip courses over each other. Use one-piece shingle strips without joints in valley.
   1. Do not nail asphalt shingles within 6 inches (150 mm) of valley center.

H. Closed-Cut Valleys: Extend asphalt-shingle strips from one side of valley 12 inches (300 mm) beyond center of valley. Use one-piece shingle strips without joints in valley. Fasten with extra nail in upper end of shingle. Install asphalt-shingle courses from other side of valley and cut back to a straight line 2 inches (50 mm) short of valley centerline. Trim upper concealed corners of cut-back shingle strips.
   1. Do not nail asphalt shingles within 6 inches (150 mm) of valley center.
   2. Set trimmed, concealed-corner asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.

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I. Open Valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley) from highest to lowest point.
   1. Set valley edge of asphalt shingles in a 3-inch- (75-mm-) wide bed of asphalt roofing cement.
   2. Do not nail asphalt shingles to metal open-valley flashings.

J. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

K. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
   1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION 073113

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SECTION 074633 - PLASTIC SIDING (VINYL)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes vinyl siding and soffit.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For vinyl siding, include VSI's official certification logo printed on Product Data.

B. Samples: For vinyl siding and soffit including related accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For vinyl siding Installer.

B. Product certificates.

C. Research/evaluation reports.

D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Vinyl Siding Installer Qualifications: A qualified installer who employs a VSI-certified Installer on Project.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings and to match existing vinyl siding profile.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 VINYL SIDING

A. Vinyl Siding: Integrally colored product complying with ASTM D 3679.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal and approved:
      a. CertainTeed Corporation.
      b. Gentek Building Products, Inc.

B. Vinyl Siding Certification Program: Provide products that are listed in VSI's list of certified products.

C. Horizontal Pattern: To match existing vinyl lap siding. Confirm profile. At present time, the profile is assumed to be as follows:
   1. 6-1/2- or 7-inch (165- or 178-mm) exposure in beaded-edge, single-board style.

D. Texture: To match existing. Smooth or Wood grain.

E. Nominal Thickness: 0.040 inch (1.0 mm)

F. Minimum Profile Depth (Butt Thickness): 1/2 inch (13 mm).

G. Nailing Hem: Double thickness.

H. Finish: Wood-grain print with clear protective coating containing not less than 70 percent PVDF.
   1. Colors: White, to match existing. Provide color match to blend with current aged vinyl.

2.2 VINYL SOFFIT

A. Vinyl Soffit: Integrally colored product complying with ASTM D 4477.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal and approved:
      a. CertainTeed Corporation.
      b. Gentek Building Products, Inc.

B. Vinyl Siding Certification Program: Provide products that are listed in VSI's list of certified products.

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C. Pattern: To match existing. Assume 6-inch (152-mm) exposure in V-grooved, single-board style.

D. Texture: To match existing. Smooth or Wood grain.

E. Ventilation: Provide perforated soffit unless otherwise indicated.

F. Nominal Thickness: 0.035 inch (0.9 mm).

G. Minimum Profile Depth: 1/2 inch (13 mm).

H. Colors: White, to match existing. Provide color match to blend with current aged vinyl.

2.3 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
   1. Provide accessories made from same material as adjacent siding unless otherwise indicated.

B. Vinyl Accessories: Integrally colored vinyl accessories complying with ASTM D 3679 except for wind-load resistance.
   1. Texture: Smooth.

C. Colors for Decorative Accessories: White, to match existing. Provide color match to blend with current aged vinyl.

D. Flashing: Provide aluminum flashing complying with Section 076200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
   1. Finish for Aluminum Flashing: Siliconized polyester coating, same color as siding.

E. Fasteners:

   1. For fastening to wood, use siding nails or ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
   2. For fastening to metal, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1/4 inch (6 mm), or three screw-threads, into substrate.
   3. For fastening vinyl, use aluminum or stainless-steel fasteners. Where fasteners are exposed to view, use prefinished aluminum fasteners in color to match item being fastened.

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PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
   1. Center nails in elongated nailing slots without binding siding to allow for thermal movement.

B. Install vinyl siding and soffit and related accessories in accordance with ASTM D 4756.
   1. Install fasteners for horizontal vinyl siding no more than 16 inches (400 mm o.c.

C. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.2 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074633

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SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system.
2. Mechanically fastened, ethylene-propylene-diene-terpolymer (EPDM) roofing system.
3. Substrate board.
4. Roof insulation.
5. Cover board.
6. Walkways.

1.2 PREINSTALLATION MEETINGS

A. Preliminary Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
1. Layout and thickness if insulation.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.
4. Tapered insulation, thickness, and slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane and fastening spacings and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Tie-in with air barrier.

C. Samples: For the following products:
1. Roof membrane and flashings of color required.
2. Walkway pads or rolls, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

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1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:
   1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
      a. Submit evidence of complying with performance requirements.
   2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field Test Reports:
   1. Concrete internal relative humidity test reports.
   2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed or listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

   1. Warranty Period: 20 years from Date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.

B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:
   1. Zone 1 (Roof Area Field): 60 lbf/sq. ft. (2.8 kPa/sq. m)>.
   2. Zone 2 (Roof Area Perimeter): 105 lbf/sq. ft. (5.03 kPa/sq. m)>.
   3. Zone 3 (Roof Area Corners): 135 lbf/sq. ft. (6.46 kPa/sq. m)>.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
   1. Fire/Windstorm Classification: Class 1A-105.
   2. Hail-Resistance Rating: SH.

E. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class B; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

A. EPDM Sheet: ASTM D 4637/D 4637M, Type II, scrim or fabric internally reinforced, EPDM sheet with factory-applied seam tape.
   1. Manufacturers:
      a. Carlisle SynTec Inc.
      b. Firestone Building Products
      c. Johns Manville
      d. Or equal and approved.
   2. Thickness: 45 mils (1.1 mm), nominal.
   3. Exposed Face Color: White on black.

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2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Plastic Foam Adhesives: 50 g/L.
      b. Gypsum Board and Panel Adhesives: 50 g/L.
      c. Multipurpose Construction Adhesives: 70 g/L.
      d. Fiberglass Adhesives: 80 g/L.
      e. Single-Ply Roof Membrane Adhesives: 250 g/L.
      f. Single-Ply Roof Membrane Sealants: 450 g/L.
      g. Non-membrane Roof Sealants: 300 g/L.
      h. Sealant Primers for Nonporous Substrates: 250 g/L.
      i. Sealant Primers for Porous Substrates: 775 g/L.
      j. Other Adhesives and Sealants: 250 g/L.
   3. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.

C. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55 to 60 mils (1.4 to 1.5 mm) thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

D. Vapor Retarder: 6 mil polyethylene sheet laid on top of roof deck. Seal around all penetrations..

E. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

F. Bonding Adhesive: Manufacturer's standard.

G. Modified Asphaltic Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard modified asphalt, asbestos-free, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

H. Seaming Material: Factory-applied seam tape, width as recommended by manufacturer.

I. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

J. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

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K. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

L. Pre-fabricated roof curbs: Manufacturer's standard roof curbs for mechanical equipment, equipment rails, pipe portals and mounting pedestals. Coordinate with mechanical equipment manufacturer for required curb profile. Pre-fabricated roof curbs are to be pre-finished.

M. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.

N. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
1. Provide white flashing accessories for white EPDM membrane roofing.

2.4 SUBSTRATE BOARDS

A. Reference drawings for locations. *Provide only where indicated*.

B. Substrate Board: ASTM C 1396/C 1396M, Type X gypsum board.
1. Thickness: 5/8 inch (16 mm).

C. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
1. Manufacturers:
   a. Certain Teed Corporation
   b. Georgia-Pacific Gypsum, LLC
   c. National Gypsum Company
   d. USG Corporation
2. Thickness: Type X, 5/8 inch (16 mm).
3. Surface Finish: Factory primed.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

2.5 ROOF INSULATION

A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
1. Manufacturers:
   a. Carlisle Syn Tec Inc.
   b. Firestone Building Products
   c. GAF
   d. Johns Manville

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2. Size: 48 by 48 inches (1219 by 1219 mm)
3. Slope: Provide factory-tapered insulation boards fabricated to a slope of ¼" per 12" minimum unless otherwise noted.
4. R Value: 25 or greater.
5. Thickness:
    a. Base Layer: 1-1/2 inches (38 mm).
    b. Upper Layer: 3 inches (76.2 mm)

B. Tapered Insulation: Provide factory-tapered insulation boards.
1. Material: Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces
2. Minimum Thickness: 1/4 inch (6.35 mm).
3. Slope:
    a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
    b. Provide preformed Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings. Provide positive slope to drain.

2.6 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation[and cover boards] to substrate, and acceptable to roofing system manufacturer.

B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
1. Modified asphaltic, asbestos-free, cold-applied adhesive.

C. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch (13 mm) thick.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, or ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
1. Manufacturers:
    a. Georgia Pacific Gypsum, LLC
    b. National Gypsum Company
    c. USG Corporation
2. Thickness: 5/8 inch (16 mm).
3. Surface Finish: Factory primed.

E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

2.7 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.

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1. Size: Approximately 36 inches wide.
2. Color: Contrasting with roof membrane.
3. Acceptable to membrane roofing system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

3.2 PREPARATION

A. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
   1. Submit test result within 24 hours of performing tests.
      a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

3.4 SUBSTRATE BOARD INSTALLATION

A. Install *Only Were Indicated on the Drawings*.

B. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
   1. At steel roof decks, install substrate board at right angle to flutes of deck.
      a. Locate end joints over crests of steel roof deck.
   2. Tightly butt substrate boards together.
   3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

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4. Fasten substrate board to top flanges of steel deck according to recommendations in FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
5. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.
6. Loosely lay substrate board over roof deck.

3.5 INSULATION INSTALLATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with [joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
    a. Locate end joints over crests of decking.
    b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
    c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
    e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
        1) Trim insulation so that water flow is unrestricted.
    f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
    g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
    h. Loosely lay base layer of insulation units over substrate.
    i. Mechanically attach base layer of insulation[and substrate board] using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
        1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
        2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
    a. Staggered end joints within each layer not less than 24 inches (610 mm) in adjacent rows.

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b. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
    1) Trim insulation so that water flow is unrestricted.
f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
h. Loosely lay each layer of insulation units over substrate.
i. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
    1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
    2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
    3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

D. Installation Over Wood / Wood Panel Decking:
1. Mechanically fasten slip sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to wood / wood panel decks.
    a. Fasten slip sheet according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
    b. Fasten slip sheet to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install base layer of insulation with joints staggered not less than 12 inches (305 mm) in adjacent rows.
    a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
    b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
    d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
        1) Trim insulation so that water flow is unrestricted.
    e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
    f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
    g. Loosely lay base layer of insulation units over substrate.

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h. Mechanically attach base layer of insulation (and substrate board where indicated on drawings) using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to wood / wood panel decks.
   1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
   2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

3. Install upper layers of insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.
   a. Staggered end joints within each layer not less than 24 inches (610 mm) in adjacent rows.
   b. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
   c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
   e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
      1) Trim insulation so that water flow is unrestricted.
   f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
   g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
   h. Loosely lay each layer of insulation units over substrate.
   i. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
      1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
      2) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
   1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   2. At internal roof drains, conform to slope of drain sump.
      a. Trim cover board so that water flow is unrestricted.
   3. Cut and fit cover board tight to nailers, projections, and penetrations.
   4. Loosely lay cover board over substrate.

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5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
   a. Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
   b. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
   c. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

B. Install slip sheet over cover board and immediately beneath roofing.

3.7 MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

A. Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roofing membrane and allow to relax before installing.

C. For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.

D. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.

E. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

F. Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.

G. Apply roof membrane with side laps shingled with slope of roof deck where possible.

H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.
   1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
   2. Apply lap sealant and seal exposed edges of roofing terminations.
   3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

I. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.
   1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
   2. Apply lap sealant and seal exposed edges of roofing terminations.

J. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
   1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.

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2. Apply lap sealant and seal exposed edges of roofing terminations.

K. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

L. In-Splice Attachment: Secure one edge of roof membrane using fastening plates or metal battens centered within splice, and mechanically fasten roof membrane to roof deck. Field splice seam.

M. Through-Membrane Attachment: Secure roofing using fastening plates or metal battens, and mechanically fasten roof membrane to roof deck. Cover battens and fasteners with a continuous cover strip.

N. Adhere protection sheet over roof membrane at locations indicated.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products according to manufacturer's written instructions.
1. Install flexible walkways at the following locations:
    a. Perimeter of each rooftop unit.
    b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
    c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
    d. Top and bottom of each roof access ladder.
    e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
    f. Locations indicated on Drawings.
    g. As required by roof membrane manufacturer's warranty requirements.

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2. Provide 6-inch (76-mm) clearance between adjoining pads.
3. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075323

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed steep-slope roof sheet metal fabrications.
5. Formed wall sheet metal fabrications.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For sheet metal flashing and trim.
1. Include plans, elevations, sections, and attachment details.
2. Distinguish between shop- and field-assembled work.
3. Include identification of finish for each item.
4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

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1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
   1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

B. Mockups: Build mockups to verify selections made under Sample submittals to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
   1. Build mockup of typical roof edge, including fascia, fascia trim and apron flashing, approximately 3 feet (1.0 m) long.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual “and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
   1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

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B. Aluminum Sheet (Building Perimeter and exposed to view from ground): ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
   1. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil (0.005 mm).
   2. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
   3. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   4. Color: Match the County's sample or a selected by from manufacturer's full range.

C. Metallic-Coated Steel Sheet (Roofing conditions not exposed to view from ground – i.e. RTU Curb / Fan Curb / etc.) : Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275); prepainted by coil-coating process to comply with ASTM A 755/A 755M.

   1. Surface: Manufacturer's standard clear acrylic coating on both sides.
   2. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Color: Match the County's sample or a selected by from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F (111 deg C); and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts. Minimum 60 day exposure prior to final roofing application.
   1. Manufacturers:
      a. Atlas Roofing
      b. Kirsch Building Products
      c. Or equal and approved.

C. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
   1. Manufacturers:

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a. Carlisle Coating.
b. Kirsch Building Products.
c. Owens Corning.
d. Or equal and approved.

2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

D. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or polysulfide polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Sealant must be compatible with roofing system.

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F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED REGLETS

A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
   1. Manufacturers:
      a. Cheney Flashing Company.
      b. Fry Reglet Corporation.
      c. National Sheet Metal Systems, Inc.
      d. Or equal and approved.
   2. Material: Aluminum, 0.024 inch (0.61 mm) thick.
      a. Finish: Mill.

2.6 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   1. Obtain field measurements for accurate fit before shop fabrication.
   2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
   3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
   1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
   2. Use lapped expansion joints only where indicated on Drawings.

C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

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E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.7 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters (including repair to Existing): Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
1. Accessories: Wire-ball downspout strainer and Valley baffles.

B. Provide Samples for the County selection on Downspouts, Parapet Scuppers, Conductor Heads and Splash Pans for selection on the following:

C. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
1. Hanger Style: Strap.
2. Fabricate from the following materials:
    a. Aluminum: 0.024 inch (0.61 mm) thick.
    b. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

D. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm) thick.
2. Stainless Steel: 0.019 inch (0.48 mm) thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

E. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from the following materials:
1. Aluminum: 0.032 inch (0.81 mm) thick.
2. Stainless Steel: 0.016 inch (0.40 mm) thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

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F. Splash Pans: Fabricate to dimensions and shape required and from the following materials:
   1. Aluminum: 0.040 inch (1.02 mm) thick.
   2. Stainless Steel: 0.019 inch (0.48 mm) thick.

2.8 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates. Shop fabricate interior and exterior corners.
   1. Fabricate from the Following Materials:
      a. Aluminum: 0.050 inch (1.27 mm) thick.
      b. Stainless Steel: 0.019 inch (0.48 mm) thick.
      c. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

B. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal, solder or weld watertight. Shop fabricate interior and exterior corners.
   1. Fabricate from the Following Materials:
      a. Aluminum: 0.050 inch (1.27 mm) thick.
      b. Stainless Steel: 0.025 inch (0.64 mm) thick.
      c. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch (1.02 mm) thick.

C. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
   1. Aluminum: 0.040 inch (1.02 mm) thick.
   2. Stainless Steel: 0.019 inch (0.48 mm) thick.
   3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

D. Counterflashing and Flashing Receivers: Fabricate from the following materials:
   1. Aluminum: 0.032 inch (0.81 mm) thick.
   2. Stainless Steel: 0.019 inch (0.48 mm) thick.
   3. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:
   1. Stainless Steel: 0.019 inch (0.48 mm) thick.
   2. Galvanized Steel: 0.028 inch (0.71 mm) thick.
   3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

F. Roof-Drain Flashing: Fabricate from the following materials:
   1. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.9 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond

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each side of wall openings; and form with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch (0.40 mm) thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.
2. Stainless Steel: 0.016 inch (0.40 mm) thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

C. Wall Expansion-Joint Cover: Fabricate from the following materials:

1. Aluminum: 0.040 inch (1.02 mm) thick.
2. Stainless Steel: 0.019 inch (0.48 mm) thick.
3. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

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2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum or stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) or as indicated on the drawings and with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws or substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

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4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters (Repair to Existing): Join sections with riveted and soldered joints. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.
2. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.

D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in asphalt roofing cement or elastomeric sealant compatible with the substrate.

E. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

F. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper discharge.

G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

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C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Reglets: Installation of reglets is specified in Section 033000 "Cast-in-Place Concrete." Section 042200 "Concrete Unit Masonry."

C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers written installation instructions.

END OF SECTION 076200

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SECTION 077253 - SNOW GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pad-type, flat-mounted snow guards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
   1. Include details of rail-type snow guards.

C. Samples:
   1. Pad-Type Snow Guards: Full-size unit.
      a. For units with factory-applied finishes, submit manufacturer's standard color selections.

D. Delegated-Design Submittal: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Include calculation of number and location of snow guards.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that the engineer is licensed in the jurisdiction in which the Project is located.

B. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating point of failure of attachment to roof system identical as that used on this Project.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design snow guards, including attachment to building, based on the following:
   1. Roof snow load.
   2. Snow drifting
   3. Roof slope.
   4. Roof type.
   5. Roof dimensions.
   6. Roofing substrate type and thickness.
   7. Snow guard type.
   8. Snow guard fastening method and strength.
   9. Snow guard spacing.
   10. Coefficient of Friction Between Snow and Roof Surface: 0.
   11. Factor of Safety: 2.

B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
   1. Snow Loads: 20 psf.

2.2 PAD-TYPE SNOW GUARDS

A. Flat-Mounted Metal Pad-Type Snow Guards:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Alpine SnowGuards, a division of Vermont Slate & Copper Services, Inc.
      b. Berger Building Products, Inc.
      c. IceBlox Inc.
      d. Rocky Mountain Snow Guards, Inc.
      e. Sieger Snow Guards Inc.
      f. TRA Snow and Sun, Inc.
   2. Material: ASTM B 209 (ASTM B209M), minimum 0.032-inch- (0.81-mm) thick aluminum sheet.

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a. Finish: Powder coat finish complying with AAMA 2603, with a minimum dry film thickness of 1.5 mils (0.04 mm).
   1) Color: As selected by the County from manufacturer's full range.

3. Material: ASTM B 26/B 26M cast aluminum.
   a. Finish: Powder coat finish complying with AAMA 2603, with a minimum dry film thickness of 1.5 mils (0.04 mm).
      1) Color: As selected by the County from manufacturer's full range.

4. Material: ASTM A 240/A 240M, Type 304 0.016-inch- (0.40-mm-) thick stainless steel sheet.
   a. Finish: ASTM A 480/A 480M, No. 2D.

5. Attachment: Manufacturer's tested system, capable of resisting design loads.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install snow guards according to manufacturer's written instructions.
   1. Space rows as indicated on Shop Drawings.
   2. Space rows as recommended by manufacturer.

B. Attachment for Asphalt Shingle Roofing:
   1. Flat-Mounted, Pad-Type Snow Guards: Mechanically anchored through each factory-prepared hole with fasteners concealed by the shingles. Retrofit mechanical anchor and counterflashing sleeve system in existing roofing.

END OF SECTION 077253

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SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes firestopping where indicated and/or required by authorities having jurisdiction:
   1. Penetrations in fire-resistance-rated walls.
   2. Penetrations in horizontal assemblies.
   3. Penetrations in smoke barriers, if any.

B. Related Requirements:
   1. Section 078443 “Joint Firestopping” for joints in or between fire-resistance-rated constructions.
   2. Section 079200 “Joint Sealants” for typical sealant requirements that are not penetration firestopping.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, indicating where it is intended for use.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

      a. 3M Fire Protection Products.
      b. NUCO Inc.

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c. Tremco, Inc.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

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C. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
   1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

D. Install fill materials by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.
   1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

3.3 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

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C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

END OF SECTION 078413

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SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Joints in or between fire-resistance-rated constructions where indicated and/or required by authorities having jurisdiction, (A.H.J.).
2. Penetrations in fire-resistance-rated walls.
3. Penetrations in horizontal assemblies.
4. Penetrations in smoke barriers, if any.

B. Related Requirements:
1. Section 078443 “Penetration Firestopping” for penetrations in fire-resistance-rated, walls and smoke barriers if any.
2. Section 079200 “Joint Sealants” for typical sealant requirements that are not joint firestopping.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Engineering Judgments: If required by authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 ENGINEERING JUDGMENTS

A. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping condition, submit illustration, with modifications marked, approved by joint firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

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PART 2 - PRODUCTS

2.1 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping: Firestopping that resist spread of fire, passage of smoke and other gases, and maintains original fire-resistance rating of assemblies in or between which joint firestopping is installed. Joint firestopping shall accommodate building movements without impairing its ability to resist the passage of fire and hot gases.

B. Caulk shall be compatible with the substrates forming openings to be caulked. Provide product incompliance with ASTM E-814 and UL 1479.
   1. Manufacturers/Products: Subject to compliance with requirements, available manufacturer offering the following product that may be incorporated into the Work includes, but is not limited to the following:
      a. DAP Products, Inc. #18806 Firestop – Fire rated silicone sealant.
   2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
   3. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.
   4. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

C. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved for conditions indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work. Start of Work signifies acceptance of conditions.

B. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

C. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

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D. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
   1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
   2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
   3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.2 IDENTIFICATION

A. Joint Identification where required by A.H.J.: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Joint Firestopping - Do Not Disturb."

3.3 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner retains the right to engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Latex joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Preconstruction laboratory test reports.

C. Preconstruction field-adhesion-test reports.

D. Field-adhesion-test reports.

E. Sample warranties.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

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1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two-years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Colors of Exposed Joint Sealants: As selected by the County from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

   1. Manufacturers:
      a. Dow Corning Corporation.
      b. GE Construction Sealants.
      c. Pecora Corporation.
      d. Sika Corporation.
      e. Tremco Incorporated.

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2.3 URETHANE JOINT SEALANTS

A. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and non-traffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.

1. Manufacturers:
    a. LymTal International Inc.
    b. Or equal and approved.

B. Urethane, S, P, 25, T, NT. 2-component, premium-grade, polyurethane-based, elastomeric sealant. Chemical cure in a non-sag consistency. Meets ASTM C-920, Type M, Grade NS, Class 25, use T, NT, M, G, A, O and Federal Specification TT-S-00227E, Type II, Class A. Meets CAN/CGSB 19.24 - M90.

1. Manufacturers:
    a. Sika Corporation
    b. Or equal and approved.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Dow Corning Corporation
    b. GE Construction Sealants
    c. Pecora Corporation
    d. Tremco Incorporated

C. Acrylic Latex: Siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. May National Associates, Inc.; a subsidiary of Sika Corporation.
    b. Pecora Corporation.
    c. Sherwin-Williams Company (The).
    d. Tremco Incorporated

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2.6 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   1. Manufacturers: Subject to compliance with requirements, provide products by the following or equal and approved:
      a. Construction Foam Products; a division of Nomaco, Inc...

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacture.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove laitance and form-release agents from concrete.
   2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

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3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
   4. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.3 Movement joints are to be provided in conjunction with the recommendations of EJ171-09, Tile Council of North America and per Detail EJ171F unless otherwise noted.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
   1. Extent of Testing: Test completed and cured sealant joints as follows:
      a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
      b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.

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2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
    a. Whether sealants have filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces [JS-1].

1. Joint Locations:
    a. Isolation and contraction joints in cast-in-place concrete slabs.
    b. Tile control and expansion joints.
    c. Joints between different materials listed above.
    d. Other joints as indicated on Drawings.
2. Sealant: Urethane, M, P, 50, T, NT

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3. Joint-Sealant Color: As selected by the County from manufacturer's full range of colors to match one or both adjacent surfaces.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces [JS-2].
   1. Joint Locations:
      a. Construction joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints in exterior insulation and finish systems.
      d. Joints between metal panels.
      e. Other joints as indicated on Drawings.
   2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
   3. Joint-Sealant Color: As selected by the County from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces [JS-3].
   1. Joint Locations:
      a. Isolation joints in cast-in-place concrete slabs.
      b. Control and expansion joints in tile flooring.
      c. Other joints as indicated on Drawings.
   2. Joint Sealant: Urethane, S, P, 25, T, NT.
   3. Joint-Sealant Color: As selected by the County from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces [JS-4].
   1. Joint Locations:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Tile control and expansion joints.
      c. Vertical joints on exposed surfaces of unit masonry, concrete walls and partitions.
      d. Other joints as indicated on Drawings.
   2. Joint Sealant: Urethane, S, NS, 25, NT. As selected by the County from manufacturer's full range of colors.
   3. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces [JS-5].
   4. Joint Locations:
      a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      b. Tile control and expansion joints where indicated.
      c. Other joints as indicated on Drawings.
   5. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
   6. Joint-Sealant Color: As selected by the County from manufacturer's full range of colors.

End of Section 079200

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SECTION 081113 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Interior HM door and window frames.
2. Factory prime painting of all interior HM fabrications and products.
3. Cylinders for door hardware specified in other Sections.
4. Electrified door hardware.

B. Related Requirements:
1. Section 081416 “Flush Wood Doors” for interior (p-lam / vinyl) faced solid-core wood door requirements at HM frames.
2. Section 087100 “Door Hardware” for door hardware requirements of this section.
3. Section 088000 “Glazing” for glass at HM frames.
4. Section 099123 “Painting” for HM frame painting requirements.
5. Section 134900 “Radiation Protection” for requirements of the HM door frame at the X-Ray Room.

1.2 PREINSTALLATION MEETINGS

A. Keying Conference: Conduct conference at Project site**.**

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 ACTION SUBMITTALS

A. Product Data and Installation Instructions: For each type of product. Provide manufacturer’s published details with indications of preparations for specified hardware.

B. Shop Drawings: Include project specific elevations, frame profiles, metal thicknesses, preparations for hardware, and other details.
1. For electrified door hardware.
a. Include diagrams for power, signal, and control wiring.
b. Include details of interface of electrified door hardware and building safety and security systems.

C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Reference Section 087100 “Door Hardware”.

D. Shop Drawings:

E. Samples: For each exposed product in each finish specified.

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F. Keying schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. Ceco Door; ASSA ABLOY.
   2. Republic Doors and Frames.
   3. Steelcraft; an Ingersoll-Rand brand.

B. Fire-Rated Assemblies: Where required, provide frames complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

2.2 INTERIOR HM FRAMES

A. Standard-Duty Frames: SDI A250.8, Level 1.
   1. Minimum Physical Performance: Level C according to SDI A250.4.
   2. Frames:
      a. Materials: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
      b. Construction: Full profile welded.
   3. Exposed Finish: Manufacturer's primed finish that is compatible with base metals and finish painting specified in Section 099123 "Interior Painting".
   4. Frame Anchors

B. Jamb Anchors: Provide as required by wall or partition conditions:
   1. Concrete Masonry Type:
   2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
   3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

C. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.3 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.
   1. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches (44.5 mm).

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c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch (1.0 mm), with minimum A60 (ZF180) coating.
d. Edge Construction: Model 2, Seamless.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges. Coordinate with Door Hardware Schedule.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Manufacturer's standard with vertical steel stiffener.
i. Fire-Rated Core: Manufacturer's standard vertical steel stiffener with insulation core for fire-rated doors.

2. Frames:
a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A60 (ZF180) coating.
b. Construction: Full profile welded.

2.4 BORROWED LITES

A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.042 inch (1.0 mm).

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 FRAME ANCHORS

A. Jamb Anchors:
1. Type: Anchors of minimum size and type required by applicable door and frame standard and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
3. Post-installed Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

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2.5 MATERIALS

A. Recycled Content of Steel Products: Provide where possible.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.

H. Glazing: Refer to Section 088000 "Glazing."

2.6 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Confirm and verify frame throat dimension requirements prior to submission of submittal and start of fabrication.

C. Hollow-Metal Frames: Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor.
3. Jamb Anchors: Provide type, number and spacing of anchors for wall or partition conditions as follows or as required by fire rated construction regulations:
    a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    b. Compression Type: Not less than two anchors in each frame.
    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.

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a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
c. Coordinate silencer hole diameter with silencer specified in Section 087100 “Door Hardware”.

D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce frames to receive nontemplated and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated
6. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
7. Coordinate rabbet depth with fire resistance rating requirements.

2.7 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer:
1. Shop Primer: SDI A250.10.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

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1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Fire-Rated Openings: Install frames according to NFPA 80.
3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
5. Solidly pack mineral-fiber insulation inside frames.
6. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
7. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
9. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8 NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

D. Inspection Agency: Provide allowance to engage a qualified inspector to perform inspections and to furnish reports to the County. This is to include doors that require re-certification due to lost or unreadable labeling. The allowance is for a single visit to inspect doors prior to Certificate of Temporary Occupancy.

E. Inspections:

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1. Fire-Rated Door Inspections: Inspect each fire-rated door according to NFPA 80, section 5.2
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements according to NFPA 101, section 7.2.1.15.

F. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

G. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

H. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.3 ADJUSTING, CLEANING & PROTECTION

A. Adjust all hardware for optimum and code required operation.

B. Touchup Painting: Clean and touchup primer to match factory primer.

C. Clean and touch up metallic-coated steel sheet to match original coating.

D. Clean all exposed metal surfaces to be free of dirt and foreign materials. Clean each side of all glass surfaces and leave free of identification sticker, dirt and surface marks.

E. Provide removable protection tape at door frame surfaces where subject to construction and/or move-in damage and at hardware handles and operators to protect from scratches and dents.

F. Remove scratch and dent protection tape upon occupancy.

END OF SECTION 081113

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SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior flush and glazed solid-core, plastic laminate faced, factory finished doors.
   2. Provide fire rated doors where scheduled on the Architectural Drawings.

B. Related Requirements:
   1. Section 081113 "Hollow Metal Frames" for frames for wood doors.
   2. Section 088000 "Glazing" for glass in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
   1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
   2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
   3. Details of frame for each frame type, including dimensions and profile.
   4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
   5. Dimensions and locations of blocking.
   6. Dimensions and locations of mortises and holes for hardware.
   7. Dimensions and locations of cutouts.
   8. Undercuts.
   9. Requirements for veneer matching.
   10. Specified door finish.
   11. Fire resistance ratings for fire-rated doors.

C. Samples: For factory-finished doors. Provide both selection and verification finish samples.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Manufacturer’s standard warranty.

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1.4 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification and WI Certified Compliance Program certificates.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses

1.5 WARRANTY

A. Provide manufacturer's standard product warranty for each product provided.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. Marshfiled – Algoma by Masonite.
   2. Graham Wood Doors; ASSA ABLOY Group Company.
   3. Mohawk Flush Doors, Inc.
   4. Construction Specialties, Inc.

2.3 SOLID-CORE FLUSH COMPOSITE DOOR WITH VINYL CLADDING

A. Basis of Design: Construction Specialties, Inc. – Acrovyn Door

B. Door Construction
   1. Non Fire Rated Doors and 20-minute interior flush doors conforming to WDMA I.S.1A-04 and the following:

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a. Thickness: 1 3/4" +/-1/16", (44.45mm +/- 1.58mm)
b. Core: Solid. Interior stiles and rails bonded. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
   1) FSC Certified Particleboard grade LD-1, 32 lb/ft$^{3)}$ (14.51kg/m³) density, no added urea formaldehyde content, ANSI A208.1.2009, CARB Phase I compliant (or) -
   2) Structural Composite Lumber, 39 lb/ft$^{3)}$ (17.69kg/m³) density - no added urea formaldehyde content
c. Crossbanding: FSC certified
d. Replaceable door stiles: ¾" (19.05mm) replaceable stiles shall be field replaceable if ever damaged by impact.
e. Replaceable door edges: Fully wrapped and rounded Acrovyn (or) stainless steel door edges shall be field replaceable if ever damaged by impact, exclusive of external fasteners to improve appearance.
   1) Subject to the terms and conditions of our Limited Warranty for the lifetime of the doors, the manufacturer shall supply replacement Acrovyn edge covers AT NO COST to the Owner.
f. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty
g. Durability Performance: Cycle Slam WDMA TM-7, 1990 Extra Heavy Duty-1,000,000 cycles to insure durability of entire door construction

2. 45 and 60-minute interior FLUSH fire rated doors conforming to WDMA I.A. 1-A and the following:
   a. Thickness: 1 3/4" +/-1/16", (44.45mm +/- 1.58mm)
   b. Cores: Solid. Interior stiles and rails bonded. Non-combustible mineral composite, 25-32 lb/ft^3 density, no added urea formaldehyde content. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
   c. Crossbanding: FSC certified
   d. Replaceable door stiles: ¾" (19.05mm) replaceable stiles shall be field replaceable if ever damaged by impact.
   e. Replaceable door edges: Fully wrapped and rounded Acrovyn [or] stainless steel door edges shall be field replaceable if ever damaged by impact, exclusive of external fasteners to improve appearance.
      1) Subject to the terms and conditions of our Limited Warranty for the lifetime of the doors, the manufacturer shall supply replacement Acrovyn edge covers AT NO COST to the Owner
   f. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty
   g. Durability Performance: Cycle Slam WDMA TM-7, 1990 – 1,000,000 cycles to insure durability of entire door construction

3. 90-minute interior FLUSH fire rated doors conforming to WDMA I.S.1A-04 and the following:
   a. Thickness: 1 3/4" +/-1/16", (44.45mm +/- 1.58mm)
   b. Core: Solid. Interior stiles and rails bonded, non-combustible mineral composite construction 25-32 lb/ft^3 density, no added urea formaldehyde content. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
   c. Crossbanding: mineral composite

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d. Replaceable door edges: Fully wrapped and rounded Acrovyn [or] stainless steel door edges shall be field replaceable if ever damaged by impact, exclusive of external fasteners to improve appearance.
e. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty
f. Durability Performance: Cycle Slam WDMA TM-7, 1990 – 1,000,000 cycles to insure durability of entire door construction.

4. Non rated and 20-minute interior flush LEAD-LINED doors conforming to WDMA I.S.1A-04 and the following:
   a. Thickness: 1 3/4" +/-1/16", (44.45mm +/- 1.58mm)
   b. Core: Solid. Interior stiles and rails bonded. Tops and bottoms factory sealed with an approved sealer to prevent moisture intrusion.
      1) FSC Certified Particleboard grade LD-1, 32 lb/ft$^{3)}$ density - no added urea formaldehyde content, ANSI A208.1.2009, CARB Phase I compliant [or]
      2) Structural Composite Lumber, 39 lb/ft$^{3)}$ (17.69kg/m^3) density - no added urea formaldehyde content
   c. Crossbanding: FSC certified
   d. Replaceable door edges: Fully wrapped and rounded Acrovyn [or] stainless steel door edges shall be field replaceable if ever damaged by impact, exclusive of external fasteners to improve appearance.
   e. WDMA I.S.1A-04 Performance Duty Level: Extra Heavy Duty

2.4 SOLID-CORE FLUSH WOOD DOORS WITH PLASTIC-LAMINATE FACES (ALTERNATE)

A. Interior Doors :
1. Performance Grade: WDMA I.S. 1A Heavy Duty.
2. Performance Grade:
   a. WDMA I.S. 1A Heavy Duty unless otherwise indicated on Drawings.
3. Architectural Woodwork Standards Grade: Premium.
4. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
5. Colors, Patterns, and Finishes: As selected by the County from laminate manufacturer's full range of products.
6. Exposed Vertical Plastic laminate that matches faces, applied before faces.
   a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
   b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
   c. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
      1) Finish steel edges and astragals with baked enamel same color as doors.
      2) Finish steel edges and astragals to match door hardware (locksets or exit devices).
7. Core for Non-Fire-Rated Doors: ANSI A208.1, Grade LD-2 particleboard.

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a. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware
b. Provide doors with glued-wood-stave or WDMA I.S. 10 structural-composite-lumber cores instead of particleboard cores for doors scheduled to receive exit devices in Section 087100 "Door Hardware."

8. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
9. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core); with entire unit abrasive planed before faces and cross-bands are applied.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

C. Openings: Factory cut and trim openings through doors.
1. Light Openings: Trim openings with manufacturer's moldings of material and profile required for both non-rated and rated light openings. Moldings at non-rated and rated openings shall match in material, profile and finish.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
1. Install fire-rated doors according to NFPA 80.

C. Job-Fitted Doors:
1. Align and fit doors in frames with uniform clearances and bevels as indicated below;
a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
b. Machine doors for hardware.
c. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
2. Clearances:
a. Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

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b. Comply with NFPA 80 for fire-rated doors.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Coordinate door height and installation with raised thresholds. Refer to the Door Schedule for threshold locations.

3.2 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to the County.

B. Inspections:
1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.3 PROTECTION

A. Provide door finish protection on doors in storage and once installed.

B. Repair finish on any damaged doors to a level acceptable to the County. Replace entire door if repair is not acceptable to County.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

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SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Access panels, doors and frames for walls and ceilings where indicated and/or required for access.
2. Required access panels, doors and frames to concealed spaces as required by Authorities Having Jurisdiction, (AHJ).

B. Related Requirements:
1. Refer to Mechanical & Electrical Drawings for required locations.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each door face material.

D. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Where Required: Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 tested according to the following test method:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.

2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Provide products manufactured by one of the following manufactures:
1. Access Panel Solutions.
2. JL Industries, Inc.
3. Milcor Commercial Products

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4. Williams Brothers Corporation

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Flush Access Doors with Exposed Flanges:
   1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard width exposed flange, proportional to door size.
   2. Locations: Wall and ceiling where not indicated as an assembly with concealed flanges.
   3. Door Size: As indicated on drawings or required for access.
   4. Typical: Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
      a. Finish: Factory prime.
   5. Wet Areas:
      a. Stainless Steel Sheet for Door: Nominal 16 gauge.
         1) Finish: 304, Brushed Satin.
   6. Frame Material: Same material, thickness, and finish as door.
   7. Hinges: Manufacturer's standard.
   8. Hardware: Locking.

D. Fire-Rated, Flush Access Doors with Exposed Flanges:
   1. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide manufacturer's standard-width exposed flange, proportional to door size.
   2. Locations: Wall and ceiling where not indicated with concealed flanges.
   3. Fire-Resistance Rating: Not less than that of adjacent construction.
   4. Temperature-Rise Rating: As required by location and application.
   5. Typical: Uncoated Steel Sheet for Door: Nominal 0.036 inch, 20 gage.
      a. Finish: Factory prime and ready to paint
   6. Wet Areas:
      a. Stainless Steel Sheet for Door: Nominal 16 gauge.
         1) Finish: 304, Brushed Satin.
   7. Frame Material: Same material, thickness, and finish as door.
   8. Hinges: Manufacturer's standard.
   9. Hardware: Locking.

E. Access Doors for Acoustical Tile
   1. Provide drop-in unit to standard acoustical tile grid. Nominal 24” x 24”.
   2. Door and Trim: 14 gauge steel. Recessed to accept a maximum of 1 inch thick acoustical tile. (Optional – Provide aluminum door and frame unit)
   3. Frame: 16 gauge steel. (Optional – Provide aluminum frame unit)
   4. Hinge: Full-length semi-concealed piano hinge. Opens 180 degrees. On long side of door.
   5. Latches: Flush, stainless steel cam-operated with screwdriver. Positioned opposite hinge and at top and bottom on larger sizes.
   6. Finish: Baked white enamel coat over rust-inhibiting phosphate treated steel.
   7. Cylinder Lock: Key-operated medium barrel.

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F. Glass Fiber (GFRG) Access Doors
   1. WB GY 3000 Series Lightweight Gypsum Ceiling Access Panel.
   2. Door & Frame: 5/8" lightweight Gypsum, drop in door.
   3. Finish: Unpainted natural grey Gypsum.

G. Sizes:
   1. Provide size as indicated or if not indicated, as required to afford passable or usable access to equipment therein.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

E. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

F. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

G. Aluminum Sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2.

H. Frame Anchors: Same type as door face.

I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

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D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For cylinder locks, furnish two keys per lock and key all locks alike.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:
   1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
   2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.

E. Aluminum Finishes:
   1. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

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SECTION 083449 - RADIATION SHIELDING DOOR AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Radiation shielding swinging doors and frames.
   2. Radiation shielding sidelight, borrowed lite and transom panels and frames.

B. Related Sections:
   1. Division 04 Section "Unit Masonry" for embedding anchors for radiation shielding hollow metal work into masonry construction.
   2. Division 08 Section "Glazing" for glass view panels in radiation shielding doors.
   3. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware for radiation shielding doors and frames.
   4. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
   5. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.
   6. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access system.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
   2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
   3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
   4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
   5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
   6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   8. ASTM B749-03 – Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
   9. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

10. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
11. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
12. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
13. UL 10C (1998) - Positive Pressure Fire Tests of Door Assemblies; UL 1784 (2001) - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:
1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of preparations for power, signal, and control systems.

D. Samples for Verification:
1. Samples are only required by request of the architect and for manufactures that are not current members of the Steel Door Institute.

E. Informational Submittals:
1. Certificates of Compliance: Submit any information necessary to indicate compliance with this specification section.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain radiation shielding doors and frames through one source from a single manufacturer wherever possible.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

C. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.

D. Smoke-Control Door Assemblies: Comply with NFPA 105.

E. Pre-Installation Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing radiation shielding doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver radiation shielding work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store radiation shielding work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for radiation shielding frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. Provide manufacturer's written 5 year warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CECO Door Products (C).
   2. Curries Company (CU).
   3. Security Metal Products (SMP).

B. Substitutions: Material from alternate radiation shielding door and frame fabricators will not be accepted on jobsite without prior written and sample approval in accordance with requirements specified in Division 01.

2.2 MATERIALS

A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

B. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Lead Glazing: Comply with requirements in Division 08 Section, "Glazing."

2.3 RADIATION SHIELDING FRAMES

A. General: Provide frames of the type and profile indicated, not less than thickness indicated; to comply with ANSI/SDI A250.8.

   1. Fabricate frames with mitered corners.
   2. Fabricate frames with "closed and tight" mitered, full depth continuously welded seams, finished smooth with no visible seam unless otherwise indicated. Knock down type frames are not permitted.
   3. Minimum 16 gage (0.053-inch -1.3-mm) thick steel sheet
   4. Lead-lining: Rolled pure sheet lead conforming to ASTM B749, matching sheet thickness specified for lead door cores.

B. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

C. Surface Applied Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.4 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup anchors to suit frame size, not less than 16 (0.8 mm) gage thickness, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
   2. Stud Wall Type: Designed to engage stud and not less than 16 gage (0.8 mm) thickness.

B. Floor Anchors: Floor anchors to be provided at each jamb. Formed from same material as frames, not less than 14 gage (0.067-inch -1.7-mm) thick.

C. Mortar Guards: Provide minimum 26 gage mortar guards welded to the back of each hardware cutout.

2.5 STOPS AND GLAZED LITES

A. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Factory installed, minimum 16 gauge (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

2.6 FABRICATION

A. Fabricate radiation shielding work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate radiation shielding work to tolerances indicated in ANSI/SDI A250.8.

C. Radiation Shielding Doors:
   1. Glazed Lites: Factory cut openings in doors with applied flush trim kit to fit.
   2. Astragals: Provide lead-lined overlapping astragals on one leaf of pairs of doors where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.
   3. Continuous Hinge Reinforcement: Provide welded continuous 12 gage strap for continuous hinges specified in hardware sets in Division 08 Section, "Door Hardware".

D. Radiation Shielding Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Welded Frames: Full depth continuously weld frame seams; grind, fill, dress, and make smooth and flush.
      a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. High Frequency Hinge Reinforcement: Provide 12 gage angle reinforcements for butt type hinges on every door and frame assembly.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gage straps for continuous hinges specified in hardware sets in Division 08 Section, "Door Hardware".
5. Electrical Knock Out Boxes: Factory weld 18 gage electrical knock out boxes to frame for electrical hardware preps; this includes but not limited to electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as noted in door hardware sets in Division 08 Section, "Door Hardware".
    a. Provide electrical knock out boxes as required for Project.
    b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
    c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section, "Door Hardware".
    d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
6. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
7. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry and Stud Wall Types: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
        1) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 84 inches (2137 mm) high.

E. Surface Hardware Preparation: Factory prepare radiation shielding work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section, "Door Hardware."
    1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
    2. Reinforce doors and frames to receive non-template, mortised and surface-mounted door hardware.
    3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of radiation shielding work for hardware.
    4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

F. Stops and Moldings: Provide factory installed stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricators shop.
    1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of radiation shielding work.
    2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so glazed lites are capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

2.7 STEEL FINISHES

A. Prime Finish: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded radiation shielding frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install radiation shielding work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Radiation Shielding Frames: Install radiation shielding frames of size and profile indicated. Comply with ANSI/SDI A250.11.
   1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
      a. At fire-protection-rated openings, install frames according to NFPA 80.
      b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
      c. Install frames with removable glazing stops located on secure side of opening.
      d. Install door silencers in frames before grouting.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
   3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with appropriate mortar.
   4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Radiation Shielding Doors: Fit radiation shielding doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
      b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
      c. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Division 08 Section, "Glazing" and with door manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including radiation shielding work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from radiation shielding work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 083449

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES & STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior entrance framing and sidelight.
2. Interior swinging entrance door(s) where scheduled.
   a. Provide glazed door(s) as specified, indicated and scheduled on drawings.
3. Door Hardware as specified in this Section and specified and scheduled in Section 087100 “Door Hardware”.
   a. Coordination of electric strike and card reader wiring where scheduled to be provided in Section 087100 “Door Hardware”.

B. Related Requirements:
1. Section 061000 “Rough Carpentry” for openings and substrate materials and conditions.
2. Section 079200 “Joint Sealants” for perimeter sealant and backerrod materials and requirements.
3. Section 087100 “Door Hardware” for door hardware requirements.
4. Section 088000 "Glazing" for glazing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include project specific plans, elevations, sections, full-size details, including attachment details to other work.

C. Samples:
1. Framing and Glass Selection Samples: Manufacturer’s full range of colors and finishes for the County’s selection.
2. Verification samples of the County’s selected finish.

D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate submittal with requirements of Section 087100 “Door Hardware”.

1.4 INFORMATIONAL SUBMITTALS

A. Specified warranties.

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1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Certified in writing by systems manufacturer as qualified to perform installation of specified systems.

B. Single Source: Obtain materials and components for systems from manufacturer or from manufacturer approved by systems manufacturer.

C. Perform Work in accordance with AAMA SFM1 and manufacturer's written instructions.

D. Conform to requirements of ANSI 117.1 and requirements of authorities having jurisdiction.

E. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

F. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
   1. Do not change intended aesthetic effects, as judged solely by the County, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review. Alternatively the County may choose to have their own Engineer or Project Manager review and approve the requested modifications.

G. Design Intent: It is the design intent to match the installed exterior doors, glazing and framing in material, finish and color. Review existing shell building aluminum-framed entrance & storefront documentation with the County prior to issuing Submittal.

1.7 WARRANTY

A. Provide written warranty in form acceptable to Owner signed by installer and Contractor warranting work to be watertight, free from deflective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within warranty period.
   1. Warranty Period: Minimum two years from date of Substantial Completion.

B. Manufacturer's Fabrication and Finish Warranty: Provide written warranty stating that fabrication meets the requirements of this Specification Section organic and that the coating finish will be free from fading more than 10%, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer's descriptive standards for warranty period and agreeing to promptly correct defects.
   1. Warranty Period: Minimum 20 years from date of Substantial Completion.

C. Manufacturer's Warranties shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project.

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1.8 PERFORMANCE REQUIREMENTS

A. General: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
   1. Structural loads.
   2. Thermal movements.
   3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
   4. Dimensional tolerances of building frame and other adjacent construction.
   5. Failure includes the following:
      a. Deflection exceeding specified limits.
      b. Thermal stresses transferred to building structure.
      c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
      d. Noise or vibration created by wind and thermal and structural movements.
      e. Loosening or weakening of fasteners, attachments, and other components.
      f. Sealant failure.
      g. Failure of operating units to function properly.

C. Structural Loads:
   1. Wind Loads: 28.65psf / -38.20psf at the salient corners and 28.65psf / -31.04psf elsewhere based on a design wind speed of 105 mph, Category B.

D. Deflection of Framing Members Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.

E. Structural-Test Performance: Systems tested according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
   2. When tested at 200 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
   3. Test Durations: As required by design wind velocity but not less than 10 seconds.

F. Temperature Change (Range): Systems accommodate 120 deg F, ambient; 180 deg F, material surfaces.

G. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of systems of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft.

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H. Water Penetration under Static Pressure: Systems do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

I. Condensation Resistance: Fixed glazing and framing areas of systems have condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.

J. Average Thermal Conductance: Fixed glazing and framing areas of systems have average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials and components in manufacturer's unopened, original packaging.

B. Store materials and components in in areas where damage will not occur. Provide adequate support to prevent damage.

C. Handle materials and components as required by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: The design for aluminum-framed systems is based on: Kawneer 190 Medium Stile Swing Doors and Trifab 450T Storefront and fixed windows for exterior applications. Refer to drawings for locations of each system, Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
1. Kawneer.
2. EFCO Corporation.
3. YKK.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed entrance door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" (2.3 mm) wall thickness at any location for the main frame and door leaf members.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum-framed entrance door members, trim hardware, anchors, and other components.

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C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Construction: Exterior framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   2. Reinforce members as required to receive fastener threads.
   3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from stainless steel.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING

A. Glazing: As specified in Division 08 Section “Glazing”.

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

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C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.5 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum-framed entrance doors.

B. Standard Hardware:
1. Weather-stripping:
   a. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
3. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.
4. Pivot: Recessed Floor Pivot
5. Push/Pull: Locking Pull / Dummy Pull (Pull extends to floor)
6. Exit Device: Panic Bar with integral dummy pull (Pull extends to floor)
7. Closer: Reference Door Hardware Schedule (Motorized and Pneumatic)...
8. Security Lock/Dead Lock: Reference Door Hardware Schedule
9. Cylinder(s)/Thumbturn: Key Cylinder
10. Electric Strike/Strike Keeper: Reference Hardware Schedule.

11. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products or product equivalents in function and comparable in quality to named products or products complying with referenced BHMA standards.
12. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
   b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.

2.6 ENTRANCE DOORS

A. Entrance Doors: Manufacturer's standard glazed and flush entrance doors for manual-swing operation. Provide quantity, item, size, finish or color indicated, and named manufacturers' products or product equivalents in function and comparable in quality to named products or products complying with referenced BHMA standards.
1. Door Construction: 1-3/4 inch (44.5 mm) overall nominal thickness, with minimum 1/8 inch (3.2 mm) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design:
   a. Vertical stile measures: 2-1/8” (54mm):
   b. Top rail measures: 2-1/4” (57.2 mm)
   c. Bottom rail measures: 10” (ADA compliant)

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d. Glazing Stops and Gaskets: Manufacturer's standard stops and gaskets.
e. Provide non-removable glazing stops on outside of exterior door.
f. Provide glazed openings of sizes indicated and/or scheduled on drawings.
g. Provide lock rail where indicated on drawings.
h. Provide insulated metal panel below half glazed doors.

3. Opening-Force Requirements:
   a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
   b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.

2.7 GLAZING

A. Glazing: Comply with Section 088000 "Glazing".

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: Low VOC, as recommended by manufacturer.

2.8 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
7. Coordinated with and accepts electric strikes and other hardware as scheduled and required.

D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

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F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 ALUMINUM FINISH

A. Finish: Clear Anodized

PART 3 - EXECUTION

3.1 PREPARATION - INSPECTION

A. Verify field conditions for production of Shop Drawing Submittals. Inspect conditions in which Work is to be performed. Inform the County in writing of any conditions that would be detrimental to the completion of the Work of this Specification Section. Do not start Work until all conditions are satisfactory.

B. Start of Work signifies acceptance of conditions and responsibility to complete the Work of this Section.

3.2 PREINSTALLATION CONFERENCE

A. Conduct a Preinstallation conference at the site to review existing conditions, material storage, hardware requirements, interface with adjoining materials and systems, access control and safety requirements and other aspects of the Work necessary to meet overall performance requirements.
   1. Attendees:
      a. Contractor.
      b. Owner or owner’s representative.
      c. Manufacturer or manufacturer’s representative.
   2. Review existing entrance submittal and confirm ability to match products.
   3. Review keying and any electric strike/card reader requirements.

3.3 INSTALLATION

A. General:

   1. Comply with manufacturer's written instructions.
   2. Do not install damaged components.
   3. Fit joints to produce hairline joints free of burrs and distortion.
   4. Rigidly secure non-movement joints.
   5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

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6. Seal perimeter and other joints watertight unless otherwise indicated.
7. Provide weeps where indicated on shop drawings and required by manufacturer.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint or provide other isolation/separation medium.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install glazing as specified in Section 088000 "Glazing" and Section 088813 “Fire Resistant Glazing”.

F. Doors: Install doors to produce smooth operation and tight fit at contact points.
1. Weathertight, Humidity Control: Install doors to produce weathertight and/or humidity controlled enclosure with weather stripping and weather sweeps.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.
3. Entrances: Install to produce smooth operation and tight fit at contact points.
4. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
5. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

G. Install insulation materials as specified in Division 7 Section "Building Insulation."

H. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

I. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.4 DOOR HARDWARE SETS

A. Refer to Section 087100 “Door Hardware”.

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3.5 ADJUSTING, CLEANING & PROTECTION

A. Adjust all hardware for optimum and code required operation.

B. Clean all exposed metal surfaces to be free of dirt and foreign materials. Clean each side of all glass surfaces and leave free of identification stickers, dirt and surface marks.

C. Provide removable protection tape at door frame surfaces where subject to construction and/or move-in damage and at hardware handles and operators to protect from scratches and dents.

D. Remove scratch and dent protection tape upon occupancy.

E. Replace any damaged Work.

END OF SECTION 084113

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SECTION 084523 – INSULATED TRANSLUCENT FIBERGLASS SKYLIGHT SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Flat factory prefabricated structural insulated translucent sandwich panels
2. Aluminum installation system
3. Aluminum flashing attached to skylights

B. Related Sections:
1. Rough Carpentry: Section 06100
2. Roofing: Section 074113.16 and 075323
3. Flashing and Sheet Metal: Section 076200
4. Sealants: Section 079200
5. Glazing: Section 088000

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Submit manufacturer’s product data. Include construction details, material descriptions, profiles and finishes of skylight components.

C. Submit shop drawings. Include elevations and details.

D. Submit manufacturer's color charts showing the full range of colors available for factory-finished aluminum.
1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.
a. Sandwich panels: 14” x 28” units
b. Factory finished aluminum: 5” long sections

E. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.

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F. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
   1. Reports required are:
      a. International Building Code Evaluation Report
      b. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
      c. Burn Extent (ASTM D 635)
      d. Color Difference (ASTM D 2244)
      e. Impact Strength (UL 972)
      f. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
      g. Bond Shear Strength (ASTM D 1002)
      h. Beam Bending Strength (ASTM E 72)
      i. Fall Through Resistance (ASTM E 661)
      j. Insulation U-Factor (NFRC 100)
      k. NFRC System U-Factor Certification (NFRC 700)
      l. Solar Heat Gain Coefficient (NFRC or Calculations)
      m. Condensation Resistance Factor (AAMA 1503)
      n. Air Leakage (ASTM E 283)
      o. Structural Performance (ASTM E 330)
      p. Water Penetration (ASTM E 331)
      q. Class A Roof Covering Burning Brand (ASTM E 108)
      r. UL Listed Class A Roof System (UL 790) (Optional) – Submit UL Card
      s. Daylight Autonomy.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications
   1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope and location. At least three of the projects shall have been in successful use for ten years or longer.
   2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
   3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 “Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems” as issued by the ICC-ES.

B. Installer’s Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified skylight systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

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1.5 PERFORMANCE REQUIREMENTS

A. The manufacturer shall be responsible for the configuration and fabrication of the complete skylight panel system.
   1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   2. Standard skylight system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
   3. Structural Loads; Provide skylight system capable of handling the following loads:
      a. Live Load: 20 PSF
      b. Snow Load: 20 PSF
      c. Drift Load: 50 PSF
      d. Wind Load: 10 PSF

1.6 DELIVERY STORAGE AND HANDLING

A. Deliver panel system, components and materials in manufacturer's standard protective packaging.

B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

A. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering, defects in accessories, insulated translucent sandwich panels and other components of the work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

B. Manufacturers:
   1. Structures Unlimited, Inc., Tel: (800) 225-3895 – Fax: (603) 627-0798 – Email: info@structuresunlimitedinc.com
   2. Major Industries, Inc. Tel: (888) 759-2678 – Email: info@majorskylights.com
   3. CPI Daylighting / Kingspan Light + Air, Tel: (800) 759-6985 – Email: info@cpidaylighting.com.

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2.2 PANEL COMPONENTS

A. Face Sheets
1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
   a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
   b. Face sheets shall not deform, deflect or drip when subjected to fire or flame.
2. Interior face sheets:
   a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 25 and smoke developed no greater than 250 when tested in accordance with UL 723.
   b. Burn extent by ASTM D 635 shall be no greater than 1”.
3. Exterior face sheets:
   a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after 25 years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
   b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of 70 ft. lbs. without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.
4. Appearance:
   a. Exterior face sheets: Smooth, .070 thick and white in color.
   b. Interior face sheets: Smooth, .045 thick and white in color.
   c. Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

B. Grid Core
1. Thermally broken composite I-beam grid core shall be of 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16”.
2. I-beam Thermal break: Minimum 2”, thermoset fiberglass composite.

C. Laminate Adhesive
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council “Acceptance Criteria for Sandwich Panel Adhesives”.
2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
4. 50% Relative Humidity at 68° F: 540 PSI
5. 182° F: 100 PSI
6. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
7. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

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2.3 PANEL CONSTRUCTION

A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
   1. Thickness: 2-3/4”
   2. Light transmission: 23%
   3. Solar heat gain coefficient 0.26.
   4. Panel U-factor by NFRC certified laboratory: 2-3/4” thermally broken grid <0.20.
   5. Complete insulated panel system shall have NFRC certified U-factor of 0.62.
   6. Grid pattern: Nominal size; pattern 12”x24”.

B. Standard panels shall deflect no more than 1.0” at 30 PSF in 10’ 0” span without a supporting frame by ASTM E 72.

C. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.

D. Thermally broken panels: Minimum Condensation Resistance Factor of 85 by AAMA 1503 measured on the bond line.

E. Skylight System:
   1. Skylight system shall pass Class A Roof Burning Brand Test By ASTM E 108.
   2. Skylight system shall be UL listed as a Class A Roof by UL 790, which requires periodic unannounced inspections and retesting by Underwriters Laboratories.

F. Skylight System shall meet the fall through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E661, thereby not requiring supplemental screens or railings.

2.4 BATTENS AND PERIMETER CLOSURE SYSTEM

A. Closure system:
   1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
   2. Skylight perimeter closures at curbs shall be factory sealed to panels.

B. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.

C. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.

D. Finish:
   1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be selected from manufacturer's standards.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Installer shall examine substrates, supporting structure and installation conditions.

B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Metal Protection:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   2. Where aluminum will contact concrete, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Water Test: Installer to test skylights according to procedures in AAMA 501.2.

B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.4 CLEANING

A. Clean the skylight system interior and exterior, immediately after installation.

B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

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SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes Kawneer Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
   1. Types of aluminum windows include:
      a. Basis of Design - Kawneer Series AA™5450 Ultra Thermal (Standard Face)

B. Related Sections:
   1. 072700 “Air Barriers” for materials used to bridge between aluminum sliding glass door and building intersection
   2. 079200 “Joint Sealants” for joint sealants installed as part of the aluminum sliding door system
   3. 084113 "Aluminum-Framed Entrances and Storefronts"

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
   1. Size required by AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) for minimum gateway performance.

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2. Test size: 60” x 99”

B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for the Project that pass AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Uniform Load Structural Test:
   1. Design Wind Loads: Determine design wind loads applicable to the Project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
      a. Basic Wind Speed (MPH): 86
      b. Importance Factor (I, II, III): III
      c. Exposure Category (A,B,C,D): C
   2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch (19 mm), whichever is less, at design pressure based on testing performed according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Uniform Load Deflection Test or structural computations.

C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change 60^0F in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

D. Condensation Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, with a CRF not less than: 78 (frame) and 79 (glass).

E. Temperature Index (I): Provide aluminum windows tested for thermal performance according to CSA-A440 with a Temperature Index not less than:
68 (frame) and 75 (glass).

F. Thermal Transmittance Test (U-Factor): When tested to AAMA specification 1503, AAMA specification 507 or NFRC 100 the thermal transmittance
(U-Factor) shall not be more than:
   1. 1" (25.4mm) insulating glass with exterior 3/16" (4.76 mm) annealed clear glass, aluminum spacer, and interior 3/16" (4.76 mm) annealed clear glass.
      a. Provide aluminum windows simulated for thermal performance according to AAMA 507 and NFRC 100 with a thermal transmittance
      (U-Factor) of 0.22 to 0.52 BTU/hr/sf/°F. (Based on center of glass U-Factor range 0.10 to 0.48).
   2. 1-1/2" (38.1 mm) insulating glass with exterior 1/8" (3.17 mm) annealed low E glass, aluminum spacer, argon gas, center 1/8" (3.17 mm) low E tempered glass, aluminum spacer, argon gas, and interior 1/8" (3.17 mm) annealed clear glass.
      a. Provide aluminum windows simulated for thermal performance according to AAMA 507 and NFRC 100 with a thermal transmittance
      (U-Factor) of 0.19 to 0.37 BTU/hr/sf/°F. (Based on center of glass U-Factor range 0.10 to 0.32).

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G. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC as determined according to NFRC 200 and AAMA 507 procedures.

H. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS), Air Infiltration Test.
1. Maximum Rate: 0.1 cfm/sq. ft. (0.5 L/s•m²) of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa) in accordance with ASTM E283.

I. Water Resistance: No water leakage as defined in AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) referenced test methods at a water test pressure equaling that indicated, when tested according to ASTM E547 and ASTM E331.
1. Test Pressure: 20 percent of positive design pressure, but not more than 10 lbf/sq. ft. (478 Pa).

J. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
1. 1-3/4" triple insulating glass made with exterior 1/8" soft coat low E glass, thermoplastic butyl spacer, argon gas, center 1/8" soft coat low E glass thermoplastic butyl spacer, argon gas, and interior 1/8" clear glass: 29 (STC) and 23 (OITC)

K. Thermal Transmittance Test (U-Factor): When tested to AAMA specification 1503, AAMA specification 507 or NFRC 100 the thermal transmittance
(U-Factor) shall not be more than:
1. 1" (25.4mm) insulating glass with exterior 1/8" (4.76 mm) annealed clear glass, aluminum spacer, and interior 1/8" (4.76 mm) annealed clear glass.
a. Provide aluminum windows simulated for thermal performance according to AAMA 507 and NFRC 100 with a thermal transmittance
(U-Factor) of 0.22 to 0.52 BTU/hr/sf/°F. (Based on center of glass U-Factor range 0.10 to 0.48).

L. Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
1. Warranty Period:
a. Window: 10 years from date of Substantial Completion.
b. Glazing Units: 10 years from date of Substantial Completion.
c. Aluminum Finish: 10 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: AAMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: CW.
2. Minimum Performance Grade: 30.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of.32 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K).

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

E. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45.

F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C) ambient; 180 deg F (100 deg C) material surfaces.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070” wall thickness at any location for the main frame and sash members.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

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D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 WINDOW

A. Window Type: As indicated on Drawings

B. Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS)
   1. Performance Class and Grade: AW-PG70-FW

C. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.
   1. Exposed Hardware Color and Finish: As selected by the County from manufacturer's full range.

D. Projected Window Hardware:
   1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E 405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
      a. Type and Style: As selected by County from manufacturer's full range of types and styles.
   2. Hinges: Non-friction type, not less than two per sash.
   3. Lock: Manufacturer's standard.
   4. Limit Devices: Limit clear opening to 4 inches (100 mm) for ventilation; with custodial key release.

2.4 GLAZING

A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer’s standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

2.5 HARDWARE

A. General: None required

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2.6 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
   1. Type and Location: Full, inside for project-out sashes.

B. Aluminum Frames: Complying with SMA 1004 or SMA 1201.

C. Glass-Fiber Mesh Fabric: 20-by-30 (0.85-by-0.42-mm) mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D 3656/D 3656M.
   1. Mesh Color: Manufacturer's standard color.

2.7 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

C. Fabricate aluminum windows that are re-glazable without dismantling sash or framing.

D. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact. Thermal barriers shall be designed in accordance with AAMA TIR A8.
   1. Frame thermal barrier shall be polyamide with a minimum of 1” (25.4 mm) separation, installed continuously and mechanically bonded to the aluminum.

E. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

F. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch (2.4-mm) thick extruded aluminum. Miter

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or cope corners, and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.

G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).

H. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match frame.

I. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

J. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
   1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
   1. Kawneer Permanodic™ AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating (Color #17 Clear) (Standard).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
   1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
   2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
   3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
   4. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.

B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

E. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

F. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085113

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SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Cylinders specified for doors in other sections.

C. Related Sections:
   1. Division 06 Section “Rough Carpentry”.
   2. Division 06 Section “Finish Carpentry”.
   3. Division 08 Section “Hollow Metal Doors and Frames”.
   4. Division 08 Section “Stainless Steel Doors and Frames”.
   5. Division 08 Section “Flush Wood Doors”.
   6. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:
   1. ANSI/BHMA Certified Product Standards - A156 Series
   2. UL10C – Positive Pressure Fire Tests of Door Assemblies

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1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.
      b. Manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for door hardware.
      g. Door and frame sizes and materials.
      h. Warranty information for each product.
   4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

D. Informational Submittals:
   1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

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E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor and Owner or Owner’s designated representative, concerning both standard and electromechanical door hardware and keying.

D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

E. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

F. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
   1. Function of building, purpose of each area and degree of security required.
   2. Plans for existing and future key system expansion.
   3. Requirements for key control storage and software.
   4. Installation of permanent keys, cylinder cores and software.
   5. Address and requirements for delivery of keys.

G. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

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1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

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B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. Seven years for heavy duty cylindrical (bored) locks and latches.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
   1. Basis of Design for provision of hardware is to be as manufactured and supplied by Assa Abloy and their subsidiaries.
   2. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the Owner and their designated consultants.

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2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
   1. Quantity: Provide the following hinge quantity:
      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
      b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.
   3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
      a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
      b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
   4. Hinge Options: Comply with the following:
      a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
   5. Manufacturers:
      a. Bommer Industries (BO).
      b. Hager Companies (HA).
      c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
   1. Manufacturers:
      a. Bommer Industries (BO).
      b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
      c. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
   1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
   2. Furnish dust proof strikes for bottom bolts.
   3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.

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4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:
    a. Burns Manufacturing (BU).
    b. Door Controls International (DC).
    c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
5. Manufacturers:
    a. Burns Manufacturing (BU).
    b. Hiawatha, Inc. (HI).
    c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) year’s experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:
1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Manufacturer’s Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.
1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

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3. New System: Key locks to a new Medeco X4 key system.

E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

F. Construction Keying: Provide temporary keyed construction cores.

G. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

H. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.
1. Manufacturers:
a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

I. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
1. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
2. Locks are to be non-handed and fully field reversible.
3. Manufacturers:
a. Corbin Russwin Hardware (RU) – CL3300 Series.
b. Sargent Manufacturing (SA) – 10 Line.
c. Yale Locks and Hardware (YA) 5400LN Series.

2.6 AUXILIARY LOCKS

A. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 certified narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion

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resistant steel (option for fully stainless steel case and components). Provide minimum 2 7/8" throw laminated stainless steel bolt. Bottom rail deadlocks to have 3/8” diameter bolts.

1. Manufacturers:
    a. Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.
    b. Adams Rite Manufacturing (AD) – 4900 Series.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
    1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
    2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
    3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
    4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:
    1. Strikes for Mortise Locks and Latches: BHMA A156.13.
    2. Strikes for Bored Locks and Latches: BHMA A156.2.
    3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
    4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
    1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
    2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
    3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
    4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
    5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

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a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Standard Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device bar and push rails to be constructed of heavy-duty wrought steel. Exit device covers to be steel or aluminum material; plastic or thermoplastic rails and covers are not acceptable. Provide trim furnished in standard architectural finishes matching the trims and finishes on specified locksets.
1. Manufacturers:
a. Corbin Russwin Hardware (RU) - ED8000 Series.
b. Sargent Manufacturing (SA) - 30 Series.
c. Yale Locks and Hardware (YA) - 6000 Series.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

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B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
   1. Manufacturers:
      a. Corbin Russwin Hardware (RU) – DC6000 Series.
      b. Sargent Manufacturing (SA) - 351 Series.
      c. Norton Door Controls (NO) - 7500 Series.

2.10 ARCHITECTURAL TRIM

A. Door Protective Trim
   1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
   2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
   3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
   4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
      a. Stainless Steel: 300 grade, 050-inch thick.
   5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
   6. Manufacturers:
      a. Burns Manufacturing (BU).
      b. Hiawatha, Inc. (HI).
      c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

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1. Manufacturers:
    a. Burns Manufacturing (BU).
    b. Hiawatha, Inc. (HI).
    c. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
1. Manufacturers:
    a. Rixson Door Controls (RF).
    b. Sargent Manufacturing (SA).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:
1. National Guard Products (NG).
2. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
3. Reese Enterprises, Inc. (RE).

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2.13 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.14 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify the County of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

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1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
   3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
   4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

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3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the Owner or their designated representative. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the Owner or their designated representative with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. Manufacturer’s Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - Sargent
5. AD - Adams Rite
6. MC - Medeco
7. RF - Rixson
8. NO - Norton
9. OT - OTHER

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Hardware Sets

Set: 1.0

Doors: 100, 101, 110, 179C, 179D, C-10B, C-7B

1	Pivot Set	195	626	RF	087100
1	Intermediate Pivot	M19	626	RF	087100
1	Exit Device (nightlatch)	ED4200S K157ET x LC M52	630	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Rim Cylinder	X4 100400 N	26	MC	087100
1	Pull	RM201 Mtg-Type 1XHD	US32D	RO	087100
2	Conc Overhead Stop	6-X36	630	RF	087100
1	Door Closer	351 OZ	EN	SA	087100
1	Mounting Plate	351A/B as req'd	EN	SA	087100
1	Threshold	253x3AFG		PE	087100
1	Seals, Sweeps and Astragals	By Aluminum Door Mfr.		OT	

Notes: Entry by key when locked. Free egress at all times.
Push/Pull operation by exit device dogging.

Set: 2.0

Doors: C-3B, C-6B, C-9B

1	Pivot Set	195	626	RF	087100
1	Intermediate Pivot	M19	626	RF	087100
1	Exit Device (exit only)	ED4200S EO M52	630	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Conc Overhead Stop	6-X36	630	RF	087100
1	Door Closer	351 OZ	EN	SA	087100
1	Mounting Plate	351A/B as req'd	EN	SA	087100
1	Threshold	253x3AFG		PE	087100
1	Seals, Sweeps and Astragals	By Aluminum Door Mfr.		OT	

Notes: Exit Only Doors, (No Exterior Hardware), Free Egress at all times.

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Set: 3.0

Doors: 157A, 157B, 158

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	ML2053 ASA LC	630	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Door Closer	351 CPSH	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Threshold	253x3AFG		PE	087100
1	Gasketing	303AV		PE	087100
1	Sweep	18061CNB		PE	087100

Set: 4.0

Doors: 131, 138, 184B

6	Hinge (heavy weight)	T4A3386 NRP	US32D	MK	087100
1	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom Lock	ML2057 ASA LC	630	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
2	Surf Overhead Hold Open	9-X26	630	RF	087100
1	Threshold	253x3AFG		PE	087100
1	Gasketing	303AV		PE	087100
2	Sweep	3452APK		PE	087100
1	Position Switch	DPS-M-BK		SU	087100
1	Metal Edge Astragal	By Door Mfr.		OT	

Notes: Entry by key when locked, active leaf only. Free egress at all times.
Door position switch to monitor opening status.

Set: 5.0

Doors: 102, 103

1	Pivot Set	195	626	RF	087100
1	Intermediate Pivot	M19	626	RF	087100
1	Push Pull	RM251	US32D	RO	087100
1	Conc Overhead Stop	6-X36	630	RF	087100

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1	Door Closer	351 OZ	EN	SA	087100
1	Mounting Plate	351A/B as req'd	EN	SA	087100
1	Seals, Sweeps and Astragals	By Aluminum Door Mfr.		OT	

Set: 6.0

Doors: 184A

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Conc Overhead Stop	6-X36	630	RF	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Gasketing	S88		PE	087100

Set: 7.0

Doors: 151

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

Set: 8.0

Doors: 183 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Gasketing	S88		PE	087100

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Set: 9.0

Doors: 149, 152, 174, 201, 220 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100
1	Gasketing	S88		PE	087100

Set: 10.0

Doors: 165

6	Hinge	TA2714 NRP	US26D	MK	087100
2	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
2	Conc Overhead Stop	6-X36	630	RF	087100
2	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Gasketing	S88		PE	087100
1	Astragal	S772		PE	087100

Set: 10.1

Doors: 142A, 142B 90 Minute

6	Hinge	TA2714 NRP	US26D	MK	087100
2	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
2	Conc Overhead Stop	6-X36	630	RF	087100
2	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Gasketing	S88		PE	087100
1	Astragal	S772		PE	087100

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Set: 11.0

Doors: 215

3	Hinge	TA2714	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	10-X36	652	RF	087100
3	Silencer	608		RO	087100
1	Gasketing	S88		PE	087100

Set: 11.1

Doors: 171 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	10-X36	652	RF	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Gasketing	S88		PE	087100

Set: 12.0

Doors: 148, 173, 186, 222

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
3	Silencer	608		RO	087100

Set: 13.0

Doors: 180, 223

6	Hinge	TA2714 NRP	US26D	MK	087100
2	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom Lock	CL3157 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
2	Surf Overhead Stop	9-X36	652	RF	087100

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2	Silencer	608		RO	087100
1	Metal Edge Astragal	By Door Mfr.		OT	

Set: 14.0

Doors: 146A, 146B, 179B, 207, 216, 219, 221, C-2

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 15.0

Doors: 203, 206

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 16.0

Doors: 156, C-3A, C-3C, C-7A, C-8B 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 16.1

Doors: C-5A 45 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100

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1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

Set: 17.0

Doors: 132, 133, 136, 161, 209A, 209B, 212

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 18.0

Doors: 137, 159, 163B, 164B, 165B, 166B 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

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Set: 19.0

Doors: 179A, 214A, 214B

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
3	Silencer	608		RO	087100

Set: 19.1

Doors: 118 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Gasketing	S88		PE	087100

Set: 20.0

Doors: 208

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
3	Silencer	608		RO	087100

Set: 21.0

Doors: 204, 205

3	Hinge	TA2714	US26D	MK	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100

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1	Surf Overhead Stop	9-X36	652	RF	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 22.0

Doors: 185, 217

6	Hinge	TA2714 NRP	US26D	MK	087100
1	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
2	Surf Overhead Stop	9-X36	652	RF	087100
2	Silencer	608		RO	087100
1	Metal Edge Astragal	By Door Mfr.		OT	

Set: 22.1

Doors: 120 45 Minute

6	Hinge	TA2714 NRP	US26D	MK	087100
1	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
2	Surf Overhead Stop	9-X36	652	RF	087100
1	Metal Edge Astragal	By Door Mfr.		OT	
2	Gasketing	S88		PE	087100

Set: 22.2

Doors: 141 90 Minute

6	Hinge	TA2714 NRP	US26D	MK	087100
1	Flush Bolt	555/557 as req'd	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Classroom Lock	CL3155 AZD LC	626	RU	087100

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1	Cylinder	20211730- P	26	MC	087100
2	Surf Overhead Stop	9-X36	652	RF	087100
1	Metal Edge Astragal	By Door Mfr.		OT	
2	Gasketing	S88		PE	087100

Set: 23.0

Doors: 154, 155 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100

Set: 24.0

Doors: C-6A

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 24.1

Doors: 127 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Gasketing	S88		PE	087100

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Set: 25.0

Doors: 111, C-11, C-12

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 26.0

Doors: C-5B, C-8A

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 26.1

Doors: C-4 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

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Set: 27.0

Doors: 119, C-10

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
3	Silencer	608		RO	087100

Set: 28.0

Doors: 128 90 Minute

3	Hinge	TA2714 NRP	US26D	MK	087100
1	Entrance Lock	CL3161 AZD LC	626	RU	087100
1	Cylinder	20211730- P	26	MC	087100
1	Surf Overhead Stop	10-X36	652	RF	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Gasketing	S88		PE	087100

Set: 29.0

Doors: 116, 143, 144

3	Hinge	TA2714	US26D	MK	087100
1	Privacy Lock	CL3120 AZD	626	RU	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 30.0

Doors: 129, 130 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Privacy Lock	CL3120 AZD	626	RU	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
3	Silencer	608		RO	087100

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Set: 31.0

Doors: S-2A, S-2B 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

Set: 32.0

Doors: S-1A, S-1B 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Conc Overhead Stop	6-X36	630	RF	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Gasketing	S88		PE	087100

Set: 33.0

Doors: 117, 153, 160, 167, 172, 202, 210, 211

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 34.0

Doors: 112A, 113A, 134, 135, 163A, 164A, 165A, 166A, 218, C-9A

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
2	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

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Set: 34.1

Doors: 105, 106 90 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
2	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
1	Gasketing	S88		PE	087100

Set: 34.2

Doors: 107, 108 45 Minute

3	Hinge	TA2714	US26D	MK	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
2	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 35.0

Doors: 162, 200

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Surf Overhead Stop	9-X36	652	RF	087100
3	Silencer	608		RO	087100

Set: 36.0

Doors: 112B, 113B

3	Hinge	TA2714	US26D	MK	087100
1	Passage Latch	CL3110 AZD	626	RU	087100
1	Deadbolt (Classroom)	DL4117 LC	626	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

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Set: 37.0

Doors: 121

1	Pivot Set	195	626	RF	087100
1	Intermediate Pivot	M19	626	RF	087100
1	Passage Latch	CL3110 AZD M28	626	RU	087100
1	Armor Plate (Adhesive applied)	K1050 34" high SA BEV	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 38.0

Doors: 115

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Pull Plate	BF 111x70C	US32D	RO	087100
1	Push Plate	70C	US32D	RO	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 39.0

Doors: 126

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Pull Plate	BF 111x70C	US32D	RO	087100
1	Push Plate	70C	US32D	RO	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
2	Armor Plate	K1050 34" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

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Set: 40.0

Doors: 125 45 Minute

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Deadbolt (Classroom)	DL4117 LC	626	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Pull Plate	BF 111x70C	US32D	RO	087100
1	Push Plate	70C	US32D	RO	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 41.0

Doors: 114

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Deadbolt (Classroom)	DL4117 LC	626	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Pull Plate	BF 111x70C	US32D	RO	087100
1	Push Plate	70C	US32D	RO	087100
1	Door Closer	351 O / 351 P10 as req'd	EN	SA	087100
1	Kick Plate	K1050 10" HGT x BEV x CSK	US32D	RO	087100
1	Mop Plate	K1050 6" HGT x BEV x CSK	US32D	RO	087100
1	Door Stop	406/409/441CU as req'd	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 42.0

Doors: 169, 170

1	Deadbolt (Classroom)	DL4117 LC	626	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
2	Pull Plate	BF 111x70C	US32D	RO	087100
2	Push Plate	70C	US32D	RO	087100
1	OH Concealed Closer	MW806 double acting	626	RF	087100
2	Armor Plate	K1050 34" HGT x BEV x CSK	US32D	RO	087100
1	Astragal	S772		PE	087100

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Set: 43.0

Doors: 124

1	Deadbolt (Classroom)	DL4117 LC	626	RU	087100
1	Mortise Cylinder	X4 100x00 N	26	MC	087100
1	Pull Plate	BF 111x70C	US32D	RO	087100
1	Push Plate	70C	US32D	RO	087100
1	OH Concealed Closer	MW807 double acting	626	RF	087100
2	Armor Plate	K1050 34" HGT x BEV x CSK	US32D	RO	087100
1	Astragal	S772		PE	087100

Set: 44.0

Doors: 181

6	Hinge	TA2714	US26D	MK	087100
2	Full Dummy Trim	CL3170 AZD	626	RU	087100
2	Roller Latch	592	US26D	RO	087100
2	Silencer	608		RO	087100

Set: 45.0

Doors: 176, EL-1

1	Hardware by others	All Hardware Provided By Door Supplier

END OF SECTION 087100

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SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fixed extruded-aluminum and formed-metal louvers.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
2. Section 081416 "Flush Wood Doors" for louvers in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

C. Samples: For each type of metal finish required.

D. Delegated-Design Submittal: For louvers indicated to comply with structural and seismic performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on tests performed according to AMCA 500-L.

B. Windborne-debris-impact-resistance test reports.

C. Sample warranties.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M.
2. AWS D1.3/D1.3M.
3. AWS D1.6/D1.6M.

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1.5 WARRANTY

A. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
2. Wind Loads: Determine loads based on a uniform pressure of 20 lbf/sq. ft. (957 Pa), acting inward or outward.

C. Seismic Performance: As indicated on drawings.

D. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Design earthquake spectral response acceleration, short period (Sds) for Project is 0.50
2. Component Importance Factor: 1.0.

E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

2.2 FIXED EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Drainable-Blade Louver :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Air Flow Company, Inc.

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b. Airolite Company, LLC (The).
c. Architectural Louvers; Harray, LLC.
d. Construction Specialties, Inc.
e. Ruskin Company.
f. Safe Air - Dowco Products.

2. Louver Depth: 6 inches (150 mm).
3. Frame and Blade Nominal Thickness: Not less than 0.060 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.
4. Mullion Type: Exposed.
5. Louver Performance Ratings:

   a. Free Area: Not less than 7.0 sq. ft. (0.65 sq. m) for 48-inch- (1220-mm-) wide by 48-inch- (1220-mm-) high louver.
   b. Point of Beginning Water Penetration: Not less than 900 fpm (4.6 m/s).
   c. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 700-fpm (3.6-m/s) free-area intake velocity.
   d. Air Performance: Not more than 0.15-inch wg (37-Pa) static pressure drop at 900-fpm (4.6-m/s) intake velocity.

6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.3 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening, except where insect screening is indicated.

B. Louver Screen Frames: Same type and form of metal as indicated for louver to which screens are attached.

C. Louver Screening for Aluminum Louvers:

1. Bird Screening: Aluminum, 1/2-inch- (13-mm-) square mesh, 0.063-inch (1.60-mm) wire.
2. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.

2.4 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.

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1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, fabricated from stainless-steel components, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing according to ASTM E 488/E 488M conducted by a qualified testing agency.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.5 FABRICATION

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

B. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.6 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: As selected by the County from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

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D. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

3.2 ADJUSTING

A. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the County, remove damaged units and replace with new units.

END OF SECTION 089119

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Miscellaneous metal furring and bracing where indicated and/or required.
3. Z-shaped or hat-shaped furring where indicated or required.
4. Grid suspension systems for interior gypsum ceilings and soffits.

B. Related Requirements:

1. Section 092900 “Gypsum Board” for specification of acoustical joint sealants required for interior partition Work of this Section and requirements related to cement board-ceramic tile assemblies installed over metal studs.

C. This specification section may supplement specification and drawing information indicated on Structural Engineering Documents. If discrepancies between this Specification Section, Architectural Drawings and Structural Documents exist, indications on the Structural Documents shall govern.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including any suspension system hanger anchors.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For embossed steel studs and tracks, post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.
1. Use of embossed steel studs to be approved by the County or their designated representative.
2. The Contractor is required to identify specific locations for use of embossed steel studs as part of approval by the County or their designated representative.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel

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Stud Association, the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft. (239 Pa).

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G60 (Z180) typical, hot-dip galvanized unless otherwise indicated.

B. Steel Studs and Runners: Tracks and Runners: ASTM C 645 (physical requirement) and ASTM C754 (installation requirement). Use either steel studs, tracks, runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.

1. Steel Studs and Runners:

a. Typical Minimum Base-Metal Thickness: 20 gage, 0.0296 inch (0.752 mm), or as required by performance requirements for horizontal deflection.
b. Cement Board-Ceramic Tile Assemblies: 20 gage, 0.0296 inch (0.752 mm), minimum at cement board-ceramic tile assemblies; L/360 maximum deflection.
c. Minimum Base-Metal Thickness at Digital X-ray and CT Scan Room Ceiling Framing: 16 gage 0.0538 (1.367 mm), or as required by performance requirements for horizontal deflection.
d. Depth: As indicated on Drawings or required by span/deflection.

C. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.

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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. CEMCO; California Expanded Metal Products Co.
    b. ClarkDietrich Building Systems.
    c. MarinoWARE.
    d. MBA Building Supplies.
    e. Phillips Manufacturing Co.
    f. SCAFCO Steel Stud Company.
    g. Steel Network, Inc. (The).
    h. Telling Industries.

D. Slip-Type Head Joints: Where indicated on Drawings and/or specified on Structural Drawings; provide one of the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to runners while allowing 2-inch (51-mm) minimum vertical movement.
2. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
3. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
4. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
        1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
        2) Superior Metal Trim; Superior Flex Track System (SFT).
        3) Telling Industries; Vertical Slip Track.

E. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Blazeframe Industries.
    b. CEMCO; California Expanded Metal Products Co.
    c. ClarkDietrich Building Systems.
    d. Fire Trak Corp.
    e. MarinoWARE.
    f. Metal-Lite.
    g. Perfect Wall, Inc.
    h. SCAFCO Steel Stud Company.
    i. Steel Network, Inc. (The).

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F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: As indicated on Drawings 0.033 inch (20 Ga.) or as required for conditions.

G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: As indicated on Drawings or if not indicated, 1-1/2 inches (38 mm).
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base-Metal Thickness: 0.033 inch (20 Ga.).
   2. Depth: As indicated on Drawings.

I. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical or hat shaped.

J. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: As indicated on Drawings for span or 3/4 inch (19 mm) minimum.
   2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.033 (20 Ga.) inch (0.8 mm).
   3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

K. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness or other conditions indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Steel Deck:
   1. Hanger Wire tie to #3 rebar with three wraps around rebar and one wrap around wire.
   2. Where required.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length required for condition.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
   1. Depth: As required for span @ L/180 maximum deflection.

F. Furring Channels (Furring Members):

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1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645.
   a. Minimum Base-Metal Thickness: [As indicated on Drawings] [0.0179 inch (0.455 mm)] [0.0269 inch (0.683 mm)] [0.0296 inch (0.752 mm)] [0.0329 inch (0.836 mm)].
   b. Depth: As required for span @ L/180 maximum deflection.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
   a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm).
4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
   a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
   1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power and other properties required to fasten steel members to substrates.

B. Acoustical joint sealant: Refer to Section 092900 “Gypsum Board” for specification of acoustical joint sealant material.

C. Isolation Strip at Exterior Walls: Provide one of the following:
   1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), non-perforated.
   2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

   1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
   2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
   3. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

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C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. As a part of the interior framing at acoustical partitions, provide a bead of acoustical joint sealant beneath the metal floor tracks and other perimeter framing members. Confirm that all gaps are filled. Fill any gaps to provide a continuous acoustic seal. Coordinate Work with that of Section 092900 “Gypsum Board”.

B. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

C. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

D. Install studs so flanges within framing system point in same direction.

E. Install tracks (runners) at floors and overhead supports and where required by conditions. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
      a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
   5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

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6. Curved Partitions:
    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

F. Direct Furring:
1. Screw to framing. Use of wood furring is not allowed unless authorized by the County or their designated representative.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

G. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

H. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

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3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

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SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior gypsum board wall, soffit, fascia and ceiling applications.
2. Acoustical joint sealant.
3. Gypsum board joint finishing and accessories.
4. Partition sound attenuation batts.
5. Cement board at wall tile indicated or scheduled on drawings.
6. Vapor Retarder, (Vapor Barrier), where indicated on drawings and/or required by authorities having jurisdiction.

B. Special Work:
1. Provide interior gypsum wall board at the exterior building walls: Provide 5/8 inch Type X gypsum board, taped and finished to match interior partition finishes.
2. At the exterior wall surface inside the dog run, Room 28, Hospital Dog Ward, install the specified wall tile cement board backer for the ceramic tile.

C. Related Requirements:
1. Section 061000 "Rough Carpentry" for provision of supplemental blocking or framing at partitions.
2. Section 092216 “Non-Structural Metal Framing” for substrate, attachment conditions and for provision of acoustical sealant at perimeter of metal framing at acoustical partitions.
3. Section 093013 “Ceramic Tiling” for wall tile systems installed over cement board specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data, performance data and Installation Instructions: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

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B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. CertainTeed Corporation.
   2. Georgia Pacific.
   3. National Gypsum Company.
   4. USG Corporation.

2.3 GYPSUM BOARD PRODUCTS

A. Gypsum Wallboard: ASTM C 1396/C 1396M. Provide if indicated on Construction Documents:
   1. Thickness: As indicated on Architectural Drawings.
   2. Long Edges: Tapered

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
   1. Thickness: 5/8” (15.9 mm).
   2. Long Edges: Tapered.

C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
   1. Thickness: 1/4 inch (6.4 mm).
   2. Long Edges: Tapered.

D. Gypsum Ceiling Board: ASTM C 1396/C 1396M. Provide where gypsum ceilings are indicated on Architectural Drawings:
   1. Thickness: Minimum of ½” or as indicated on Architectural Drawings.
   2. Long Edges: Tapered.

E. Impact or abuse resistant Gypsum Board: ASTM C 1629/C 1629M, (Level 1 or better). Provide at locations, where indicated on Architectural Drawings:
   1. Core: Type X as indicated on Architectural Drawings.
   2. Thickness: As indicated on Architectural Drawings.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

F. Moisture and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces. Provide, if indicated, at all walls in “wet” areas, including animal housing and bathing, janitorial and rest room facilities, where not tiled or covered with FRP:
   1. Core: Type X as indicated on Architectural Drawings.
   2. Thickness: As indicated on Architectural Drawings.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

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2.4 SOUND CONTROL

A. Sound Dampening Gypsum Drywall:
   1. PABCO Gypsum QuietRock 510 or approved equal:
      a. Thickness: 1/2" inch (12.7 mm) where indicated on drawings
      b. For use on walls only – no ceiling applications.
   2. PABCO Gypsum QuietRock 530 or approved equal:
      a. Thickness: 5/8 inch (15.875 mm) where indicated on drawings.
      b. Type X for fire resistant rated partitions.

B. Partition Sound Attenuation Batts: ASTM C 665, Type 1, un-faced.
   1. Thicknesses: As indicated and/or required for indicated and/or required STC ratings.

C. Provision of acoustical joint sealant Work is Work of this section and Work of Section 092216.23 “Non-Structural Metal Framing”.

D. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.
   1. Provide acoustical joint sealants manufactured by one of the following:
      a. Grabber Construction Products.
      b. Pecoria Corporation.
      c. USG Corporation.
   2. Provide acoustical joint sealant at all acoustical interior partition perimeters and penetrations.
   3. Coordinate acoustical joint sealant Work with Section 092216.23 “Non-Structural Metal Framing” required acoustical joint sealant beneath interior partition metal tracks and other framing perimeters.

2.5 VAPOR RETARDERS AND ACCESSORIES

A. At walls or areas where indicated or required by AHJ., provide variable permeance “smart” sheet vapor retarder and accessory joint tape:
   1. Vapor Retarder Sheet: Subject to compliance with requirements, manufacturer offering products include, but are not limited to the following:
      a. Certainteed Membrane
      b. Pro Clima DB+
      c. Pro Clima Intello Plus
   2. Accessory Joint Tape: Provide manufacturer’s recommended joint tape.

2.6 CEMENT BOARD CEMENTITIOUS BACKING PANELS

A. Cement Board Cementitious Backer Panels: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

B. Subject to compliance with requirements, manufacturer’s offering products include, but are not limited to the following:
   1. CertainTeed Corporation; Fiber-Cement Backer Board.
   2. James Hardie Building Products, Inc.; Hardiebacker, Hardiebacker 500.

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3. USG Corporation; DUROCK Cement Board.

C. Cement Board for Tile at any Curved Locations: Provide flexible fiberglass faces cement board:
1. National Gypsum Company PermaBase Flex cement board.

D. Thickness: As indicated on the Architectural Drawings or if not indicated, 1/2" inch (12.7 mm).

E. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.7 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet Galvanized or aluminum-coated steel sheet or rolled zinc, Plastic, Paper-faced galvanized steel sheet, approved by the County or their designated representative.
2. Use plastic trim components at bathing, hydrotherapy and/or aquatic areas and other areas subjected to water spray or where moisture and mold-resistant gypsum board is specified or indicated for use.
3. Profiles: Provide to suit conditions at board corners, edges and intersections with adjacent materials, as approved by the County or their designated representative, to provide a complete and finished gypsum drywall installation.
a. Cornerbead.
b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.
g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Special Trim: Refer to Architectural Drawings for any details indicating intersecting special aluminum trim at tile installations.

2.8 METAL GYPSUM CEILING GRID & FASCIA

A. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Armstrong Short-Span Grid System:
a. Provide main and tee members required for application.

2.9 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:
1. Interior Gypsum Board: Paper type as approved by board manufacturer.

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2. Interior Cement Board: Mesh type as approved by board manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats as specified.

2.10 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Gypsum Board Fasteners: Steel drill screws ASTM C 1002; Type and lengths required by board manufacturer for substrates and applications indicated.

D. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

E. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

F. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Manufacturers:
   a. Hilti, Inc.
   b. Pecora Corporation
   c. Specified Technologies, Incorporated
   d. USG Corporation

G. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

H. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

I. Cement Board Fasteners: Ceramic coated or hot dipped galvanized screws, ASTM C 1002; specifically designed for cement board attachment to wood or metal studs.
1. Size/Type: 1 5/8 inch (41.275 mm) long Hi-Lo thread screws, (No. 8), wafer head at wood studs; 1 5/8 inch (41.275 mm) long drill point screws, (No. 8) wafer head at 20 gage steel studs.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Examine gypsum panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

B. Review and confirm with the County or their designated representative, required locations for partition sound attenuation sealant and batts prior to start of partition framing Work. Coordinate installations with installations of adjacent materials and systems.

C. Install acoustic sealant in conjunction with rough framing, sound attenuation batt installation and installation of gypsum board panels.

3.2 INSTALLATION AND FINISHING OF GYPSUM PANELS

A. Comply with ASTM C 840.

B. Provide fire resistant rated construction where indicated and required. Coordinate installation with rated openings.

C. Install and adjoin to existing construction where indicated and required to provide uniform, continuous wall and/or ceiling surfaces.

D. Install acoustical joint sealant as indicated and recommended and required by sound attenuation batt manufacturer to achieve specified or indicated STC/NRC ratings.

E. Install sound attenuation batts in accordance with manufacturer’s requirements and recommendations. Fill all framing voids.

F. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

G. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
   1. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by the County or their designated representative for visual effect.

H. Prefill open joints and damaged surface areas.

I. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

J. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
   1. Level 2: Ceiling plenum areas, concealed areas, and where indicated.

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2. Level 3: At panel surfaces that will be exposed to view.
   a. Primer and its application to surfaces are specified in Section 099123 "Painting".

3.3 INSTALLATION OF CEMENT BOARD

A. Install as recommended and required by cement board manufacturer. Comply with referenced standards.
   1. Fasten at a maximum of 8 inches (203.20 mm) o.c. vertically at each stud.
   2. Tape all board panel joints with recommended mesh tape prior to the application of waterproofing, crack isolation membranes or mortar materials.

3.4 INSTALLATION OF VAPOR RETARDERS

A. Install vapor retarders where indicated and/or required by authorities having jurisdiction.

B. Staple, screw or adhere sheeting to studs as recommended by sheet manufacturer. Cover the full interior surface of the insulated areas completely.

C. Tape sheets at all joints with sheet manufacturer's tape. Allow no voids.

D. Trim sheeting close to components that protrude through the sheeting and seal with tape.

3.5 PROTECTION

A. Protect vapor retarders from damage or puncture. Repair vapor retarders prior to the installation of interior gypsum board.

B. Protect adjacent wall, floor and any cabinetry and countertop surfaces from drywall compound and promptly remove non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

C. Prior to installation of any surface coatings or membranes, remove and replace metal framing, gypsum panels and/or accessory products that are wet, moisture damaged, and/or mold damaged.

D. Protect finished Work.

END OF SECTION 092900

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SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Thinset ceramic mosaic tilework where indicated and scheduled on drawings.
2. Thinset ceramic glazed wall tile where indicated and scheduled on drawings.
3. Porcelain floor tile and porcelain wall base work with specified grout where indicated and/or scheduled on drawings.
4. Waterproofing - crack isolation membrane.
5. Mortars and grouts.

B. Related Work:
1. Section 092900 “Gypsum Board” for cement board substrates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product and accessory.

B. Installation Instructions: For each type of product and accessory.

C. Samples:
1. Selection samples for each type and composition of tile of each color and finish available.
2. Selection samples of full range of grouts for selection by the County or their designated representative by the County or their designated representative.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Independent moisture test results.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish in full box or sheet quantities of full-size units equal to 1 percent of amount installed for each type, composition, color, pattern, and size.
a. Package for Owner’s long-term storage.

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1.5 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer Employees: Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

B. Provide moisture testing of all substrates prior to installation of any underlayment, mortar or tile work.
   1. Conduct independent testing in accordance with ASTM D 4263, ASTM F 1869 or method(s) approved by the County or their designated representative. Submit test results for review by the County or their designated representative.
   2. Confirm that test results are in conformance with waterproofing - crack isolation membrane and thinset mortar manufacturer requirements.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build a mockup of each type of floor and wall tile installation.
      a. Mockup shall demonstrate typical edge and intersection conditions.
      b. Provide fully grouted mockups, installed over specified substrates and membranes.
      c. Size: Approximately 3 square feet.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Single Source:
   1. Provide each tile product from same, single production run.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS

A. Factory-Mounted Unglazed or Glazed Ceramic Mosaic Tile Type:
   1. Furnish the following:
   2. a. Daltile Keystones, or approved equal.
   3. Module Size: Floor - Nominal 4 inch by 4 inch at toilet rooms. Wall - Nominal 2 inch by 2 inch at toilet rooms.
   4. Thickness: 1/4 inch.
   5. Face: Plain with cushion edges.
   6. Surface: Smooth.

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7. Tile Color and Pattern: As selected by the County or their designated representative from manufacturer's full range.
8. Grout Color: As selected by the County or their designated representative from manufacturer's full range.
9. Trim Units: At Restroom floors, provide 3 piece base with cove, straight and bull nose tiles.
10. Joints of wall and floor tile are to be aligned and of the same width.

B. Ceramic Glazed Tiles:
1. Furnish tiles by one of the following manufacturers; or approved manufacturer of product meeting specifications:
   a. American Olean; a division of Dal-Tile Corporation.
   b. Daltile.
2. Module Size: Nominal 4 x 4 inch square tile.
3. Face Size Variation: Rectified or approved by the County or their designated representative.
4. Thickness: 1/4 inch minimum - 5/16 inch maximum.
5. Face: Pattern of design selected, with manufacturer's standard edges.
6. Tile Color and Pattern: As selected by the County or their designated representative from manufacturer's full range.
7. Grout Color: As selected by the County or their designated representative from manufacturer's full range.
8. Trim Units: Provide standard bullnose shapes at field tile edges and coved tiles at inside corners.
9. Mounting: Un-backed individual tiles.
10. Joints of wall and floor tile are to be staggered and at mid-point of tile.

C. Glazed Porcelain Floor Tile:
1. Furnish the following:
   a. Daltile or approved equal.
2. Module Size: Nominal 12 inch by 12 inch.
3. Thickness: 3/8 inch.
4. Face: Plain with cushion edges.
5. Surface: Smooth.
6. Slip Resistance: DCOF AcuTest equal or greater than 0.42, wet.
7. Tile Color and Pattern: As selected by the County or their designated representative from manufacturer's full range.
8. Grout Color: As selected by the County or their designated representative from manufacturer's full range.
9. Trim Units: Provide standard bullnose shapes at field tile edges and coved tiles at inside corners.
10. Joints of wall and floor tile are to be staggered and at mid-point of tile.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

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1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

B. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.
1. Manufacturers:
   a. Georgia Pacific Gypsum, LLC
   b. USG Corporation
   c. Or equal and approved.
2. Thickness: As indicated.

C. Fiber-Cement Backer Board: ASTM C 1288.
1. Manufacturers:
   a. Georgia Pacific Gypsum, LLC
   b. USG Corporation
   c. Or equal and approved.
2. Thickness: As indicated.

2.4 WATERPROOFING - CRACK ISOLATION MEMBRANE

A. Laticrete Hydroban single component self-curing liquid rubber polymer or approved equal product.
1. No substitutions.

2.5 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.
1. For wall applications, provide non-sagging mortar.

2.6 GROUT MATERIALS

A. Professional Grade Sand and Portland Cement Grout: ANSI A108.7 and A118.3; Fusion Pro Single Component Grout manufactured by Custom Building products, or approved equal product:
1. Composition: Advanced polymers with inorganic fillers and pigments.
2. Stain and antimicrobial protection.
3. Colors: Up to 3 colors as selected by the County or their designated representative from manufacturer’s standard colors.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

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1. Manufacturers:
   a. Bonsal American, an Oldcastle Company
   b. Custom Building Products
   c. Southern Grouts & Mortars
   d. Summitville Tiles, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with adhesives and/or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
   3. Conduct moisture testing of all substrates prior to installation of any underlayment, mortar or tile work.

B. Proceed with installation only after test results have been approved and any unsatisfactory conditions have been corrected.

C. Start of tile work signifies contractor's acceptance of substrate conditions.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Provide leveling compound at finish floor transitions such as at restroom doorway metal edging so that sheet vinyl, carpet or other adjacent flooring is level with the top of the ceramic tile floor. Position the metal edging transition strip at door centerline.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return tile to the manufacturer or blend tiles at Project site before installing.

D. Prior to start of tile work, review tile layouts with the County or their designated representative. Confirm tile layout starting and finishing points, vertical coursing and intersections with adjacent materials, finishes, fixtures and equipment.

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1. Confirm and coordinate installation sequencing of adjacent finish flooring and architectural cabinetry with tile work.
2. Review any required expansion and control joint locations with the County or their designated representative prior to start of Work.

E. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
      a. Tile floors consisting of tiles 8 by 8 inches or larger.
      b. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Where specified, provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Install saw cut mitered field tiles at outside corners unless outside corner tile shape is available.

F. Jointing Pattern: Unless otherwise indicated or directed by the County or their designated representative, lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths.

G. Joint Widths: Unless otherwise indicated, install tile with the joint widths required by tile manufacturers and backing.

H. If not otherwise indicated in Architectural Drawings, install tiles in a uniform grid.

I. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

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J. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated or required by project conditions. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Unless otherwise directed by the County or their designated representative, where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

L. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.

M. Install waterproofing - crack isolation membrane at all tile locations. Comply with manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

3.4 FINAL CLEANING

A. Provide final cleaning of all tile surfaces.

END OF SECTION 093013

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SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and suspension systems for ceilings.

B. Related Work:
1. Section 092900 “Gypsum Board” for gypsum board ceilings.
2. Section 099123 “Painting” for Tectum cloud field painting.

C. Alternates: Refer to Drawings and Section 012300 “Alternates” for Alternate No. 2 through 4 that apply to the Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Selection Samples: For each exposed product and for each color and texture specified.

C. Shop Drawings: Submit Shop Drawings for TEC-1 tectum ceiling cloud. Indicate support grid locations and panel joints.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Evaluation reports.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to NVLAP.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

A. Acoustical Panel Standard: Comply with ASTM E 1264.

B. Metal Suspension System Standard: Comply with ASTM C 635.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.3 ACOUSTICAL PANELS

A. Provide the following panel types where scheduled on the Architectural Finish Schedule Drawing:
1. (ACT-1) Acoustical Panels for Dry Locations: Armstrong Ultima #1912, Tegular, White.
   a. Size: 24 inch (600 mm) square panels.
2. 2.(ACT-2) Acoustical Panels for Wet Locations: Armstrong Calla #2824, Tegular, White.
   a. Size: 24 inch (600 mm) square panels.
3. (ACT-3) Wood Grain Finished Particle Board Core Acoustical Panels: Armstrong Wood Looks Vector.
   a. Size: 24 inch (600 mm) square panels.
   b. Perforations: None.
   c. Color: Wood grain and color selected by the County or their designated representative from manufacture’s full range.
4. (MPC-2) Wood Grain Metal Acoustical Panels: Armstrong Effects Wood Looks Vector.
   a. Size: 24 inch (600 mm) square panels.
   b. Perforations: Extra Microperforated.
   c. Color: Wood grain and color selected by the County or their designated representative from manufacture’s full range.
   d. Edge: Standard 4 inch (101.6 mm) wood grain finished aluminum trim.

2.4 CEILING CLOUDS

A. Provide the following where scheduled on the Architectural Finish Schedule Drawing:

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1. (TEC-1) Acoustical Tectum Panels:.
   a. Size: panel sizes to best make up the indicated shape.
   b. Thickness: 2 inch (50.8 mm).
   c. Finish: Natural with field painting as specified in Section 099123 “Painting”.
   d. Grid End Fillers: Provide extra Tectum material to infill ends of routed grid slots. Refer to Part 3 of this Section.

2.5 METAL SUSPENSION SYSTEMS

A. Armstrong Suprafine 9/16 grid or approved equal at ACT-1 and 2 locations.
   1. Color: White at ACT 1 & 2.

B. Armstrong Prelude XL 15/16 grid at TEC-1, MPC-2 and ACT-3 locations.
   1. Color: White at TEC-1.
   2. Color: Match panel wood grain at MPC-2 and ACT-3.

2.6 ACCESSORIES

A. Provide all accessory aluminum edge trim, hanging wire and attachment hardware approved by suspension system manufacturer and in compliance with performance requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install acoustical ceiling panels and suspension systems to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Unless otherwise indicated on Reflected Ceiling Plans, or directed by the County or their designated representative, measure each ceiling area and establish layout of acoustical panels to typically balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
   1. Coordinate Ceiling grid layouts with the County or their designated representative prior to start of installations.
   2. Coordinate panel layout with diffuser, grill and light locations.
   3. Center lights and other ceiling devices on panels and grids where possible. If light and/or device location can’t be centered, or is indicated not to be centered, coordinate exact location with the County or their designated representative prior to grid and panel preparation and installation.

C. At cut mineral fiber border panels, field cut panel edges that abut walls and other intersecting construction so that panel elevation and tegular panel perimeter is maintained. Paint field cuts with matching color paint where in direct vision of building occupant.

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D. Install metal panels and metal edging as directed by manufacturer. Keep grain direction consistent and in direction requested by the County or their designated representative.

E. Tectum Clouds: Install suspension grid inboard, approximately 2-3 inches (50.8 to 76.2 mm) from the edge of the tectum cloud. Field cut from extra tectum material fillers and install them at ends of grid slots to conceal the grid slot at the cloud edge. Filed paint clouds and groove fillers as specified in Section 099123 “Painting”.

F. Replace any damaged panels and/or grid components with new.

END OF SECTION 095113

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SECTION 096516 - RESILIENT SHEET FLOORING AND BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes the following Work:
   1. Resilient sheet flooring where indicated and/or scheduled.
   2. Integral resilient base at resilient sheet flooring.
   3. Reducer strips, transition strips and accessories, as indicated and/or scheduled on drawings.
   4. Substrate moisture testing.

1.2 ACTION SUBMITTALS

A. Product Data and Installation Instructions: For each type of product.

B. Shop Drawings: For each type of flooring. Include project specific flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   1. Show details of any special patterns.
   2. Submit a cut diagram indicating seam locations and roll direction. Use mitered seam layouts for corners when changing directions 180 degrees (e.g. when running material down corridors which bisect at a right angle), unless approved otherwise.

C. Samples:
   1. Samples: Submit duplicate 12" x 12" (300 mm x 300 mm) sample pieces of sheet material, 12" (300 mm) long [gulley edge] [cap strip] [joint cover strip] [cove former] in accordance with Section 01330 - Submittal Procedures
   2. Base: Specified base forming component samples.

1.3 INFORMATIONAL SUBMITTALS

A. Moisture Testing: Test results.

B. Alkalinity and Adhesion Testing: Test results.

C. Manufacturer’s Warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

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1.5 WARRANTY

A. Manufacturer's standard "Commercial" warranty.
   1. Warranty Period: 10 years from date of Substantial Completion.
   2. Manufacturer's Warranty shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project.

1.6 QUALITY ASSURANCE

A. Provide moisture testing of all substrates prior to installation of any adhesive or resilient flooring components.
   1. Conduct independent testing in accordance with ASTM D 4263, ASTM F 1869 or method(s) approved by the County or their designated representative. Submit test results for review by the County or their designated representative.
   2. Confirm that test results are in conformance with resilient component manufacturer requirements.

B. Provide alkalinity and adhesion testing in accordance with manufacturer's requirements. Installer Qualifications:
   1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
   2. .Training: Installer who has attended an Altro flooring installation training clinic.

C. Regulatory Requirements: Provide slip resistant sheet vinyl flooring in compliance with the following:
   1. Americans with Disabilities Act Architectural Guidelines (ADAAG).
   2. Occupational Safety & Health Administration (OSHA).

D. Conduct a pre-construction meeting with the County or their designated representative, Installer and manufacturer's representative.

1.7 DELIVERY, STORAGE & HANDLING

A. Deliver, store and handle products in accordance with manufacturer's requirements.

1.8 SITE CONDITIONS

A. Temperature Requirements: If storage temperature is below 65^0F (18^0C) or the floor temperature is below 50^0F (18^0C), the Altro flooring product must be moved to a warmer place and allowed to reach this temperature before unrolling or installation. For further information, refer to current Altro Installation Practices and Quick Facts.

B. Maintain air temperature and structural base temperature at flooring installation area between 68^0F (20^0C) and 80^0F (26^0C) for 48 hours before, during and 24 hours after installation.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Basis of Design: Altro Flooring – XpressLay
   1. Altro – XpressLay
   2. Armstrong SRF Slip Retardant Flooring
   3. Or Equal and approved.

2.2 PERFORMANCE REQUIREMENTS

A. Fire Test Response Requirements:
   1. Class 1 ASTM 648, ASTM E 662, <450 or as required to meet requirements of Authorities Having Jurisdiction.

B. Slip Resistance:
   1. Static Coefficient of Friction: ASTM D2047 .78 Dry, .80 Wet.
   2. TRRL Pendulum Test, (PVT): BS7976 36+.

C. Fire & Smoke: ASTM E648 – Class 1

2.3 RESILIENT SHEET FLOORING

A. Product/Manufacturer:
   1. (SV-1) Altro XpressLay adhesive free sheet flooring by Altro Floors.
   2. Thickness: 0.087" (2.20 mm).
   3. Roll Width: 6 feet, 7 inches (2 m).
   4. Roll Length: 65’7” (20 m).
   5. Color: As selected by the County or their designated representative from manufacturer’s standards.
   6. Seamless-Installation Method: Heat welded sheets and heat welded integral cove base.

2.4 RESILIENT SHEET FLOORING INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based, moisture tolerant, formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers, required by sheet flooring and substrate conditions.

C. Seamless-Installation Accessories:
   1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

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2. Color: As selected by the County or their designated representative from manufacturer's full range to match sheet flooring.

D. Integral Cove Base Accessories:
1. Cove Former: Typically 1-inch (25.4) nominal radius; Altro # CF20R, or as required for wall materials and conditions and as approved by the County or their designated representative.
2. Capping Seal: Altro # C7, color selected by the County or their designated representative from manufacturer’s full range of colors.
3. Capping Seal Altro # C4 is to be used when flooring is seamless sheet vinyl and wall is ceramic tile.
4. Capping Seal Altro # A832 is to be used when flooring is seamless sheet vinyl and wall is PVC/Plastic Sheet.
5. Gulley Edge: Altro Gulley Edges, sized for termination conditions.

E. Integral Transition Strips
1. Joint Cover Strip:
2. Gradus EJC75/20 for 3” (75mm) Joint Cover
3. Gradus EJC50/20 for 2.15”(50mm) Joint Cover
4. Transition Strip:
5. Visedge DS 2.15” (50mm) Vinyl Securing Strip
6. Visedge VR Vinyl Securing Strip

2.5 ACCESSORY PRODUCTS

A. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient sheet flooring manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where Work will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine substrate surfaces for compatibility with resilient component adhesive.

C. Proceed with installation only after test results have been approved and any unsatisfactory conditions have been corrected.

D. Start of work signifies contractor’s acceptance of substrate conditions.

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3.2 PREPARATION

A. Conduct a pre-construction meeting with the County or their designated representative and Installer to review existing conditions and flooring orientation, seam locations, starting points, edge and transition details, test results and layout requirements.

B. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

C. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
   4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:
   a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
   b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install resilient sheet flooring or base until it is the same temperature as the space where it is to be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:
   1. Maintain uniformity of flooring direction.
   2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
   3. Match edges of flooring for color shading at seams.

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4. Avoid cross seams.
5. Where applicable, align wood board and grain patterns between adjacent sheets.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on any covers for telephone and electrical ducts and similar items or access panels in installation floor areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Xpresslay double-sided tape is applied to the substrate and centered under all seams and joints, as well as at the perimeter.

I. Seamless Installation:
1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to permanently fuse sections into a seamless flooring. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.
2. Coved Installation: Where flooring is coved up wall surfaces and other abutments, installation shall be in accordance with manufacturer’s flooring Installation Practices using the following accessories:
a. At standard wall finishes: Use Altro C7 vinyl cap strip to accommodate sheet vinyl to a height as indicated; adhere with contact tape.
b. At ceramic tile, Altro Whiterock semi-rigid wall cladding or FRP paneling: Use Altro C8 Vinyl Captile Strip of C4 cap, respectively.
c. At 0.75" (19.1 mm) radius coving at juncture of vertical and horizontal surfaces: Use Altro Vinyl Cove Former 20R: install with contact tape.
d. At 1.5" (38 mm) radius coving at juncture of vertical and horizontal surfaces: Use Altro Vinyl Cove Former 38R: install with contact tape.
e. Top set cove base: Install in accordance with manufacturer’s instructions.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring and base.

B. Floor Polish: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
1. Apply two coats.

C. Protect resilient sheet flooring and base until Substantial Completion.

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END OF SECTION 096516

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SECTION 096516.16 – SMALL ANIMAL RESILIENT FLOORING AND BASE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes the following Work:
   1. Fluid Applied Resilient flooring where indicated and/or scheduled.
   2. Integral resilient base at resilient sheet flooring.
   3. Reducer strips, transition strips and accessories, as indicated and/or scheduled on drawings.
   4. Substrate moisture testing.

1.2 SCOPE

A. The complete installation of the Small Animal Flooring System consists of a prefabricated rubber basemat (4mm) integrated with seamless, self-leveling polyurethane topcoats (2mm). The finished product is a homogeneous and resilient multipurpose synthetic surface with the unique characteristics of a dual-durometer system.

1.3 RELATED SECTIONS

A. Subfloor
   1. The Small Animal Flooring System shall not be installed until concrete has cured for a minimum of 30 days (Concrete will be tested to ensure that it is dry per manufacturer's guidelines using Relative Humidity (RH) digital probes per ASTM F2170. Concrete must read less than 80% RH.). The general contractor shall furnish, install, and finish the concrete subfloor, depressing the slab sufficiently to accommodate the floor system. Concrete subfloors should be clean, dry, free from any sealer, drying agent, curing compound or parting compound. The slab shall be steel troweled to a true level and finished smooth and straight to a tolerance of 1/8" in any 10' radius.
   2. The successful contractor shall suitably prepare subfloor. High spots shall be ground level, and low spots filled with approved leveling compounds. Any crack filling of the concrete must be done with an approved cement-based filler. All grease and oil must be completely removed, as these will prevent the adhesive from achieving a proper mechanical bond. The concrete slab movement should be stabilized by a constantly maintained room temperature.
   3. The general contractor shall adequately waterproof beneath the slab and at the perimeter subfloors on or below grade using a suitable type membrane. Below grade slabs or areas with hydrostatic head shall be adequately waterproofed beneath the slab on earth side of walls using 1/8" premolded membrane.
   4. The subfloor shall be turned over to the flooring contractor broom clean.

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1.4 ACTION SUBMITTALS

A. Product Data and Installation Instructions: For each type of product.

B. Shop Drawings: For each type of flooring. Include project specific flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   1. Show details of any special patterns.
   2. Submit a cut diagram indicating seam locations and roll direction. Use mitered seam layouts for corners when changing directions 180 degrees (e.g. when running material down corridors which bisect at a right angle), unless approved otherwise.

C. Samples:
   1. Samples: Submit duplicate 12" x 12" (300 mm x 300 mm) sample pieces of sheet material, 12" (300 mm) long gulley edge, cove former in accordance with Section 01330 - Submittal Procedures
   2. Base: Specified base forming component samples.

1.5 INFORMATIONAL SUBMITTALS

A. Moisture Testing: Test results.

B. Alkalinity and Adhesion Testing: Test results.

C. Manufacturer’s Warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.7 WARRANTY

A. Manufacturer’s standard “Commercial” warranty.
   1. Warranty Period: 10 years from date of Substantial Completion.
   2. Manufacturer’s Warranty shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project.

1.8 QUALITY ASSURANCE

A. Provide moisture testing of all substrates prior to installation of any adhesive or resilient flooring components.
   1. Conduct independent testing in accordance with ASTM D 4263, ASTM F 1869 or method(s) approved by the County or their designated representative. Submit test results for review by the County or their designated representative.

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2. Confirm that test results are in conformance with resilient component manufacturer requirements.

B. Provide alkalinity and adhesion testing in accordance with manufacturer's requirements.

C. Installer Qualifications:
   1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
   2. .Training: Installer who has attended an Altro flooring installation training clinic.

D. Regulatory Requirements: Provide slip resistant sheet vinyl flooring in compliance with the following:
   1. Americans with Disabilities Act Architectural Guidelines (ADAAG).
   2. Occupational Safety & Health Administration (OSHA).

E. Conduct a pre-construction meeting with the County or their designated representative, Installer and manufacturer's representative.

1.9 DELIVERY, STORAGE & HANDLING

A. Deliver, store and handle products in accordance with manufacturer's requirements.

1.10 SITE CONDITIONS

A. Temperature Requirements: If storage temperature is below 65^0F (18^0C) or the floor temperature is below 50^0F (18^0C), the Altro flooring product must be moved to a warmer place and allowed to reach this temperature before unrolling or installation. For further information, refer to current Altro Installation Practices and Quick Facts.

B. Maintain air temperature and structural base temperature at flooring installation area between 68^0F (20^0C) and 80^0F (26^0C) for 48 hours before, during and 24 hours after installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Basis of Design: PADENPOR ™ XTR
   1. Manufacturers:
      a. Abacus Sports Flooring - PADENPOR ™ XTR
      b. FLEXIFLOR ®- P.U.
      c. Sika®Comfort Floor Decorative Pro System
      d. Or Equal and approved.

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2.2 PERFORMANCE REQUIREMENTS

A. Fire Test Response Requirements:
   1. Class 1 ASTM 648, ASTM E 662, <450 or as required to meet requirements of Authorities Having Jurisdiction.

B. Slip Resistance:
   1. Static Coefficient of Friction: ASTM D2047 .78 Dry, .80 Wet.
   2. TRRL Pendulum Test, (PVT): BS7976 36+.

C. Fire & Smoke: ASTM E648 – Class 1

2.3 RESILIENT FLOORING

A. Product/Manufacturer:

B. PADENPOR – Abacus Sports Installation, Ltd.

C. Basemat Adhesive
   1. Shall be a two-component polyurethane adhesive supplied by the flooring distributor and specifically compounded to assure compatibility with the basemat and applicable subsurface. The adhesive shall be applied in accordance with the manufacturer's instructions at a rate of 0.2 lbs. per sq. ft.

D. Basemat
   1. Shall be prefabricated PADENPOR ™-MAT 628 supplied by the flooring distributor in a thickness of 4mm and roll-width of 59", made out of recycled SBR rubber and bound with an environmentally safe MDI polyurethane binder. The basemat material shall be treated to resist most types of microbes, oils, and fungi.

E. Basemat Sealer
   1. Seal coat shall be a two-component polyurethane compound supplied by the flooring distributor and applied at a rate of 0.12 lbs. per sq. ft.

F. Integral base shall be a single component urethane caulk supplied by the flooring distributor.

G. Wear Coat shall be a two-component self-leveling polyurethane compound supplied by the flooring distributor and applied at a rate of 0.50 lbs. per sq. ft.

H. Color Finish shall be a two-component polyurethane varnish supplied by the flooring distributor and applied at a rate of 0.06 lbs. per sq. ft. The color shall be selected from a color-chart available from the flooring distributor

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2.4 RESILIENT SHEET FLOORING INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based, moisture tolerant, formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where Work will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine substrate surfaces for compatibility with resilient component adhesive.

C. Proceed with installation only after test results have been approved and any unsatisfactory conditions have been corrected.

D. Start of work signifies contractor’s acceptance of substrate conditions.

3.2 WORKING CONDTIONS

A. The synthetic flooring specified herein shall not be installed until all masonry, plaster, tile, marble and terrazzo work is completed, and overhead mechanical trades and painters have finished their works in the floor area. The general contractor shall remove foreign material from subfloor (i.e. paint, mortar, drywall compound, etc.)

B. The building must be dry, all openings must be closed in, and permanent heating and air conditioning installed and working. Moderate room temperature of 65^0–75^0F shall be maintained one week prior to and throughout the duration of the installation.

3.3 PREPARATION

A. Conduct a pre-construction meeting with the County or their designated representative and Installer to review existing conditions and flooring orientation, seam locations, starting points, edge and transition details, test results and layout requirements.

B. Prepare substrates according to resilient flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

C. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

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2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:
   a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
   b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install resilient flooring or base until it is the same temperature as the space where it is to be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.4 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. All two-component polyurethane compounds must be power-mixed for at least 5 minutes before application.

C. Apply polyurethane adhesive directly onto subfloor by using a notched trowel.

D. Roll PADENPOR ™-MAT into adhesive by using an installation cart. Roll seams with a carpet roller and repeat rolling the entire surface approximately 45 minutes after installation.

E. Apply sealer by using a straight trowel. The sealer must be applied in two layers. Allow each layer to properly cure and inspect the entire floor again for any open spots. Grind down any ridges using a circular grinder with sandpaper. Clean floor by vacuuming or dry dust mop.

F. Apply integral base with coping tools. Make sure to clean up excess material before it cures.

G. Apply wear coat by using a notched squeegee. Make sure that the material is applied wet-in-wet. Allow surface to cure entirely and if necessary, grind down any imperfections using sandpaper of 150 or finer grain. Clean floor by vacuuming or dry dust mop.

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3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient flooring and base.

B. Protect resilient flooring and base until Substantial Completion.

C. Maintenance
   1. No wax should be applied to matte polyurethane finish. Regular cleaning can be carried out with a water/detergent mixture using a wet mop. If necessary, use a nylon brush in order to remove heavy dirt. Dust can be removed with a damp mop, which has been sprayed with a very light water/detergent mixture. Major dirt marks (from black shoe soles, etc.) can be wiped off with polyurethane thinner or acetone.

END OF SECTION 096516

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SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid vinyl floor tile.
   2. Rubber floor tile.
   3. Vinyl composition floor tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and pattern specified.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE (VCT)

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. American Biltrite.
   2. Armstrong World Industries, Inc.
   3. Congoleum Corporation.

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B. Tile Standard: ASTM F 1066, Class 2, through pattern.

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch (3.2 mm).

E. Size: 12 by 12 inches (305 by 305 mm).

F. Colors and Patterns: Match the County’s or their designated representative 's sample.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

      a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

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b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

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H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
   1. Apply two coat(s).

END OF SECTION 096519

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SECTION 096723 - RESINOUS EPOXY FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes resinous epoxy flooring as indicated and/or scheduled on drawings.

B. Work includes the following:
1. Flooring.
2. Integral cove base.

C. Moisture testing of substrates.

1.2 ACTION SUBMITTALS

A. Product Data, MSDS data and Installation Instructions: For each type of product.

B. Samples: Verification sample for exposed product color and texture selected by the County or their designated representative from manufacturer's standard colors and textures.

1.3 INFORMATIONAL SUBMITTALS

A. Provide the Following:
1. Certification indicating Volatile Organic Compound, (VOC), content of all flooring system compounds and components.
2. Material and installation certificates signed by manufacturer certifying that finished flooring complies with specifications and manufacturer's standards.
3. Moisture Testing: Submit results of specified testing.
4. Manufacturer's warranty.
5. Installer's warranty.
6. Installer's qualifications.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an installer who specializes in Work of this Section, with a minimum of 5 years' documented experience and trained by the manufacturer in the installation of resinous flooring and who is acceptable by manufacturer of primary materials.

B. Single Source Responsibility: Obtain resinous flooring materials from a single manufacturer.

C. On-Site Representation: Installer/Manufacturer shall provide on-going, on-site representation by Manufacture's technical representative.

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D. Schedule and conduct a pre-construction meeting to review project conditions, substrates, schedule and required Work.

1.6 WARRANTIES

A. Manufacturer's Warranty: Manufacturer's standard warranty that includes coverage of materials and resultant damage from failure of installation to resist degradation and penetration of moisture.

B. Installer's Warranty: Installer's warranty that includes coverage of materials and installation and resultant damage from failure of installation to resist degradation and penetration of moisture.

C. Warranties specified in this Section shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project.

1.7 PROJECT CONDITIONS

A. Provide continuous ventilation and heating facilities to ensure that surface and ambient temperatures are between 60 and 90 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, and the substrate temperature is above dew point, unless required otherwise by manufacturer's instructions. The applicator shall be provided with storage of material that is out of direct sunlight. The relative humidity in the specific application area shall be less than 85 percent and the surface temperature shall be at least 5 degrees above the dew point.

B. Conditions of new concrete to be coated with epoxy material:

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of twenty-eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
2. New concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is not necessary or desirable). Existing surfaces shall be prepared as required by the manufacturer.
3. Sealers and curing agents should not to be used.
4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Provide sufficient lighting to maintain 80 foot-candles measured mid-height at substrate surface.

D. Safety Requirements:

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

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5. Provide one 10 lb. type ABC fire extinguisher at each active storage, mixing and application area.
6. Provide continuous ventilation during mixing, application and curing. Coordinate with manufacturer's recommendations and requirements.

E. Schedule ordering and delivery of materials and progress of application Work so as to avoid delays in other trade discipline's Work.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; container labeling shall include manufacturer's name, type of paint, color mix designation, expected coverage, surface preparation instructions, instructions for mixing and reducing, drying time, and clean-up recommendations.

B. Store materials to conform with applicable codes and fire regulations, in designated spaces.

C. Keep storage area secure when direct access is not required or when not performing work under this Section. Take precautionary measures to prevent fire hazards and spontaneous combustion.

D. Store materials in a well-ventilated area at minimum ambient temperature of 45 degrees Fahrenheit and a maximum of 90 degrees Fahrenheit.

E. Do not use the sanitary system, (sinks, toilets and drains), for mixing or disposal of refuse material. Carry water to mixing rooms and dump waste material in a suitable refuse receptacle. Remove used rags and all waste from site each day.

PART 2 - PRODUCTS

2.1 RESINOUS EPOXY FLOORING, BASE & CURBS

A. Manufacturers offering the following resinous epoxy (quartz) flooring products, include but are not limited to:

1. System: Dur-A-Flex, Inc. "Dur-a-Quartz".
2. Provide the following installed product components and finishes:
   a. System Primer: Dur-A-Glaze MVP Primer at 16 mils. dry film thickness, (DFT).
   b. System Crack & Isolation Membrane: Elast-O-Coat Membrane at 20 mils. DFT.
   c. Cove base at height(s) indicated and required for application.
   d. 1st Broadcast and Grout Coat: Dur-A-Glaze #4 with Q28 Aggregate and Water Clear hardener at 16 mils. DFT.
   e. 2nd Broadcast and Grout Coat: Same as first above.
   f. 3rd Grout Coat: Same as first above except without broadcast of aggregate.
   g. Orange Peel Coat: Dur-A-Glaze #4 at 8 mils. DFT.
   h. 1st Top Coat: Armor Top with Dur-A-Grip at 3 mils. DFT.

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3. Color and Texture: Single color and texture, selected by the County or their designated representative from manufacturer's full range.
4. Broadcast all Q28 aggregate at 0.5 lb. / sf.
5. Patch Materials:
   a. Shallow Fill and Patching: Dur-A-Glaze #4 Cove-Rez.
   b. Deep Fill and Sloping Material, (over ¼ inch): Dur-A-Crete.
6. Accessory materials:
   a. Only as approved and/or furnished by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect all surfaces and verify that they are in proper condition to receive the work of this Section. Notify Contractor of any condition that may potentially affect proper application of coatings. Start of Work signifies acceptance of conditions.

B. Confirm that all drains and other plumbing fittings and fixtures, and other intersecting Work is in place, completed and ready for the resinous floor installation.

C. Confirm conditions at drains and other plumbing components to facilitate a tight, leak-proof resinous application at plumbing/resinous intersections.

D. Confirm that all substrates at runs are sloped to drains at slopes indicated on drawings or if not indicated, a minimum of 1/8" /ft toward drains.

E. Confirm all final details and finished dimensions at curbs, depressions, bases and intersections with adjacent floor, wall materials.

F. Moisture Testing: Proceed with installation only after all substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:
   1. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 20 lbs. of water/1000 sq. ft. in 24 hours or rate required by manufacturer.
   2. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 99 percent relative humidity level or level required by manufacturer.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair bond. Provide clean, dry, and neutral substrate for application.

B. Concrete Slabs:
   1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants

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incompatible with resinous flooring materials and accessory materials. Where required, provide the following:

a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.

b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.

c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system and provide a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.

d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired in accordance with manufacturer's requirements.

2. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch in accordance with manufacture's requirements.

3.3 INSTALLATION - APPLICATION

A. Install and apply materials in separate steps as delineated in the Manufacturer's specifications and listed in Part 2 of this Section:

1. Allow specified drying time between applications.
2. Install and apply materials to follow and conform to specified and indicated contours and slopes. Where drains are located, slope all work down toward drains.
3. End applications at edges with straight lines as located and finalized with the County or their designated representative.
4. Provide a continuous, watertight, uniform surface.
5. At all active work, mixing, application and curing areas, provide continuous natural and/or mechanical ventilation, at rates recommended by manufacturer. To control vapors and fumes, maintain a negative pressure. Ventilate away from other occupied building areas to exterior locations approved by Owner and General Contractor. Protect finished surfaces from adverse weather conditions.

3.4 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding and or shot-blasting residue and dust from installation and adjacent areas prior to application of materials.
2. Cure installation as required by manufacturer. Establish barricades or other protective devices to keep occupants off of un-cured surfaces.
3. Provide final cleaning at the completion installation. Remove any wall splatters or other excessive materials by non-abrasive, non-destructive methods.

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B. Protection: Provide final protection and maintain conditions, in a manner acceptable to the County or their designated representative, that ensure that the resinous flooring is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096723

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SECTION 098433 – SOUND ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the provision of shop-fabricated, sound-absorbing wall panel units tested for acoustical performance, where indicated on drawings and as specified in this Section.

1.2 DEFINITIONS

A. Wet Areas: Areas of the building with sound absorbing wall units where animal holding areas get manually washed by hose.

B. Dry Areas: Areas of the building with sound absorbing wall units that are not wet areas; including reception and waiting areas.

1.3 ACTION SUBMITTALS

A. Product Data and Installation Instructions: For each type of product indicated, including adhesives.

B. Shop Drawings: For sound-absorbing wall units, submit layout drawings that show panel layout and joint locations.

C. Samples: Verification samples for each exposed product and for each color specified.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: As determined by testing per ASTM E 84, Class A.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.

B. Installer Qualifications: Installer with a minimum of 2 years successful experience with pervious installations.

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C. Pre-installation Conference: Conduct a pre-installation conference at the site to review all installation locations and substrates. Coordinate panel alignment and layouts and attachment requirements with the County or their designated representative prior to installation.

PART 2 - PRODUCTS

2.1 SOUND-ABSORBING WALL UNITS

A. Provide panels manufactured by MDC Wallcoverings:
   1. Model: Zintra Acoustic Panels.
   2. Material: 100% polyester, matte surface finish
   3. Thickness: ½ inch (25.4 mm).
   4. Acoustic Rating: NRC 0.45-0.90 NRC.
   5. Color: Selected by the County or their designated representative from manufacturer's standard colors.
   6. Mounting: Surface mounted with manufacturer's clear anodized aluminum "J" trim sections and manufacturer's recommended adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sound-absorbing wall units in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Installation Sequence: Install sound absorbing wall panels toward end of construction Work to minimize damage.

C. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated on drawings. Mount units securely to supporting substrate.

D. Attach panels with one of the following methods:
   1. Adhere to substrate with silicon based construction adhesive. (Preferred Method).
   2. Attach with screws, Z-clips, nails, stand-offs and aluminum trim.

E. Suitable substrates are scuffed MDF, plywood, gyp board, CMU or any uniformly clean, suitably sound, stable, smooth and/or previously painted surface with a verified bond of the coatings and layers with a surface which has some tooth to allow adequate bonding. If you have any doubts about your surface, then a site mock up is suggested. Application to loose or unsecured plywood or MDF panels is not recommended.

F. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

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END OF SECTION 098433

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SECTION 099123 – PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:
   1. Gypsum board at walls, fasciae, soffits and ceilings as indicated on the Architectural Drawings and Finish Schedule.
   2. Finish painting of hollow metal frames.
   3. Exposed underside of roof deck and roof structure at Reception and Waiting Areas.
   4. Exposed metal fabrications.
   5. Sealer at exposed concrete slab surfaces.
   6. Substrate moisture testing where scheduled in this Section or required by paint manufacturer.

B. Alternates: Refer to Drawings and Section 012300 “Alternates” for Alternate No. 1 that applies to the Work of this Section.

C. Related Requirements:
   1. Section 055000 “Metal Fabrications” for any shop primed metal fabrication substrates.
   2. Section 081113 “Hollow Metal Frames” for finish paint substrate.
   3. Section 095113 “Acoustic Panel Ceilings” for Tectum ceiling cloud substrate.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

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1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Verification Samples: Submit verification samples of paint products and colors specified and indicated.

1.4 INFORMATION SUBMITTALS

A. Proof of applicator's qualifications.

B. Testing: Substrate moisture test results where specified.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing product name, manufacturer and date.
   1. Paint and Primer: 1 unopened gallon of each material and color applied.
   2. Concrete Floor Sealer: 1 unopened container, (5 gallon) of component.

1.6 QUALITY ASSURANCE

A. Applicator's Qualifications: Applicator with demonstrated 5 years' experience in painting Work similar on scope and quality demanded for this Project.

B. Single Source: Provide paint materials from single manufacturing source.

C. Paint Coverage: Provide painting coats to cover surfaces satisfactorily when applied at proper consistency and in accordance with specified minimum film thicknesses and with manufacturer's recommendations. Typically apply a minimum of 2 finish coats of paint over 1 coat of primer.

D. Apply coats and film thicknesses so that existing and new wall surfaces are indistinguishable.

E. Thinning: Do not thin paints with water or solvent based thinners unless approved by the County or their designated representative or recommended for project conditions by manufacturer.

F. Testing: Substrate testing as required in PARTS 2 & 3 of this Section.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, products manufactured by the paint and coating manufacturers below, as listed in Part 2 articles of this Specification Section for the paint category indicated.
   1. Manufacturers:
      a. Benjamin Moore
      b. Monochem.

2.2 PAINT, GENERAL

A. Master painting Institute, (MPI), Standards: Where specified in this Section, provide products that comply with MPI standards that are listed in the "MPI Approved Products List".

B. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates and factory primed surfaces indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate or factory primed surface indicated.

C. Colors: As selected by the County or their designated representative from manufacturer's full range or Match County's samples.

D. Sealers, Primers, Paints and Coatings: Refer to Paint Schedule at end of this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content, paint and coating adhesion and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Fiber-Cement Board: 12 percent.
   3. Masonry (Clay and CMUs): 12 percent.

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4. Wood: 15 percent.
5. Portland Cement Plaster: 12 percent.
6. Gypsum Board: 12 percent.
7. Submit complying test results for record.

C. Verify suitability of substrates, including surface conditions and compatibility with any existing or proposed finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of sealer, primer, paint or coating indicates acceptance of substrate surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove, store and protect hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove any incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 SEQUENCE OF WORK

A. Sequence of Work: Coordinate painting of painting with the installation of adjacent materials to allow complete painting of all exposed and semi-exposed surfaces.

B. Sequence of Work: Coordinate finish painting with general construction Work so that opportunities for finish damage to occur are minimized.

C. Provide “WET PAINT” signage and barricades to help alert occupants to painting and drying time closures.

D. Maintain required building egress at all times that building is occupied.

E. Remove any rags or other flammable materials or fire hazards from the project site at the end of each work day.

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3.4 APPLICATION

A. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure the break-up of lumps, complete dispersion of settled pigment and color and gloss uniformity. Where thinning is approved, additions shall not exceed paint manufacturer's recommendations.

B. Apply sealers, primers, paints and coatings according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Unless otherwise approved by paint manufacturer, allow at least 24 hours between paint coats applied to parging.

C. Apply sealers and paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
   1. Apply sealers, primer and paint to minimum film thicknesses specified.

3.5 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by the County or their designated representative, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces where approved by the County or their designated representative. Re-paint entire sections of wall surface, ceiling or component where touch up work is not approved by the County or their designated representative as a final finish result.

C. PAINT SCHEDULE -

D. Provide the following painted finishes where scheduled or indicated for the following substrates and materials:

E. Sealer For Interior Exposed to View Concrete Floor Slabs:
   1. Sealer: Monochem Permashield 100 # 5460:
      a. Type: Water Based Acrylic/Polyurethane.
      b. VOC Level: <40 g/L.
      c. Gloss: Low-Gloss.
      d. Colors: Clear.
      e. Coats: Minimum to achieve 2 – 3 dry mils of thickness, (2 coats).
      f. Substrate moisture testing required.

F. Interior HM Frames, Access Doors & Frames:
   1. Primer, (If Not Factory Primed): Benjamin Moore Super Spec HP® Acrylic Metal Primer (P04):
      a. Type: Waterborne Acrylic.
      b. VOC Level: <50 g/L.
      c. Color: White.

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d. Coats: Minimum 1 coat to achieve a minimum of 2 dry mils of thickness.

2. Finish Coats: Benjamin Moore “ben” Premium (627):
   a. Type: Waterborne Acrylic Latex.
   b. VOC Level: <2 g/L.
   c. Gloss: Semi-gloss.
   d. Colors: Stock or tinted colors selected by the County or their designated representative.
   e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.

G. Gypsum Board Walls, Fasciae, Soffits, Tectum Clouds, (Latex):
1. Primer: Benjamin Moore Fresh Start Primer (N023):
   a. Type: Waterborne Latex.
   b. VOC Level: <44 g/L.
   c. Gloss: Flat.
   d. Texture: Un-textured.
   e. Colors: White or tinted for colors selected by the County or their designated representative.
   f. Coats: 1 coat to achieve a minimum of 2 dry mils of thickness.
2. Finish Coats: Benjamin Moore “ben” Premium (626):
   a. Type: Waterborne Acrylic Latex.
   b. VOC Level: <50 g/L.
   c. Gloss: Eggshell.
   d. Colors: Up to 4 stock or tinted colors selected by the County or their designated representative.
   e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.

H. Gypsum Board Walls, (Epoxy):
1. Primer: Benjamin Moore recommended Acrylic Primer:
2. Finish Coats: Benjamin Moore “ben” Pre-Catalyzed Waterborne Epoxy (V342):
   a. Type: Waterborne Acrylic Epoxy.
   b. VOC Level: <83 g/L.
   c. Gloss: Eggshell.
   d. Colors: Up to 2 stock or tinted colors selected by the County or their designated representative.
   e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.
   f.

I. Gypsum Board Ceilings:
1. Finish Coats: Benjamin Moore Muresco Ceiling Paint (258):
   a. Type: Acrylic Latex,
   b. Sheen: Flat, (Gloss Level 1).
   c. VOC Level: 44.
   d. Color: White 258-01 or Classic White 258-04 as selected by the County or their designated representative.
   e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.

J. Finish Carpentry Cellular PVC, Board Cladding and Panels:
1. Primer: Benjamin Moore Fresh Start Primer (N023):

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a. Type: Waterborne Latex.
b. VOC Level: <44 g/L.
c. Gloss: Flat.
d. Texture: Un-textured.
e. Colors: White or tinted for colors selected by the County or their designated representative.
f. Coats: 1 coat to achieve a minimum of 2 dry mils of thickness.

2. Finish Paint: Benjamin Moore MoorGlo House and Trim Paint (N096):
a. Type: Acrylic.
b. Sheen: Soft Gloss, (Gloss Level 2).
c. VOC Level: 150 g/L.
d. Colors: Up to 2 of manufacturer's standard colors selected by the County or their designated representative. (No dark colors allowed on PVC).
e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.

K. Wood or Metal Roof Deck Underside, Metal Joists, Exposed Steel:
1. Primer / Finish Paint: Benjamin Moore Super Spec HP D.T.M. (P24 or 29, 3B or 2B):
a. Type: Alkyd, Tintable Base.
b. Sheen: Semi-Gloss.
c. VOC Level: 206 g/L.
d. Coats: Minimum to achieve 2.5 dry mils of thickness. (Spray application).
e. ASTM E-84 Class A (0-25) over non-combustible surfaces.
f. Color: (1) custom color.

L. Concrete Masonry Units, (CMU):
1. Block Filler: Benjamin Moore Ultra Spec Hi-Build Masonry Block Filler.
a. Dry Thickness: 8.1 – 11.0 mils.
b. Sheen: Flat.
c. VOC Level: 45.
2. Finish Coats: Benjamin Moore "ben" Premium (626):
a. Type: Waterborne Acrylic Latex.
b. VOC Level: <50 g/L.
c. Gloss: Eggshell.
d. Colors: Up to 4 stock or tinted colors selected by the County or their designated representative.
e. Coats: Minimum 2 coat to achieve a minimum of 3 dry mils of thickness.

M.

N. END OF SECTION 099123

O.

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SECTION 101423 – ROOM IDENTIFICATION SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Work includes, but is not limited to the following categories of signs required by the Owner and authorities having jurisdiction:
   1. Interior toilet room, (restroom), Oxygen Generator Room room-identification signs and other room identification signs required by authorities having jurisdiction.
   2. Where required at accessible entry doors and exterior exit doors; provide raised character and braille wall mounted exit signage adjacent to doors.
   3. Room identification sign at fire protection Sprinkler Room or rooms containing fire protection sprinkler equipment, as required by authorities having jurisdiction where sprinkler system and sprinkler equipment room is provided for building.
   4. Signage required at the Oxygen Generator Room.

B. Related Requirements:
   1. Section 104416 “Fire Extinguishers” for bracket mounted extinguisher identification signage.
   2. Plumbing and Fire Protection Drawings for any required fire protection signage not indicated above as a part of this Section.
   3. Electrical Drawings for illuminated exit signs and electrical panel circuit and energy related indications.
   4. Exterior business and building identification signage and street address signage is Work by others.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of sign.
   1. Include fabrication and installation details and attachments to other work.
   2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
   3. Show dimensions and clearances required, performance characteristics and capacities and wiring diagrams/controls as applicable.
   4. Show message list, typestyles, graphic elements, including any raised characters and Braille, and layout for each sign.
   5. Identify colors and textures.
   6. All shop drawings shall be neat, well organized and clearly legible in all respects.
   7. Submit elevations and plan views for all sign types, including graphic layouts, complete dimensions, materials, locations of all exposed fasteners, colors and finishes. Determine the total quantity for each sigh type and note it in the shop drawings.
   8. Site Condition Verification: Where required by the County or their designated representative tect, for specific items, Contractor shall inspect sit to confirm installation, conditions, then

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submit shop drawings and or written documentation for approval indicating proposed mounting devices. Verify field dimensions prior to commencing fabrications.

C. Selection Samples: For full range of available product colors, textures, edge conditions text styles and other attributes required for County's selection.
   1. Colors and Finish: Submit 3 each, 12x12 inch samples of all paint colors, silkscreen colors, vinyl colors and material finishes as applicable.
   2. Typeface(s): Submit complete typeface font(s), including upper and lower case letters, numbers and punctuation. Also submit samples of letter and work spacing for each cap height specified.

D. Approvals and Artwork for Evacuation Plans:
   1. Contractor shall obtain all required approvals of colors and graphic conventions to be shown on the evacuation plan as required from the proper jurisdiction.
   2. Contractor shall generate all required artwork for all maps. Maps are to include all locations for fire extinguisher cabinets and fire alarm pull boxes on drawings provided by or referred to by the County or their designated representative. Contractor shall obtain written approval from the proper jurisdiction of all map locations and primary and secondary exit routes shown to be shown on these maps. Contractor shall reference approved drawings for construction of exit paths and egress locations.
   3. Contractor shall submit one full size color evacuation map to the County or their designated representative for final approval of color and format. All subsequent color prints shall match this approved sample, which will be retained by the County or their designated representative for quality control.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties for each category of sign.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Minimum of 5 years from date of Substantial Completion.
   2. Warranties specified in this Section shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 SIGNS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   1. Advance Corporation.
   2. ASI Signage Innovations.
   3. Best Sign Systems.

B. General Room-Identification Signage: Signage with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
   1. Basis-of-Design Product: Advance Corporation, Braille-Tac Division.
   2. Laminated-Sheet Sign: Photopolymer face sheet with raised copy and Braille laminated to acrylic or phenolic backing sheet to produce composite sheet.
      a. Provide cast methyl methacrylate plastic sheet in size indicated with a minimum flexural strength of 16,000 psi when tested in accordance with ASTM D 790 and a minimum allowable continuous service temperature of 176 degrees Fahrenheit (80^0C.)
      b. Cast acrylic sheet shall have the following properties:
         1) Flame resistance: Application of a lighted match shall not produce melting, flashing, flaring or distortion. Signs shall not ignite at a temperature less than 800 degrees Fahrenheit.
      c. Coatings: Use paints for background colors which are recommended by the acrylic manufacturers for optimum adherence to acrylic surface and are non-fading for the application intended.
      d. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
      e. Surface-Applied Graphics: Applied Acrylic Polyurethane eggshell/matte paint.
      f. Colors: As selected by the County or their designated representative from manufacturer's full range.
      g. Sign Sizes: 6 inch x 6 inch. Coordinated with each other, allowing space for consistently sized lettering and Braille; readable from 20 feet (6.09 m).

   3. Sign-Panel Perimeter: Finish edges smooth.
      a. Edge & Corner Conditions: Manufacturer’s standard.
   4. Mounting: Manufacturer's standard method for substrates indicated with adhesive or two-face tape.

C. Tactile Signs (Interior Grade):
   1. Provide light sensitive photopolymer layer/polyester base, manufactured to produce a hardened, etched surface with 1/32” relief copy and or Braille dots after exposure to

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ultraviolet light. Wash and post-wash exposed materials in accordance with manufacturer's instructions.

2. Produce tactile signs with etched polymer type WFH 95 as manufactured by BASF or approved equal.
3. Sign Face Finish: Provide acrylic lacquer, high volume spray applied.
4. Text and or graphics Finish: Provide multi-plastic or other paint silkscreened for high adhesion. Coating shear lines to precisely reflect letterforms and or graphic outline contours.
5. Protective Sigh Finish: Provide non-glare transparent acrylic lacquer glaze.
6. Laminate Photopolymer:
   a. Sign Face: Provide photosensitive polyamide resin emulsion
   b. Sign Face Carrier: Provide .011 polyester film.
   c. Laminating Material: Provide high bond, pressure sensitive. High viscosity adhesive.
7. Pre-laminated Photopolymer: Provide .033" acrylic photopolymer bonded to.080 inch phenolic backing (overall thickness 1/8").

D. Fasteners, Hardware and Devices: Stock proprietary fastening devices of approved standard manufacture such as cadmium plated screws, bolts and washers.
1. Conceal all fasteners except where noted or shown otherwise.
2. Finish on all exposed devices to match overall sign finish, except as otherwise noted.
3. Provide vandal-resistant fasteners at all exposed locations unless otherwise noted.
   Use fasteners fabricated from metals that are noncorrosive to either the sign material(s) or the mounting surface.

E. Very High Bond Tape: Provide #4905/.o2o: clear and or #4950/.o45 white closed cell acrylic foam carrier with VHB adhesive, very high solvent resistance and very high shear and peel adhesion as manufactured by 3M Scotch or approved equal.

2.3 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to water or wet environments to resist water penetration and retention.
2. All work shall be free from burrs, dents, raw edges and sharp corners.
3. Finish all surfaces smooth unless otherwise indicated or specified.
4. Surfaces which are intended to be flat shall be free from bulges, oilcanning, gaps or other physical deformities. Such surfaces shall be fabricated to remain flat under installed conditions.
5. All surfaces shall be flat to a tolerance of plus or minus 1/16" when measured at any point with a ten foot straight edge.
6. All visible sign surfaces of the same type shall have the same finish. Color and finish shall be consistent across the entire surface of a sign.

B. Graphics: All text, arrows and symbols shall be provided in the sizes, colors, typefaces and spacing specified in the drawings. All text shall be a true, clean, digitally or photomechanically accurate reproduction of the typeface(s) selected, with letter-spacing and directional arrows as shown in the drawings.

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C. Sign Schedule: Contractor is to develop a sign schedule from the proposed signage schedule provided at the end of this section. The Contractor shall provide a complete signage schedule for the project. This schedule shall be provided as part of the Submittal Requirements.

D. Artwork for Evacuation Maps:
   1. All evacuations maps shall be 11”x17” Fiery RIP color prints, matte finish, on paper of sufficient weight to prevent drooping or curling when inserted into the frame.

2.4 LANGUAGES

A. Confirm with the Owner that signage will either be in English, another primary language spoken at the site location or be bilingual. If bilingual, confirm which language will be primary and which will be secondary. Comply with the requirements of authorities having jurisdiction.

B. Confirm that the braille alphabet will be ADA Grade-II “Unified English Braille” system. Provide braille as required by authorities having jurisdiction.

2.5 GRAPHICS

A. General: Provide text style font, size, and other text attributes as selected by the County or their designated representative from the manufacture’s standards, incorporating the County’s general layout requirements as follows:
   1. Lettering case: Upper case lettering only.
   2. Lettering height: 0.5 inch (12.7 mm) minimum, 2 inch (50.8mm) maximum height.
   3. Symbols: Incorporate accessibility and gender universal symbols at toilet room signs.

B. Braille: Provide raised Braille messaging for each sign.
   1. Provide ADA Grade II Braille unless otherwise required by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREINSTALLATION REQUIREMENTS

A. Coordinate final sign installation locations with the County or their designated representative prior to the start of sign installation Work.

B. Contractor shall inspect all installation locations for conditions which will adversely affect the execution, permanence and or quality of the Work and notify the County or their designated representative in writing of any and all unsatisfactory conditions. Contractor shall not proceed with installation until said unsatisfactory conditions have been corrected. Commencement of the installation indicates acceptance of site conditions and guarantees delivery of an acceptable product.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions and requirements of authorities having jurisdiction.

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1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs parallel to or on wall or door surfaces so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
4. Install all signs at 60 inches (1524 mm) centered above floor.
5. Signage mounting shall be compliant with specified accessibility requirements and requirements of authorities having jurisdiction.
6. Install all other signs where directed by the County or their designated representative.

B. Mounting Methods:
   1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
   2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

C. Remove any temporary protective coverings and strippable films as signs are installed.

3.3 CLEANING AND PROTECTION

A. At completion of the installation, clean all surfaces in accordance with manufacturer's instructions. Protect signage from damage until acceptance. Repair or replace damaged units.

END OF SECTION 101423

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SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Corner guards.

B. Related Work:
   1. Section 087100 “Door Hardware” for any door face or door edge protection.

1.2 ACTION SUBMITTALS

A. Product Data and Installation Requirements: For each type of product indicated.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 REFERENCES

A. A. Comply with applicable requirements of the following standards and those others referenced

B. In this Section, under the provisions of Section 014200 “References”.
   1. ASTM A 167 - Stainless and Heat-resisting Chromium-nickel Steel Plate, Sheet and Strip.
   2. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide stainless steel corner guard products offered by one of the following manufacturers:
   1. Construction Specialties, Inc.
   2. Pawling Corporation.
   3. WallGuard Corporation.

2.2 MATERIALS

A. Stainless Steel: Type 304 Stainless Steel, #4 Satin Finish, Adhesive Mounted to Surface.

B. Fasteners: All fasteners to be non-corrosive and compatible with stainless steel corner guards and retainers. All necessary fasteners to be supplied by the manufacturer.

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2.3 Fabrication

A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install corner guard unit's level, plumb, and true to line without distortions. Do not use units with scrapes, cracks, bends, or other defects that might be visible in the finished Work.
   1. Install corner guard units in locations and at mounting heights indicated on Drawings or as directed by the County or their designated representative.
   2. Coordinate installation with wall base. Set bottom of corner guard at top of wall base, unless otherwise indicated or directed by the County or their designated representative.

B. Provide and maintain manufacturer's protective plastic film cover until near Substantial Completion. Remove and dispose prior to occupancy.

C. Remove any excess adhesive using methods and materials recommended in writing by manufacturer.

D. Replace any defective products or installations with new.

END OF SECTION 102600

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SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet room accessories.
   2. Under lavatory guards.
   3. Custodial accessories.
   4. Provision of soap, towels, tissue & napkin products for specified dispensers, in types selected by Owner and quantities specified.

B. Related Requirements:
   1. Section 061000 “Rough Carpentry” for required blocking for accessory support.

1.2 ACTION SUBMITTALS

A. Prior to submission of Submittal, confirm types of dispensers and liquids and types of paper towels and toilet tissue that the Owner wishes to provide for facility use. Make appropriate substitutions to Part-2 Products listings.

B. Product Data: For each type of product indicated.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Manufacturer’s warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Single Source: Provide products from a single manufacturer.

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1.6 WARRANTIES

A. Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 15 years from date of Substantial Completion.
   2. Warranties specified in this Section shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project

1.7 PREINSTALLATION CONFERENCE

A. Prior to installation, review each accessory location with the County or their designated representative to confirm accessibility and specific visual and functional installation requirements.

B. Prior to installation, confirm that required blocking and support is in place.

PART 2 - PRODUCTS

2.1 Provide the following listed Bobrick Washroom Equipment, Inc. and IPS Corporation accessories or approved equal units, as indicated and/or scheduled on the Architectural Drawings, and as listed below:

2.2 PUBLIC USE & STAFF TOILETROOMS

A. Toilet Tissue (2 Roll) Dispenser: No. B-4388; 1 at each toilet.

B. Combination Towel (Folded) Dispenser/Waste Receptacle, (Recessed): No. B-369; at each bathroom.

C. Liquid-Soap Dispenser, Wall: No. B-4063; 1 at each sink.

D. Liquid-Soap Dispenser, Deck: No. B-822; (1) at each sink where not wall mounted.

E. Grab Bars: No. B-5806.99 x length required; (2) horizontal and 1 vertical at each toilet; or “L” shaped units of lengths that satisfy requirements of Authorities Having Jurisdiction.

F. Swing-up Grab Bars: No. B-4998.99; (1) at each toilet only if required by Authorities Having Jurisdiction, or where indicated on Drawings.

G. Sanitary-Napkin Disposal Unit: No. B-353; (1) at each bathroom where indicated/scheduled.

H. Mirror Unit: B-1658 1830, (Or other approved mirror as indicated).
   1. Size: 18” x 30”; (1) at each lavatory, where indicated.

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I. Robe / Leash hook: No. B-6727; (1) at each toilet room door, or if toilet stall compartments are provided on Drawings, (1) at each toilet stall compartment door.

2.3 RECEPTION DESK

A. Robe / Leash hook: No. B-6727; provide where indicated or if not indicated a total of four (4) hooks.

2.4 BATHING/GROOMING AREAS – (Where applicable)

A. Robe / Leash hook: No. B-6727; provide where indicated or if not indicated a total of (1) hook at each station.

2.5 UNDER LAVATORY GUARDS

A. Under lavatory Guard: Lav Guard 2 E-Z series, Trubro Lav Guard, manufactured by IPS Corporation; 1 at each exposed lavatory drain

2.6 CUSTODIAL ACCESSORIES

A. Mop and Broom Holder: No. B-232 x 24”, or 36”; 1 at each janitor closet, as indicated.

2.7 SOAP, TOWEL, TISSUE & NAPKIN PRODUCTS

A. Provide products as selected by Owner from product lines offered by manufacturer or toilet accessory vendor.

B. Provide the following quantities of dispensing products:
1. Soap(s): Quantities to fill all dispensers with an additional maintenance stock of two, (2) unopened full, (approximately gallon sized), containers of each product.
2. Towels, Tissues & Napkins: Quantities to fill all dispensers with an additional maintenance stock of two (2) unopened, full cartons or boxes of each product.

2.8 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of 6 keys to Owner's representative.

B. Grab Bars: Fabricate in lengths required by governing authorities having jurisdiction and regulations.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Confirm that wall thicknesses will facilitate recessed units prior to ordering of toilet accessories.

B. At masonry walls, provide equivalent surface mounted units where provisions for semi-recessed units are not indicated or available.

C. Maintain all required accessibility clearances and maneuvering dimensions required by authorities having jurisdiction.

D. Prior to start of Work, confirm that required blocking is in place and surfaces and materials are ready to receive accessory installation. Start of Work signifies acceptance of conditions.

E. Conduct Preinstallation conference and coordinate final mounting heights and lateral locations with the County or their designated representative prior to commencing installations.

3.2 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights and lateral dimensions indicated and required by authorities having jurisdiction; or if not indicated as specifically directed by the County or their designated representative.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

C. Stock and fill all soap, towel and tissue dispensers and instruct Owner’s representative on stocking and filling procedures.

END OF SECTION 102800

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SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire-protection cabinets for portable fire extinguishers where required and located by the local Fire Inspector.

B. Related Requirements:
1. Section 104416 “Fire Extinguishers” for fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data and Installation Instructions: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall materials and wall thickness.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

A. Products meeting requirements include but are not limited to the following:
1. Larsen “Architectural Series”, model number 24096R-FG or approved equal.

B. Cabinet trim style: Rolled edge, semi-recessed cabinet.

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1. Projection from wall: nominal 2-1/2 inches.
2. Full glazed design with clear tempered safety glass.
3. Door and trim: Cold-rolled steel with factory applied white thermally fused polyester coating, acceptable to receive a field applied recoating.
4. Handles: Red door handles having raised letters “FIRE”.
5. Lettering: Factory furnished vertical reading, black or red decals, selected by the County or their designated representative, for field application. Install where required by governing authorities and directed by the County or their designated representative.
6. Provide matching surface mounted units at masonry wall locations where semi-recessed units can’t provide the required 4 inch recess because of wall thickness.

C. Maintain all required accessibility clearances and maneuvering dimensions.

D. Coordinate locations with the County or their designated representative prior to installation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to Authorities Having Jurisdiction.

C. Fire-Protection Cabinets: Fasten cabinets to structure. Make square and plumb.

D. Identification: Apply decals at locations directed by the County or their designated representative.

E. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION 104413

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SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes permanent portable, hand-carried fire extinguishers for cabinets where indicated on Drawings and located by the local Fire Marshall or Fire Department.

B. Provide temporary, (for construction/demolition operations), portable, hand-carried fire extinguishers as required by Section 010001 “General Project Requirements” Section 024116 “Structure Demolition”, and/or Section 024119 “Selective Demolition”, and NFPA 241.

C. Where cabinets are not indicated on drawings and extinguishers are required, provide mounting brackets for fire extinguishers at those locations.

D. Related Requirements:
   1. Section 010001 “General Project Requirements” for provision of temporary fire extinguishers during construction.
   2. Section 061000 “Rough Carpentry for concealed blocking at fire extinguisher mounting brackets.
   3. Section 104413 “Fire Protection Cabinets” for fire extinguisher cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Manufacturer’s standard warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

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1.6 WARRANTIES

A. Manufacturer’s Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Manufacturer’s standard, from date of Substantial Completion.
   2. Warranties specified in this Section shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers”.

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated and required by governing authorities.
   1. Multi-purpose dry chemical type (mono ammonium phosphate),6 pound capacity, multi-purpose rated ‘3A, 40B:C’; equal to Larsen, model number MP6, with metal valves and siphon tubes, replaceable molded valve stem seals, pressure gauges and hose discharge.
   2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers not indicated to be stored in cabinets. Provide manufacturer’s baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by the County or their designated representative.
   1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
      a. Orientation: Vertical.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to start of Work, review all extinguisher locations with the County or their designated representative. Confirm that concealed wall blocking is in place where extinguishers are installed with mounting brackets and not cabinets.

3.2 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Where required to be in accordance with NFPA 150, “install fire extinguishers within 50 feet (15.2 m), travel distance of any point within the animal housing facility”.

C. Install fire extinguishers inside cabinets or on mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction and where approved by the County or their designated representative.

D. Install identification lettering where approved by the County or their designated representative and authorities having jurisdiction.

E. Mounting Brackets: At locations indicated and required, fasten mounting brackets through wall surfaces and into concealed blocking. Install square and plumb.

F. Do not use permanent fire extinguishers as construction fire extinguishers. Do not provide temporary construction fire extinguishers as permanent fire extinguishers at substantial completion and Owner occupancy.

END OF SECTION 104416

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SECTION 117990 – VETERINARY EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. The furnishing and/or installation of veterinary and office equipment scheduled and indicated on the Construction Documents.
      a. Work includes the furnishing and installing of new equipment, installation of the Owner furnished existing equipment and the installation of Owner furnished new equipment.
      b. Work includes on-site relocation and moving of equipment delivered by the Owner for Contractor installation, and/or existing on-site Owner equipment identified in the Equipment Schedule or on the Drawings as being relocated.

B. Related Requirements:
   1. Refer to the Architectural Drawings and Equipment Guide for the Equipment Schedule and plan locations of equipment.
   2. Refer to the Plumbing, Mechanical, and Electrical Drawings for utility requirements.
   3. Coordination of the Oxygen Generation Room louver requirements with the oxygen generation equipment provided as Work of this Section.

C. Work of this Section does not include the following:
   1. Owner furnished and installed equipment not on the Equipment Schedule or not specified in this Section.
   2. Owner furnished vendor installed animal cages and/or runs and associated components.
   3. Off-site storage and/or relocation of Owner's equipment from other locations to the project site.

1.2 DEFINITIONS

A. Equipment: Equipment includes both veterinary practice categories of equipment and general medical office categories of equipment. Refer to the Equipment Schedule.

B. Animal Runs: Animal Runs typically include gates, divider and end panels, drain baffles, animal benches and anchoring and fastening of run components. Contractor animal run Work includes depressed run slabs, run plumbing, drains and drainage, run tile or FRP wall surfaces, run sound absorbing wall panels and run flooring and wall base work. Contractor animal run Work shall also be coordinated with the Owner's Vendor for the installation requirements of the animal runs.

C. Animal Cages: Self-contained cages with possible accessories that are typically placed into position on a work surface, millwork cage bases or are wheeled, movable units.

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1.3 ACTION SUBMITTALS

A. Product Data and Installation Instructions: Submit for each Contractor furnished product or fabrication indicated.

B. Shop Drawings: Submit shop drawings for animal cages and dog run partitions and gates.

C. Specific equipment utility requirements including any electrical power, data connections, water (temperatures), drainage, ventilation, medical gasses, and suction.

D. Samples: Submit selection samples for each piece of equipment, (Where applicable), for each color and texture.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates, such as Energy Star and UL compliance.

B. Warranties: Manufacturer’s warranties.

C. Operational permits and licenses, if required.

D. Records of testing documentation required by authorities having jurisdiction.

1.5 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance data for each furnished piece of equipment.
   1. Include vendor’s name and contact information for each piece of equipment.

1.6 QUALITY ASSURANCE

A. Installer Qualifications, (Where required by equipment manufacturer): The installer must be an employee trained and approved by manufacturer for installation of units required for this Project.

B. High-Altitude Conversion, (Where applicable): Provide gas-operated appliances with manufacturer's conversion kit installed by a qualified service agency according to manufacturer's written instructions for Project location and type of fuel.

C. Animal Cage and Run Coordination: The Contractor shall coordinate with the Owner’s animal cage and/or run manufacturer and installer throughout the construction of the cage and/or run areas of the Project, to establish and confirm dimensions of cage bases, run drainage, wall finish and other intersecting aspects of the animal cage or run Work. Provide final dimensional information on submittals.

D. Provide all post installation testing, permits and licenses required by authorities having jurisdiction.

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1.7 PRE-FABRICATION, PRE-INSTALLATION COORDINATION CONFERENCE

A. Within 4 weeks of receipt of Notice-to-Proceed, the Contractor shall schedule and conduct a pre-installation coordination conference at the job site or if approved by the County or their designated representative, via conference telephone, to review all veterinary office equipment requirements and to confirm equipment selections, ordering and delivery requirements and status, spatial requirements, utility requirements, quantities and locations.
   1. Required Attendees:
      a. Owner (County)
      b. General Contractor.
      c. Vendor or manufacturer's representative, if requested by the County or their designated representative.

B. After the pre-installation coordination meeting and prior to submission of equipment related submittals, Contractor shall confirm utility and special requirements with his equipment vendors.

C. Prior to related shop drawing production, distribute utility and spatial information to Subcontractors and fabricators who's Work relates to such equipment and utilities.

D. Coordinate the oxygen generation louver requirement with Work of Section 089119 "Fixed Louvers".

1.8 WARRANTIES

A. Manufacturer's Warranties: Provide manufacturer's standard form in which manufacturer agrees to repair or replace equipment or components that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Provide manufacturer's standard, from date of Substantial Completion.
   2. Warranties specified in this Section shall stand separate and in force and shall not be limited by any Construction Guarantee or Warranty indicated in the Division 1 Supplementary Conditions issued for this Project

1.9 DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery with construction schedule to prevent equipment damage and equipment installation delays.

B. Coordinate size of access and route to place of installation to prevent delay of installation due to physical impediments. Any work involving the demolition and reconstruction of partitions, walls, floors, roofs, windows and/or doorways to place and install the Work of this Section shall be performed at no additional cost to the Owner.

C. Store equipment in a protected area and in original protective packaging until time of fabrication or installation.

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PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. General: Provide products scheduled and indicated on Drawings:
   1. Provide all required accessories and selected optional components to afford a complete operating equipment installation.
   2. Provide electrical power where required for equipment operation.
   3. Provide refrigerator/freezer cold water and drainage utilities if required by scheduled units.
   4. Provide drainage and water supply to equipment where scheduled.
   5. Washer/dryer, Exhaust Hoods: Where indicated, provide exhaust ventilation to exterior of building.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install equipment in accordance with manufacturer's recommendations and requirements.

B. Built-in Equipment: Securely anchor units to supporting floors, cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.

C. Field Fabricated Equipment:
   1. Prior to start of Work, inspect conditions to coordinate those conditions with the County or their designated representative reviewed Shop Drawings. Promptly inform the by the County or their designated representative of any discrepancies. Start of Work signifies contractor's acceptance of conditions and acceptance of any resultant required disassembly, re-start or replacement of Work and all associated cost.
   2. Fabricate and install in accordance with reviewed Shop Drawings and manufacturer's instructions and recommendations.

D. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

E. Anti-Tip Devices and Wall Anchorage: Provide and install according to manufacturer's written instructions and seismic and safety requirements of authorities having jurisdiction. Coordinate wall fastening with blocking and/or structural supports.

F. Utilities: Comply with plumbing, mechanical and electrical drawing requirements, manufacturer requirements and governing authorities and regulations. Make all final connections before Substantial Completion.

G. Adjust equipment for correct operation and vibration levels. Install level and plumb and at operating heights; with any optional adjustments set as requested by Owner.

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3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:
   1. Perform visual, mechanical, and electrical inspection and testing for equipment according to manufacturers' written recommendations. Certify compliance with each manufacturer's performance parameters.
   2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
   3. Operational Test: After installation, start units to confirm proper operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
   5. Provide all operational permits and licenses required by authorities having jurisdiction for the use of equipment by the Owner.

C. The use of equipment such as refrigerators, by construction personnel, is not allowed.

3.3 INSPECTION, CLEANING, PROTECTION

A. After installation is complete, insure that operating parts work freely and fit neatly. Adjust hardware and components as required. Replace any damaged Work.

B. Clean all user accessible interior and exterior surfaces and protect surfaces from damage until Substantial Completion acceptance.

C. Distribute approved submittal copies of equipment maintenance and operation instructions to Owner for record.

D. Upon completion of the Work of this Section, remove tools and all crating pallets, boxes, coverings rubbish and debris. Clean equipment in accordance with manufacturer’s recommendations.

3.4 POST INSTALLATION INSTRUCTION

A. At completion of Work and prior to Owner’s final acceptance, arrange instruction sessions between Equipment Vendor and Owner for equipment, including the X-ray and scanning equipment installations. Instruction shall include the following:
   1. Review and demonstration of all equipment functions.
   2. Review of all safety instructions, procedures and aspects associated with the equipment.
   3. Review of all maintenance requirements.
   4. Confirmation of emergency contact information.

END OF SECTION 117990

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Project Guide

for

VETERINARY EQUIPMENT

JEFFERSON COUNTY ANIMAL CARE FACILITY
PROJECT NO.: PW19B035BLD

4848 STATE ROUTE 30
HOUSE SPRINGS, MO 63501

Jefferson County Department of Public Works
729 Maple Street
P.O. Box 100
Hillsboro, MO 63050

Date of Issue: 11 March 2019

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Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
102	Reception Area, Adoptions	410.01	Hook, Leash	N	4	OFCI	Bobrick	B-6727												
102	Waiting Area (Adopters & Reclaimers)	634	Monitor, Display, Wall Mount,	N	1	OFVI	Dell	D32118HN		28.7	0.3	18.9	16.09	20	120V	Yes				
102	Waiting Area (Adopters & Reclaimers)	634.02	Monitor, Bracket, Wall Mount, Articulating 10"-29"	N	1	OFCI	Peerless-AV	TVT624												
103	Waiting Area (Surrenders & Finders)	634	Monitor, Display, Wall Mount,	N	1	OFVI	Dell	D32118HN		28.7	0.3	18.9	16.09	20	120V	Yes				
103	Waiting Area (Surrenders & Finders)	634.02	Monitor, Bracket, Wall Mount, Articulating 10"-29"	N	1	OFCI	Peerless-AV	TVT624												
103	Waiting, Surrender & Finders	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
104	Reception Area	631	Computer, Desktop	N	4	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
104	Reception Area	642	Multi-function Device	N	1	OFVI	Konica Minolta	bizhub 25e												
104	Reception Area, Surrenders	410.01	Hook, Leash	N	4	OFCI	Bobrick	B-6727												
106	Admissions, Exam Room	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
106	Admissions, Exam Room	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
106	Admissions, Exam Room	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
106	Admissions, Exam Room	562	Table, Exam, Peninsula, Lift, Foot Operated, Scale	N	1	OFCI	Midmark Animal Health	110-0310-21		44	22	90		300	120V					
106	Admissions, Exam Room	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
106	Admissions, Exam Room	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
106	Admissions, Exam Room	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
107	Temporary Cat Holding	330.01	Cage, Cat, Holding	N	6	OFCI	Snyder	B3		25.75	46.75	67.5								
107	Temporary Cat Holding	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
107	Temporary Cat Holding	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
107	Temporary Cat Holding	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
108	Temporary Dog Holding	333	Cage, Dog, Holding	N	1	OFCI	Snyder	F		25.75	46.75	31.5								
108	Temporary Dog Holding	333.01	Cage, Dog, Holding	N	2	OFCI	Snyder	B3		25.75	46.75	22.5								
108	Temporary Dog Holding	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
108	Temporary Dog Holding	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
108	Temporary Dog Holding	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
109	Reception Area	410.01	Hook, Leash	N	4	OFCI	Bobrick	B-6727												
109	Reception Area	631	Computer, Desktop	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
109	Reception Area	642	Multi-function Device	N	1	OFVI	Konica Minolta	bizhub 25e												
111	SNC/SMC Waiting Area	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
112	SNC/SMC Exam Room #1	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
112	SNC/SMC Exam Room #1	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
112	SNC/SMC Exam Room #1	451	Disposal, Syringe, Wall Enclosure	N	2	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
112	SNC/SMC Exam Room #1	552	Table, Exam, Wall Mount, Perpendicular	N	1	OFCI	Midmark Animal Health	101-1640-00		44	22	36								
112	SNC/SMC Exam Room #1	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
112	SNC/SMC Exam Room #1	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
112	SNC/SMC Exam Room #1	634	Monitor, Display, Wall Mount,	N	1	OFVI	Dell	D32118HN		28.7	0.3	18.9	16.09	20	120V	Yes				
112	SNC/SMC Exam Room #1	634.02	Monitor, Bracket, Wall Mount, Articulating 10"-29"	N	1	OFCI	Peerless-AV	TVT624												
112	SNC/SMC Exam Room #1	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
113	SNC/SMC Exam Room #2	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
113	SNC/SMC Exam Room #2	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
113	SNC/SMC Exam Room #2	451	Disposal, Syringe, Wall Enclosure	N	2	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
113	SNC/SMC Exam Room #2	552	Table, Exam, Wall Mount, Perpendicular	N	1	OFCI	Midmark Animal Health	101-1640-00		44	22	36								
113	SNC/SMC Exam Room #2	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
113	SNC/SMC Exam Room #2	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
113	SNC/SMC Exam Room #2	634	Monitor, Display, Wall Mount,	N	1	OFVI	Dell	D32118HN		28.7	0.3	18.9	16.09	20	120V	Yes				
113	SNC/SMC Exam Room #2	634.02	Monitor, Bracket, Wall Mount, Articulating 10"-29"	N	1	OFCI	Peerless-AV	TVT624												
113	SNC/SMC Exam Room #2	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
115	Medication/Dispensing, Lab	145.01	Refrigerator, Undercounter, Locking, Temp Display	N	1	OFCI	Summit	FF6L7NZ		23.5	23.63	33.5			120V					
115	Medication/Dispensing, Lab	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
115	Medication/Dispensing, Lab	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
115	Medication/Dispensing, Lab	512	Analyzer, Blood (22 Parameters)	N	1	OFOI	Abaxis	VETSCAN HM5		10.6	12.5	14			100-240V					
115	Medication/Dispensing, Lab	514	Analyzer, Electrolyte	N	1	OFOI	DiaSys	x-pedite ise vet		13.2	12.4	12	14							
115	Medication/Dispensing, Lab	515	Centrifuge, Microhematocrit	N	2	OFOI	LW Scientific	V24T												
115	Medication/Dispensing, Lab	516	Centrifuge, Fecal	N	1	OFOI	LW Scientific	Universal Centrifuge												
115	Medication/Dispensing, Lab	517	Microscope / USB Camera	N	1	OFOI	AmScope	40X-2000X 3W LED							115V					
115	Medication/Dispensing, Lab	720	Eyewash, Deck Mounted	N	1	CFCI	Haws	76i10									1/2" CW			
115	Medication/Dispensing, Lab	773	Electrical, Power Strip, Multi-Plug 15A	N	1	CFCI	Legrand	2000												
115	Medication/Dispensing, Lab	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
116	SNC/SMC Staff, Unisex, Restroom	411	Mirror	N	1	CFCI	Bobrick	B-293-1830		4.25	18	30								
116	SNC/SMC Staff, Unisex, Restroom	433	Grab Bar, Toilet	N	1	OFCI	Bobrick	B-6897		54	42									

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
116	SNC/SMC Staff, Unisex, Restroom	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
116	SNC/SMC Staff, Unisex, Restroom	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
116	SNC/SMC Staff, Unisex, Restroom	446	Dispenser, Toilet, Paper	N	1	OFCI	Bobrick	B-2890			42									
117	Janitor	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
117	Janitor	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						
119	SNC/SMC Medical Offices	631	Computer, Desktop	N	2	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
120	Lab Waste Storage	174	Shelf, Wall Mount, 36"	N	1	OFCI	Advance Tabco	WS-15-36-16		36	15									
120	Lab Waste Storage	827	Bin, Bio-Hazard with Lid / Dolly	N	2	OFOI	Rubbermaid	FG352600RED	28 Gallon											
121	Radiology Room (Digital)	182.01	Shelf, Wall Mtd, Stainless Steel	N	1	OFCI	Advance Tabco	AWS-KD-24		24	12	10.5								Over Ultrasound
121	Radiology Room (Digital)	533	Ultrasound	N	1	OFVI	GE	LOGIQ V5 Vet												
121	Radiology Room (Digital)	575	X-ray, Table / Head / Bucky	N	1	OFVI	MyVet	i72W		59.1	25.2	80			280/230 VAC Single Phase					
121	Radiology Room (Digital)	575.01	Immobilizer	N	1	OFOI	Wolf X-Ray	80-224CC	Large											
121	Radiology Room (Digital)	575.02	Immobilizer	N	1	OFOI	Wolf X-Ray	80-215CB	Medium											
121	Radiology Room (Digital)	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
121	Radiology Room (Digital)	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
121	Radiology Room (Digital)	711	Outlet, Oxygen	N	2	OFCI	Hospital Systems Inc.	Oxygen	299056-OXY											
121	Radiology Room (Digital)	712	Outlet, Vacuum WAGD	N	2	OFCI	Hospital Systems Inc.	Vacuum	299059-WAGD											
121	Radiology Room (Digital)	817	Rack, Apron, Lead, Mobile	N	1	OFOI	Infab	683419	(6) Box Hangers	25	27	78								
122	Pre-Op Holding Area	332.01	Cage, Standard, Stainless Steel	N	3	OFCI	Midmark Animal Health	160-4836-00	Double Door	28	48	36								
122	Pre-Op Holding Area	332.04	Cage, Standard, Stainless Steel	N	6	OFCI	Midmark Animal Health	160-3630-00	Single Door	28	36	30								
122	Pre-Op Holding Area	452	Track, IV	N	2	OFCI	C/S Cubicle Curtains	17000	17100 IV Pendant (3)	48										
122	Pre-Op Holding Area	711	Outlet, Oxygen	N	2	OFCI	Hospital Systems Inc.	Oxygen	299056-OXY											
122	Pre-Op Holding Area	774	Electrical, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Duplex	299098											
123	Pack Prep Area	166.01	Washer, Commercial	N	1	OFCI	LG	WM1388HW		27.75	24	33.5			120V/10A					
123	Pack Prep Area	166.02	Dryer, Commercial, 40 LB	N	1	OFCI	LG	DLEC888W		25.25	24	33.5			240V/30A					
123	Pack Prep Area	182.01	Shelf, Wall Mtd, Stainless Steel	N	1	OFCI	Advance Tabco	AWS-KD-36		36	12	10.5								
123	Pack Prep Area	441.01	Dispenser, Towel, Paper	N	1	OFCI	Bobrick	B-29744	Semi-Recessed	5.06	17.18	9.13								
123	Pack Prep Area	443.01	Dispenser, Soap, Touchless	N	1	OFCI	Steris	SDS	Touchless Adapter											
123	Pack Prep Area	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
123	Pack Prep Area	511.02	Autoclave, Steam, Countertop	N	1	OFVI	Tuttnauer	EZ10		21.5	20	14.4			120V/12A					
123	Pack Prep Area	810	Cleaner, Ultrasonic, Countertop	N	1	OFVI	Coltene/BioSonic	UC150/60021987	60022042 Accessory Kit	10.8	13.6	14								
123	Pack Prep Area	815	Box, Glove, Wall Mount	N	2	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
123	Pack Prep Area	819	Cabinet, Surgical, Pass-Thru	N	1	OFCI	Tristar	70050		12	36	36								
123	Pack Prep Area	819.01	Panel, Louver	N	1	OFCI	Quantum Storage	QLP-4819CO	Assortment of Bins		48	19	18							
123	Pack Prep Area	820	Dispenser, Sterile Paper	N	1	OFCI	Duralov	DL-RD-WM-36		6	38	10								
124	SNC/SMC Surgery	571	Table, Surgical, V-Top, 60"	N	2	OFVI	Midmark Animal Health	100-4071-00	Non-Heated Top	60	20.25	33.5 - 39.5								
124	SNC/SMC Surgery	592	Light, Surgical, Double Head	N	2	OFVI	Startrol	8X4-GS2							100-240V					
124	SNC/SMC Surgery	595	Electrosurgery, Cauterizer	N	1	OFVI	Apyx Medical Corporation	Bovie 1250S-V	Smoke Shark System and Mobile Stand											
124	SNC/SMC Surgery	595.01	Electrosurgery, Smoke Evacuator	N	1	OFVI	Apyx Medical Corporation	Shark System SE02												
124	SNC/SMC Surgery	595.01	Electrosurgery. Stand	N	1	OFVI	Apyx Medical Corporation	ESMS2 Mobile Stand												
124	SNC/SMC Surgery	634	Monitor, Display, 55"	N	2	OFVI	Sony	LMD-X550MD		3.4	49.9	30.4	35		110V/3.2A					
124	SNC/SMC Surgery	634.01	Mount, Display, 24" Clg. Mount	N	2	OFCI	GCX Solutions	FLP-0010-20												
124	SNC/SMC Surgery	682	Clock, Battery Operated, Wall Mount	N	1	OFCI	Global Industrial	T9F695324	Radio Controlled	2.5	14	14								
124	SNC/SMC Surgery	711	Outlet, Oxygen	N	2	OFCI	Hospital Systems Inc.	Oxygen	299056-OXY											
124	SNC/SMC Surgery	712	Outlet, Vacuum WAGD	N	2	OFCI	Hospital Systems Inc.	Vacuum	299059-WAGD											
124	SNC/SMC Surgery	774	Electrical, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Duplex	299098											
124	SNC/SMC Surgery	812	Suction, Portable	N	2	OFOI	Gomco	G-180		7.5	16.8	9.4	11							
124	SNC/SMC Surgery	813	Cart, Treatment, 4 Drawer	N	1	OFOI	Harloff	ETC-4		15.13	23.38	27.25	60							
124	SNC/SMC Surgery	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
124	SNC/SMC Surgery	816	Rack, Endotracheal	N	1	OFCI	Jorgensen Labs	J0160A												
124	SNC/SMC Surgery	818	Stand, Mayo	N	2	OFOI	Medline Industries													
124	SNC/SMC Surgery	826	Cart, Supply	N	1	OFVI	Mass Medical	MX610DHG	Custom Fit for Tubes and Supplies	26	45.12	78.75								
125	SNC/SMC Treatment & Surgery Prep	332.01	Cage, Standard, Stainless Steel	N	3	OFCI	Midmark Animal Health	160-4836-00	Double Door	28	48	36								
125	SNC/SMC Treatment & Surgery Prep	332.04	Cage, Standard, Stainless Steel	N	6	OFCI	Midmark Animal Health	160-3630-00	Single Door	28	36	30								
125	SNC/SMC Treatment & Surgery Prep	441	Dispenser, Towel, Paper	N	2	OFCI	Bobrick	B-262		4	10.8	14.1								
125	SNC/SMC Treatment & Surgery Prep	443.01	Dispenser, Soap, Touchless	N	2	OFCI	Steris	SDS	Touchless Adapter											
125	SNC/SMC Treatment & Surgery Prep	444	Dispenser, Sanitizer	N	4	OFCI	Steris	2D53-Q7/2D45-OK												
125	SNC/SMC Treatment & Surgery Prep	451	Disposal, Syringe, Wall Enclosure	N	2	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
125	SNC/SMC Treatment & Surgery Prep	452	Track, IV	N	5	OFCI	C/S Cubicle Curtains	17000	17100 IV Pendant (3)	48										
125	SNC/SMC Treatment & Surgery Prep	531	Dental, Arm, Cabinet Mount	N	1	OFVI	Midmark Animal Health	VetPro 5000	With Oil Free Compressor											
125	SNC/SMC Treatment & Surgery Prep	531.01	Dental Prophylaxis, Sensor, Wall Mount	N	1	OFVI	Midmark Animal Health	VetPro DR												
125	SNC/SMC Treatment & Surgery Prep	542	X-Ray, Dental, Wall Mount	N	1	OFVI	iM3	CR7 Vet Dental					95		240					
125	SNC/SMC Treatment & Surgery Prep	542.1	Computer, Dental Imaging System	N	1	OFVI	Midmark Animal Health	VetPro CR												
125	SNC/SMC Treatment & Surgery Prep	573	Table, Treatment, Wet	N	1	OFCI	Midmark Animal Health	8003-005-00-XXX	3 Drawers, Racks, Custom Color , Integrated Handle	25	60	36		275						

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
125	SNC/SMC Treatment & Surgery Prep	573.01	Table, Treatment, Wet, Tub	N	1	OFCI	Midmark Animal Health	8003-005-00-XXX	Tub	25	60	36		275						
125	SNC/SMC Treatment & Surgery Prep	573.02	Table, Treatment, Dry	N	1	OFCI	Midmark Animal Health	8007-007-00-XXX	Custom Color	26	61	36		230						
125	SNC/SMC Treatment & Surgery Prep	593	Light, Treatment	N	2	OFVI	Midmark Animal Health	255 LED	Single Head LED					65	115					
125	SNC/SMC Treatment & Surgery Prep	593.1	Light, Dental LED	N	1	OFVI	Midmark Animal Health Henry Schein		003-1287-00 Ceiling Track with Monitor											
125	SNC/SMC Treatment & Surgery Prep	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
125	SNC/SMC Treatment & Surgery Prep	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
125	SNC/SMC Treatment & Surgery Prep	711	Outlet, Oxygen	N	2	OFCI	Hospital Systems Inc.	Oxygen	299056-OXY											
125	SNC/SMC Treatment & Surgery Prep	713	Outlet, Vacuum	N	2	OFCI	Hospital Systems Inc.	Vacuum	299055-VAC											
125	SNC/SMC Treatment & Surgery Prep	774	Electrical, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Duplex	299098											
125	SNC/SMC Treatment & Surgery Prep	774.1	Low Voltage, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Data	299100											
126	Post Op Recovery	332.01	Cage, Standard, Stainless Steel	N	3	OFCI	Midmark Animal Health	160-4836-00	Double Door	28	48	30								
126	Post Op Recovery	333	Cage, Standard, Stainless Steel	N	6	OFCI	Midmark Animal Health	160-3630-00	Single Door	28	36	30								
126	Post Op Recovery	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
126	Post Op Recovery	711	Outlet, Oxygen	N	2	OFCI	Hospital Systems Inc.	Oxygen	299056-OXY											
126	Post Op Recovery	713	Outlet, Vacuum	N	2	OFCI	Hospital Systems Inc.	Vacuum	299055-VAC											
126	Post Op Recovery	774	Electrical, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Duplex	299098											
126	Post Op Recovery	774.1	Low Voltage, Cord Drop	N	2	OFCI	Hospital Systems Inc.	1 Data	299100											
126	Post Op Recovery	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
126	SNC/SMC Treatment & Surgery Prep	523	Floor Scale	N	1	OFCI														
127	Field Supervisor Officers	631	Computer, Desktop	N	3	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
127	Field Supervisor Officers	642	Multi-function Device	N	1	OFVI	Konica Minolta	bizhub 25e												
127	SNC/SMC Treatment & Surgery Prep	523.01	Floor Scale - Readout	N	1	OFOI														
128	Animal Control Officers	631	Computer, Desktop	N	6	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
128	SNC/SMC Treatment & Surgery Prep	553	Gurney	N	1															
129	Changing Room	411	Mirror	N	1	CFCI	Bobrick	B-293-1830		4.52	40	30								
130	Changing Room (ACCESSIBLE)	411	Mirror	N	1	CFCI	Bobrick	B-293-1830		4.52	40	30								
131	Departure Closet	140	Freezer, chest 8.8 CF	N	1	OFVI	Summit Appliance	SCFM162	KEYPAD/DT	27.5	55.75	33			115V					
132	Quarantine Bite Dog Housing - Exercise Runs	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
132	Quarantine Bite Dog Housing - Exercise Runs	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
132	Quarantine Bite Dog Housing - Exercise Runs	387	Run, Transfer Door, Surface Mtd	N	4	OFCI														
132	Quarantine Bite Dog Housing - Exercise Runs	390	Run, Bench	N	4	OFCI		1048-RB												
132	Quarantine Bite Dog Housing - Exercise Runs	441	Dispenser, Towel, Paper	N	2	OFCI	Bobrick	B-262		4	10.8	14.1								
132	Quarantine Bite Dog Housing - Exercise Runs	443.01	Dispenser, Soap, Touchless	N	2	OFCI	Steris	SDS	Touchless Adapter											
132	Quarantine Bite Dog Housing - Exercise Runs	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
132	Quarantine Bite Dog Housing - Exercise Runs	751	System, Cleaning, Hose Reel,	N	1	OFVI	SMT	SMT-300HDR	Provide Hose and Spray Wand	24	41	41								
132	Quarantine Bite Dog Housing - Exercise Runs	751.1	Hose Reel, Ceiling Mounted (50')	N	1	OFCI	SMT	300-5025	Extended Spray Wand.											
132	Quarantine Bite Dog Housing - Exercise Runs	751.1	System, Cleaning, Hose Reel, Mixing Box	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
132	Quarantine Bite Dog Housing - Exercise Runs	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
133	Quarantine Bite Dog Housing - Resting Runs	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
133	Quarantine Bite Dog Housing - Resting Runs	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
133	Quarantine Bite Dog Housing - Resting Runs	441	Dispenser, Towel, Paper	N	2	OFCI	Bobrick	B-262		4	10.8	14.1								
133	Quarantine Bite Dog Housing - Resting Runs	443.01	Dispenser, Soap, Touchless	N	2	OFCI	Steris	SDS	Touchless Adapter											
133	Quarantine Bite Dog Housing - Resting Runs	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
133	Quarantine Bite Dog Housing - Resting Runs	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
133	Quarantine Bite Dog Housing - Resting Runs	751.1	System, Cleaning, Hose Reel, Mixing Box	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
133	Quarantine Bite Dog Housing - Resting Runs	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
134	Isolation, Infectious (Parvo)	330	Cage, Isolation	N	4	OFCI	Mason	ISO-CARE		36.25	30.75	81.5			115V					
134	Isolation, Infectious (Parvo)	441	Dispenser, Towel, Paper	N	1	OFCI	Bobrick	B-262		4	10.8	14.1								
134	Isolation, Infectious (Parvo)	443.01	Dispenser, Soap, Touchless	N	1	OFCI	Steris	SDS	Touchless Adapter											
134	Isolation, Infectious (Parvo)	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
134	Isolation, Infectious (Parvo)	550.01	Table, Exam Wall Hugger, Parallel	N	1	OFCI	Midmark Animal Health	101-2740-00		44	22		200							
134	Isolation, Infectious (Parvo)	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
134	Isolation, Infectious (Parvo)	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
134	Isolation, Infectious (Parvo)	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
135	Quarantine Bite Dog Housing - Isolation	333	CAGE-30x48	N	4	OFCI														
135	Quarantine Bite Dog Housing - Isolation	441	Dispenser, Towel, Paper	N	1	OFCI	Bobrick	B-262		4	10.8	14.1								
135	Quarantine Bite Dog Housing - Isolation	443.01	Dispenser, Soap, Touchless	N	1	OFCI	Steris	SDS	Touchless Adapter											
135	Quarantine Bite Dog Housing - Isolation	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
135	Quarantine Bite Dog Housing - Isolation	451	Disposal, Syringe, Wall Enclosure	N	1	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
135	Quarantine Bite Dog Housing - Isolation	550.01	Table, Exam Wall Hugger, Parallel	N	1	OFCI	Midmark Animal Health	101-2740-00		44	22		200							
135	Quarantine Bite Dog Housing - Isolation	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
135	Quarantine Bite Dog Housing - Isolation	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
135	Quarantine Bite Dog Housing - Isolation	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
136	Quarantine Bite Dog Housing - Resting	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
136	Quarantine Bite Dog Housing - Resting	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
136	Quarantine Bite Dog Housing - Resting	387	Run, Transfer Door, Surface Mtd	N	6	OFCI														
136	Quarantine Bite Dog Housing - Resting	390	Run, Bench	N	6	OFCI		1048-RB												
136	Quarantine Bite Dog Housing - Resting	441	Dispenser, Towel, Paper	N	1	OFCI	Bobrick	B-262		4	10.8	14.1								
136	Quarantine Bite Dog Housing - Resting	443.01	Dispenser, Soap, Touchless	N	1	OFCI	Steris	SDS	Touchless Adapter											
136	Quarantine Bite Dog Housing - Resting	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
136	Quarantine Bite Dog Housing - Resting	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
136	Quarantine Bite Dog Housing - Resting	751.1	System, Cleaning, Hose Reel, Mixing Box	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
136	Quarantine Bite Dog Housing - Resting	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
137	Quarantine Bite Dog Housing - Exercise	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
137	Quarantine Bite Dog Housing - Exercise	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
137	Quarantine Bite Dog Housing - Exercise	441	Dispenser, Towel, Paper	N	1	OFCI	Bobrick	B-262		4	10.8	14.1								
137	Quarantine Bite Dog Housing - Exercise	443.01	Dispenser, Soap, Touchless	N	1	OFCI	Steris	SDS	Touchless Adapter											
137	Quarantine Bite Dog Housing - Exercise	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
137	Quarantine Bite Dog Housing - Exercise	451	Disposal, Syringe, Wall Enclosure	N	2	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
137	Quarantine Bite Dog Housing - Exercise	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
137	Quarantine Bite Dog Housing - Exercise	751.1	System, Cleaning, Hose Reel, Mixing Box	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
137	Quarantine Bite Dog Housing - Exercise	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
138	Oxygen Closet	714	Rack, 'H' Cylinder, Wall Mount	N	1	OFCI	WT Farley	CR-WM200		7.75	1.5	20.5								
138	Oxygen Closet	716	Generator, Oxygen	N	1	OFVI	Summit Hill Laboratories	VGS5015	50 PSI, 15, LPM	25	17	38		220	230V					
139	Bathing, Dog	410.01	Hook, Leash	N	2	OFCI	Bobrick	B-211		3.5	2.75	2.75								
139	Bathing, Dog	524	Dryer, Dbl Motor	N	1	OFOI	Go Pet Club	DT-505												
139	Bathing, Dog	526	Bathing System	N	2	OFCI	Oster	BathPro 5.1	Hydrosurge								5GPM			
139	Bathing, Dog	590	Tub, Grooming, Bathing (Splash / Ramp)	N	1	OFCI	Midmark Animal Health	105-0446-10	Ramp on Right Side	60	25	58.5								
140	Clerical Area	642	Multi-function Device	N	1	OFVI	Konica Minolta	bizhub 25e												
141	Clean Supply / Mop	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
141	Clean Supply / Mop	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						
143	Restroom, Staff, Male, Shower	433	Grab Bar, Toilet	N	1	CFCI	Bobrick	B-6897		54	42									
143	Restroom, Staff, Male, Shower	433.01	Grab Bar, Shower	N	1	CFCI	Bobrick	B-6806x30												
143	Restroom, Staff, Male, Shower	433.02	Seat, Shower	N	1	CFCI	Bobrick	B-207x36												
143	Restroom, Staff, Male, Shower	433.03	Curtain, Shower / Rod / Hook	N	1	CFCI	Bobrick	B-204-1/B-204-2												
143	Restroom, Staff, Male, Shower	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
143	Restroom, Staff, Male, Shower	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
143	Restroom, Staff, Male, Shower	446	Dispenser, Toilet, Paper	N	1	OFCI	Bobrick	B-2890			42									
144	Restroom, Staff, Female, Shower	433	Grab Bar, Toilet	N	1	CFCI	Bobrick	B-6897		54	42									
144	Restroom, Staff, Female, Shower	433.01	Grab Bar, Shower	N	1	CFCI	Bobrick	B-6806x30												
144	Restroom, Staff, Female, Shower	433.02	Seat, Shower	N	1	CFCI	Bobrick	B-207x36												
144	Restroom, Staff, Female, Shower	433.03	Curtain, Shower / Rod / Hook	N	1	CFCI	Bobrick	B-204-1/B-204-2												
144	Restroom, Staff, Female, Shower	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
144	Restroom, Staff, Female, Shower	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
144	Restroom, Staff, Female, Shower	446	Dispenser, Toilet, Paper	N	1	OFCI	Bobrick	B-2890			42									
145	Break Room, Staff / Volunteers	120	Coffee, Maker	N	1	OFOI	Keurig	K155	Direct Water Connect/Filter											
145	Break Room, Staff / Volunteers	121	Microwave, Commercial, Counter	N	1	OFOI	Summit Appliance	SCM1000SS		14.75	20.25	12.25			115V					
145	Break Room, Staff / Volunteers	122	Dispenser, Water, Filtered	N	1	OFVI	Waterlogic	WL800 Max II		20.1	16.9	49.2			110V/60Hz		1/2" NPT			
145	Break Room, Staff / Volunteers	144.01	Regrigerator, Commercial (18 CF)	N	1	OFOI	Summit Appliance	BKRF18SS		30	29.63	67.63			115V					
145	Break Room, Staff / Volunteers	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
145	Break Room, Staff / Volunteers	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
145	Break Room, Staff / Volunteers	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
145	Break Room, Staff / Volunteers	671	Lockers, Half-Height	N	21	OFCI	Salisbury Industries	37165	4" Base	18	12	72								
145	Break Room, Staff / Volunteers	811	Oven, Toaster	N	1	OFOI	Waring	WCO250X		21	19	12			120V/14A					
146	File Room	670	File Cabinet Lateral - 5 Drawer	N	3	OFOI	Hon	H695		19.25	42	67								
147	Food Prep Kitchen (Dogs)	121	Microwave, Commercial, Counter	N	1	OFOI	Summit Appliance	SCM1000SS		14.75	20.25	12.25			115V					
147	Food Prep Kitchen (Dogs)	144.01	Regrigerator, Commercial (18 CF)	N	2	OFVI	Summit Appliance	BKRF18SS		30	29.63	67.63			115V					
147	Food Prep Kitchen (Dogs)	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
147	Food Prep Kitchen (Dogs)	173	Cart, Utility	N	2	OFCI	Inter Metro Industries	MY 1627-34BU		35.5	18.3	31.5	34							
147	Food Prep Kitchen (Dogs)	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
147	Food Prep Kitchen (Dogs)	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
147	Food Prep Kitchen (Dogs)	450	Dispenser, Food (40 lb)	N	2	OFCI	Bergan	11732	Wall Mounting Bracket	11.25	15.75	26.13		200						
147	Food Prep Kitchen (Dogs)	814.01	Table, Work, SSl w/ Dbl Sink, Drainboard L/R	N	1	OFCI	Aero Mfg	MF2-2418-30LR		96	24	35								
147	Food Prep Kitchen (Dogs)	825	Table, Work, Stainless Steel (78")	N	1	OFCI	Aero Mfg	2F1-3020-78LR	Custom	30	78	35								
147	Food Prep Kitchen, Canine	174.01	Shelf, Wire, Wall Mount	N	2	OFCI	Inter Metro Industries	12WS32C		38.25	12									

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
150	Clerical Area	642	Multi-function Device	N	1	OFVI	Konica Minolta	bizhub 25e												
151	Closet, WAGD	717	Gas, Scavenging, WAGD	N	1	OFVI	Midmark Animal Health	Matrx												
152	Power Wash Pump Room (SMT)	752	System, Cleaning, Central Station	N	1	OFVI	SMT	SMT-600REK SS	Sized by Vendor (48" Clear Space Required	28	48	43 - 60								
153	Puppy Whelping Room	815.01	Table, Work, Stainless Steel, w/ Over Shelf	N	1	OFCI	Aero Mfg	3TSBX-3048/3DO-1248		48	30	36								
154	Office, Animal Control JT	631	Computer, Desktop	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
155	Office, Administrative Assistant	631	Computer, Desktop	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
156	Office, Open, Shelter Attendants	631	Computer, Desktop	N	4	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
159	Housing, Adoptable Dog	332.01	Cage, Standard, Stainless Steel 48	N	5	OFCI	Tristar Vet	160-4830-01		28	48	36								
159	Housing, Adoptable Dog	332.02	Cage, Standard, Stainless Steel 24	N	8	OFCI	Tristar Vet	160-2424-00		28	24	24								
159	Housing, Adoptable Dog	332.03	Cage, Standard, Stainless Steel 30	N	4	OFCI	Tristar Vet	160-2430-00		28	24	30								
159	Housing, Adoptable Dog	332.04	Cage, Standard, Stainless Steel 36	N	4	OFCI	Tristar Vet	160-3630-00		28	36	30								
159	Housing, Adoptable Dog	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
161	Housing, Stray & Surrender Dog	332.01	Cage, Standard, Stainless Steel 48	N	5	OFCI	Tristar Vet	160-4830-01		28	48	36								
161	Housing, Stray & Surrender Dog	332.03	Cage, Standard, Stainless Steel 30	N	12	OFCI	Tristar Vet	160-2430-00		28	24	30								
161	Housing, Stray & Surrender Dog	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
161	Housing, Stray & Surrender Dog	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
161	Housing, Stray & Surrender Dog	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
161	Housing, Stray & Surrender Dog	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
161	Housing, Stray & Surrender Dog	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
162	Janitor	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
162	Janitor	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						
163	Housing, Stray & Surrender - Exercise	380	Run, Panel, Divider, 72"	N	3	OFCI		1072-SP												
163	Housing, Stray & Surrender - Exercise	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
163	Housing, Stray & Surrender - Exercise	387	Run, Transfer Door, Surface Mtd	N	10	OFCI														
163	Housing, Stray & Surrender - Exercise	390	Run, Bench	N	10	OFCI		1048-RB												
163	Housing, Stray & Surrender - Exercise	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
163	Housing, Stray & Surrender - Exercise	750	System, Cleaning, Connection Port, Recessed	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
163	Housing, Stray & Surrender - Exercise	751.1	Hose Reel, Ceiling Mounted (50')	N	1	OFCI	SMT	300-5025	Extended Spray Wand.											
164	Housing, Stray & Surrender - Resting	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
164	Housing, Stray & Surrender - Resting	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
164	Housing, Stray & Surrender - Resting	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
164	Housing, Stray & Surrender - Resting	750	System, Cleaning, Connection Port, Recessed	N	1	OFVI														
164	Housing, Stray & Surrender - Resting	750	System, Cleaning, Connection Port, Recessed	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
165	Housing, Adoptable Dog - Resting	380	Run, Panel, Divider, 48"	N	3	OFCI		1048-SP												
165	Housing, Adoptable Dog - Resting	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
165	Housing, Adoptable Dog - Resting	387	Run, Transfer Door, Surface Mtd	N	10	OFCI														
165	Housing, Adoptable Dog - Resting	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
165	Housing, Adoptable Dog - Resting	750	System, Cleaning, Connection Port, Recessed	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
165	Housing, Adoptable Dog - Resting	751.1	Hose Reel, Ceiling Mounted (50')	N	1	OFCI	SMT	300-5025	Extended Spray Wand.											
166	Housing, Adoptable Dog - Exercise	380	Run, Panel, Divider, 72"	N	3	OFCI		1072-SP												
166	Housing, Adoptable Dog - Exercise	382	Run, Gate, 12" Glass Side Panel	N	4	OFCI		1036-KD / Side Partition												
166	Housing, Adoptable Dog - Exercise	387	Run, Transfer Door, Surface Mtd	N	10	OFCI														
166	Housing, Adoptable Dog - Exercise	390	Run, Bench	N	10	OFCI		1048-RB												
166	Housing, Adoptable Dog - Exercise	740	Waste-Flush Drain Activator Button	N	3	CFCI	Zurn Sloan	Z-300-C-WB-FG 110ESS(3450147)	w/ Trap 3/4" Tap & Water Supply Control Box, Remote Flush Valve											
166	Housing, Adoptable Dog - Exercise	750	System, Cleaning, Connection Port, Recessed	N	1	OFVI	SMT	300-5213	Surface Remote Station	2.125	8.5	6.5								
166	Housing, Adoptable Dog - Exercise	751.1	Hose Reel, Ceiling Mounted (50')	N	1	OFCI	SMT	300-5025	Extended Spray Wand.											
168	Wash, Food Bowl	161.01	Washer, Compact	N	1	OFVI	Auto-Chlor	A4	Pass-thru	31	28.5	73			115V/20A/1		7.5GPM			
168	Wash, Food Bowl	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
168	Wash, Food Bowl	173	Cart, Utility	N	2	OFOI	Inter Metro Industries	MY 1627-34BU		35.5	18.3	31.5	34							
168	Wash, Food Bowl	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
168	Wash, Food Bowl	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
168	Wash, Food Bowl, Canine	175	Table, Clean, Stainless Steel (48")	N	1	OFVI	Aero Mfg	4TSBX-3048	Secure to Washer	30	48	35	92							
168	Wash, Food Bowl, Canine	176.01	Sink, Prewash, Drainboard, Right	N	1	OFVI	Aero Mfg	MF1-3020-24R	Secure to Washer	30	48.77	35	120							
173	Janitor	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
173	Janitor	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
175	Laundry, General	177	Washer/Extractor, Commercial 30 LB	N	2	OFVI	Continental Girbau	EH030	Front Loading	34.9	34.9	52.2								
175	Laundry, General	178	Dryer, Commercial 40 LB	N	2	OCVI	Continental Girbau	CG30-40	Front Loading	46.875	31.5	63.875								
179	Multi-Purpose	120	Coffee, Maker	N	1	OFOI	Keurig	K155	Direct Water Connect/Filter											
179	Multi-Purpose	121	Microwave, Commercial, Counter	N	1	OFOI	Summit Appliance	SCM1000SS		14.75	20.25	12.25			115V					
179	Multi-Purpose	144.01	Regrigerator, Commercial (18 CF)	N	1	OFOI	Summit Appliance	BKRF18SS		30	29.63	67.63			115V					
179	Multi-Purpose	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
179	Multi-Purpose	410.01	Hook, Leash	N	4	OFCI	Bobrick	B-6727												
179	Multi-Purpose	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
179	Multi-Purpose	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
179	Multi-Purpose	683	Screen, Projection, Fixed	N	1	OFCI	Draper	254207	Fixed, Bezel Frame	81.25	51.25		76							
179	Multi-Purpose	684	Floor Box, Tel Data Power	N	2	OFCI	Legrand	EFB45CTCAL	Access. Cover Plate, Alum Finish	9.875	13.875	1.5								
185	Janitor, Cleaning Supply	174	Shelf, Wall Mount, 36"	N	1	OFCI	Advance Tabco	WS-15-36-16		36	15									
185	Janitor, Cleaning Supply	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
185	Janitor, Cleaning Supply	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						
202	Mop	480	Shelf, Mop	N	1	OFCI	Eagle	US0824-16/3		8	24	6.5								
202	Mop	822	Dispenser, Chemical	N	1	OFCI	Diversy	3764735	Air Gap	7.5	18.5	24.25		30						
202	Mop	823	Cart, Cleaning	N	1	OFOI	Rubbermaid	FG9T7300BLA		49.75	22.9	44.13		55						
204	Housing, Respiratory Isolation/Feline	145.01	Refrigerator, Undercounter, Locking, Temp Display	N	1	OFCI	Summit	FF6L7NZ		23.5	23.63	33.5			120V					
204	Housing, Respiratory Isolation/Feline	330	Cage, Isolation	N	2	OFCI	Mason	ISO-CARE		36.25	30.75	81.5			115V					
204	Housing, Respiratory Isolation/Feline	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
204	Housing, Respiratory Isolation/Feline	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
204	Housing, Respiratory Isolation/Feline	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
204	Housing, Respiratory Isolation/Feline	451	Disposal, Syringe, Wall Enclosure	N	1	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
204	Housing, Respiratory Isolation/Feline	550	Table, Exam Wall Mount, Parallel	N	1	OFCI	Tristar Vet	400-24		35	20		200							
204	Housing, Respiratory Isolation/Feline	631	Computer, Desktop	N	4	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
204	Housing, Respiratory Isolation/Feline	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
205	Housing, Infectious Isolation, Feline	145.01	Refrigerator, Undercounter, Locking, Temp Display	N	1	OFCI	Summit	FF6L7NZ		23.5	23.63	33.5			120V					
205	Housing, Infectious Isolation, Feline	330	Cage, Isolation	N	2	OFCI	Mason	ISO-CARE		36.25	30.75	81.5			115V					
205	Housing, Infectious Isolation, Feline	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
205	Housing, Infectious Isolation, Feline	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
205	Housing, Infectious Isolation, Feline	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
205	Housing, Infectious Isolation, Feline	451	Disposal, Syringe, Wall Enclosure	N	1	OFCI	Cardinal Health (5 QT)	85161H	Service Contract											
205	Housing, Infectious Isolation, Feline	550	Table, Exam Wall Mount, Parallel	N	1	OFCI	Tristar Vet	400-24		35	20		200							
205	Housing, Infectious Isolation, Feline	631	Computer, Desktop	N	4	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
205	Housing, Infectious Isolation, Feline	815	Box, Glove, Wall Mount	N	1	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
208	Bathing, Cat	524	Dryer, Dbl Motor	N	1	OFOI	Go Pet Club	DT-505												
208	Bathing, Cat	526	Bathing System	N	1	OFCI	Oster	BathPro 5.1	Hydrosurge								5GPM			
208	Bathing, Cat	816	Sink, Bathing	N	1	OFCI	Tristar Vet	800-18	Elevated Grate	36	25.75	58								
209	Housing, Cat, Adoptable	350	Condo, Feline	N	14	OFCI	Mason Company	Quad Unit/Glass Front	Litter Box Units/Exhaust	24.125	24	40.125								
209	Housing, Cat, Adoptable	350.1	Condo, Feline, Litter Unit	N	4	OFCI	Mason Company	Litter Box Unit	3.75" Base	24.125	18	40.125								
209	Housing, Cat, Adoptable	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
209	Housing, Cat, Adoptable	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
209	Housing, Cat, Adoptable	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
209	Housing, Cat, Adoptable	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
212	Housing, Cat, Stray / Surrender	350	Condo, Feline	N	24	OFCI	Mason Company	Quad Unit/Wire Front	Litter Box Units/Exhaust	24.125	24	40.125								
212	Housing, Cat, Stray / Surrender	350.1	Condo, Feline, Litter Unit	N	12	OFCI	Mason Company	Litter Box Unit	3.75" Base	24.125	18	40.125								
212	Housing, Cat, Stray / Surrender	350.2	Condo, Feline, Litter Unit/Wire Front	N	4	OFCI	Mason Company	Single Unit/Wire Front	3.75" Base	24.125	36	40.125								
212	Housing, Cat, Stray / Surrender	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
212	Housing, Cat, Stray / Surrender	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
212	Housing, Cat, Stray / Surrender	444	Dispenser, Sanitizer	N	1	OFCI	Steris	2D53-Q7/2D45-OK												
212	Housing, Cat, Stray / Surrender	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
212	Housing, Cat, Stray / Surrender	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						
212	Housing, Cat, Stray / Surrender	815	Box, Glove, Wall Mount	N	2	OFCI	Bowman	GS-006	Vertical Mount	3.8	15.8	10.06	2.7							
214	Kitchen, Food Prep, Cat	144.01	Regrigerator, Commercial (18 CF)	N	2	OFVI	Summit Appliance	BKRF18SS		30	29.63	67.63			115V					
214	Kitchen, Food Prep, Cat	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
214	Kitchen, Food Prep, Cat	173	Cart, Utility	N	2	OFCI	Inter Metro Industries	MY 1627-34BU		35.5	18.3	31.5	34							
214	Kitchen, Food Prep, Cat	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
214	Kitchen, Food Prep, Cat	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
214	Kitchen, Food Prep, Cat	450	Dispenser, Food (40 lb)	N	2	OFCI	Bergan	11732	Wall Mounting Bracket	11.25	15.75	26.13		200						
214	Kitchen, Food Prep, Cat	814.01	Table, Work, SSl w/ Dbl Sink, Drainboard L/R	N	1	OFCI	Aero Mfg	MF2-2418-30LR		96	24	35								
214	Kitchen, Food Prep, Cat	825	Table, Work, Stainless Steel (78")	N	1	OFCI	Aero Mfg	2F1-3020-78LR	Custom	30	78	35								
214	Kitchen, Food Prep, Feline	174.01	Shelf, Wire, Wall Mount	N	2	OFCI	Inter Metro Industries	12WS32C		38.25	12									

Rm #	Rm Name	No.	Description	Exist/New	Qty	OF/CI/VI	Make	Model	Options	Depth Length (in)	Width (in)	Height (in)	Weight (lb)	Struc. Wgt (lb)	Electrical	Data	Water	Exhaust	BTU	Notes
214	Kitchen, Food Prep, Feline	175	Table, Clean, Stainless Steel (48")	N	1	OFCI	Aero Mfg	4TSBX-2448	Undershelf	48	24	35								
216	Housing, Exotic (Bird / Fish)	334	Cage, Avian	N	2	OFCI	Marineland	3-Tier Bird Display		42.25	21.75	80			120V/15A					
216	Housing, Exotic (Bird / Fish)	370	Aquarium- Tank & Filter	N	1	OFCI	Marineland	Z090520	Single Module	51.5	21.5	87			115V/10.5A 115V/2.2A		1/2" CW			
216	Housing, Exotic (Bird / Fish)	773	Electrical, Power Strip, Multi-Plug 15A	N	2	CFCI														
219	Housing, Small Animal	332.02	Cage - 28x30	N	4	OFCI	Mason Company	Quiet Cottage - 28	1/3 Glass Panel	30	28	31								
219	Housing, Small Animal	332.03	Cage-30x36	N	2	OFCI	Mason Company	Quiet Cottage - 36	1/3 Glass Panel	30	36	31								
219	Housing, Small Animal	370	Cage - Small Animal Display	N	1	OFCI	Mason Company	3-Drawer Small Animal Display	Dividers	52	25	76			120V/15A			150 CFM		
219	Housing, Small Animal	773	Electrical, Power Strip, Multi-Plug 15A	N	2															
221	Wash, Food Bowl	161.01	Washer, Compact	N	1	OFVI	Auto-Chlor	A4	Pass-thru	31	28.5	73			115V/20A/1		7.5GPM			
221	Wash, Food Bowl	163	Disposal, Garbage	N	1	OFCI	Emerson, Insinkerator	Evolution Septic Assist 76006							115/1Ph/5.7A					
221	Wash, Food Bowl	173	Cart, Utility	N	2	OFOI	Inter Metro Industries	MY 1627-34BU		35.5	18.3	31.5	34							
221	Wash, Food Bowl	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
221	Wash, Food Bowl	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
221	Wash, Food Bowl	814	Table, Work, Stainless Steel	N	1	OVCI	Aero Mfg	4EG-2448		48	24	35	74							
221	Wash, Food Bowl, Feline	175	Table, Clean, Stainless Steel (48")	N	1	OFVI	Aero Mfg	4TSBX-3048	Secure to Washer	30	48	35	92							
221	Wash, Food Bowl, Feline	176	Sink, Prewash, Drainboard, L/R	N	1	OFVI	Aero Mfg	MF1-3020-24R	Secure to Washer	30	48.77	35	120							
C-1	PUBLIC CORRIDOR	681	Cabinet, Fire Extinguisher	N	2	CFCI	Larsen	24096R-FG		6	9.5	24								
C-11	PUBLIC CORRIDOR	681	Cabinet, Fire Extinguisher	N	2	CFCI	Larsen	24096R-FG		6	9.5	24								
C-12	STAFF CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-2	PUBLIC CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-3	PUBLIC CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-4	PUBLIC CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-5	STAFF CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-6	STAFF CORRIDOR	681	Cabinet, Fire Extinguisher	N	1	CFCI	Larsen	24096R-FG		6	9.5	24								
C-8	STAFF CORRIDOR	681	Cabinet, Fire Extinguisher	N	2	CFCI	Larsen	24096R-FG		6	9.5	24								
C-9	Corridor, Public	441	Dispenser, Paper, Towel	N	1	OFCI	Bobrick	B262		4	10	14								
C-9	Corridor, Public	443	Dispenser, Soap	N	1	OFCI	Steris	1308-Q7/4D40-Q5/4D51-Q7		4.5	10.75	10.75								
C-9	Corridor, Public	630	Computer, Wall Mounted	N	1	OFVI	Dell	OptiPlex 3050 Micro	i5-7500T Processor, 8G, Software Package, Keyboard and Monitor											
C-9	Corridor, Public	630.01	Computer, BracketWall Mounted	N	1	OFCI	GCX Solutions	WC-0002-11	WMM-0005-09, FLP-004-89, WM-0023-56, WM-007-41	37	14		4.5	25						

DTP1201-006030 _ B155 _ ENG _ FRCH _ UCG _ RevE _ 2012 _ Size:215.9X139.7MM _ Color:CMYK+PMS8480C+PMS130C

NO. 120 COFFEE, MAKER

KEURIG®

OWNER'S MANUAL

OfficePRO® Premier B155 Keurig® Brewer

MANUEL D'UTILISATION

Cafetière OfficePRO® Premier B155

IMPORTANT SAFEGUARDS Safe Operation & Use

When using electrical appliances, basic safety precautions should be followed, including the following:

1. Read all instructions before using.
2. Do not touch hot surfaces. Use handles and knobs when available.
3. This appliance must be properly installed and located in accordance with these instructions before it is used.
4. The use of accessory attachments not recommended by the appliance manufacturer may result in fire, electrical shock or injury to persons.
5. Do not place on or near a hot gas or electric burner, or in a heated oven.
6. Do not use outdoors.
7. To protect against fire, electric shock and injury do not immerse cords, plugs, or the appliance in water or any other liquid.
8. Do not overfill the Water Reservoir.
9. Use **only water** in this appliance! Do not put any other liquids or foods in the Water Reservoir except as directed in the Cleaning Instructions.
10. Turn off and unplug the Brewer before cleaning or maintenance. Allow to cool before putting on or taking off parts and before cleaning the appliance.
11. For best operation, plug the appliance into its own electrical outlet on a dedicated circuit to prevent flickering of lights, blowing of fuses or tripping a circuit breaker.
12. Do not operate any appliance with a damaged cord or plug or after the appliance malfunctions or is damaged in any manner. Contact Keurig Customer Service to report any malfunction of or damage to the Brewer.
13. Do not let the cord hang over the edge of the table or counter, or touch hot surfaces.
14. To disconnect, turn Power Button to 'OFF' status and then remove the plug from the wall outlet.
15. Close supervision is necessary when any appliance is used by or near children.
16. **Do not lift the Handle to open the Lid of the Brewer while brewing is in progress.**
17. Always keep the Water Reservoir Lid on unless you are refilling it.
18. This appliance is equipped with a power cord having a grounding wire with a grounding plug. The appliance must be grounded using a 3-hole properly grounded outlet. In the event of an electrical short circuit, grounding reduces the risk of electrical shock.
19. If the outlet is a standard 2-prong wall outlet, it is your personal responsibility and obligation to have it replaced with a properly grounded 3-prong wall outlet.
20. Do not, under any circumstances, cut or remove the third (ground) prong from the power cord or use an adapter.
21. Consult a qualified electrician if the grounding instructions are not completely understood, or if doubt exists as to whether the appliance is properly grounded.
22. Do not use the appliance for other purposes than its intended use.

SAVE THESE INSTRUCTIONS.

WARNING TO USERS AND PARENTS

1. DO NOT permit children to use brewer unless there is adult supervision. Brewer dispenses very hot water.

2. SPECIAL NOTICE FOR HOT COCOA USERS: IMMEDIATELY AFTER USING A HOT COCOA K-CUP® PACK, RUN a Hot Water Brew Cycle without a K-Cup® pack to avoid the possibility of clogging the exit needle. **DO NOT** assume the next user will do this.

CAUTION: There are two sharp needles that puncture the K-Cup® pack, one above the K-Cup® Pack Holder and the other in the bottom of the K-Cup® Pack Holder. To avoid risk of injury, do not put your fingers in the K-Cup® Pack Assembly Housing.

CAUTION: There is extremely hot water in the K-Cup® Pack Holder during the brewing process. To avoid risk of injury, do not lift the Handle or open the K-Cup® Pack Assembly Housing during the brewing process.

If an extension cord is used, (1) the marked electrical rating of the cord set or extension cord should be at least as great as the electrical rating of the appliance; (2) the cord should be arranged so that it will not drape over the countertop or tabletop where it can be pulled on by children or tripped over unintentionally; and (3) the extension cord must include a 3-prong grounding plug.

THIS PRODUCT IS FOR
HOUSEHOLD USE & COMMERCIAL USE

WARNING THIS PRODUCT CONTAINS CHEMICALS, INCLUDING LEAD, WHICH IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT REMOVE THE BOTTOM COVER. NO USER SERVICEABLE PARTS ARE INSIDE. REPAIR SHOULD BE DONE BY AUTHORIZED SERVICE PERSONNEL ONLY.

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KEURIG® GOURMET SINGLE CUP BREWING SYSTEM
OfficePRO® Premier B155 — Using Your Brewer

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Pour des directives en français, veuillez vous reporter à la page 20.

Record your Brewer Serial Number here.

Removing the serial number label from the Brewer will void warranty.

Set-up

Helpful Hints

1. **Keep your Brewer turned "ON" at all times.**
   To brew a fresh cup of coffee, tea or hot cocoa anytime you want, we suggest you keep your Brewer turned "ON" all the time. However, the Brewer is fully programmable so you can set it to turn on and off automatically to match your schedule. Or, if you prefer, set the Brewer to automatically turn off after a period of time. Follow the simple instructions on pages 13–14 to make using the Brewer convenient for you.

2. **For the best tasting gourmet coffee, tea or hot cocoa, Keurig recommends using bottled water or the Keurig™ Water Filter Starter Kit (available at www.keurig.com).**
   Water quality varies from place to place. If you notice an undesirable taste in your cup of coffee, such as chlorine or other mineral tastes, we recommend you consider using bottled water or water from a filtration system.

3. **Customize the Size, Flavor & Brew That's Perfect for You.™**
   With the choice of over 200 varieties of K-Cup® packs and 4 brew sizes (Small Cup-4 oz., Small Mug-6 oz., Medium Mug-8 oz., and Large Mug-10 oz.) your Keurig® Brewer gives you endless options to customize the size, flavor and brew that's perfect for you. For a strong, intense cup, select an Extra Bold K-Cup® pack (with up to 30% more ground coffee than regular varieties) and brew the size that's right for you. The smaller the brew size, the more intense flavor in your cup. The larger the brew size, the less intense flavor in your cup.

4. **Plug Brewer into its own grounded outlet.**
   If the electric circuit is overloaded with other appliances, your Brewer may not function properly. The Brewer should be operated on its own circuit, separate from other appliances.

5. **Brewing into a travel mug.**
   To brew into a travel mug, simply remove the Drip Tray Assembly and place the travel mug on the Drip Tray Base.

6. **De-scale Brewer regularly.**
   Please see pages 16 and 17 for instructions.

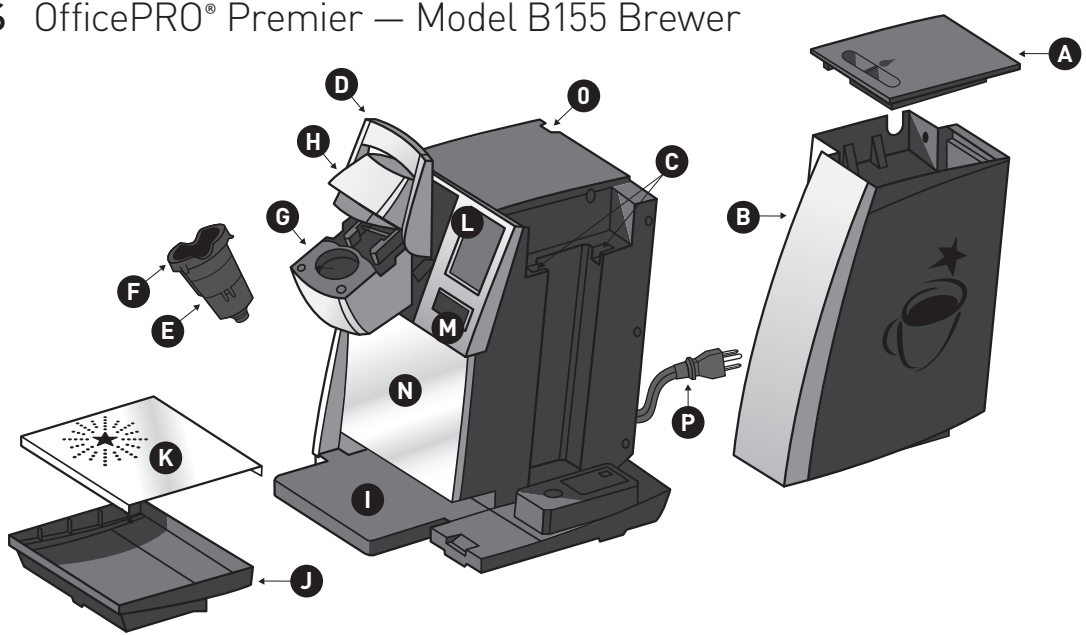
Unpacking Instructions

1. Place Brewer box on a large steady surface (such as a table or countertop) or on the floor. Open the box.
2. Remove enclosed literature and K-Cup® variety pack.
3. Turn the box on its side with the front of the box face down.
4. Reach into the box and grasp the foam insert that contains the Brewer.
5. Carefully pull the foam insert toward you and out of the box. The Brewer will still be encased in the polyfoam and be on its side.
6. Remove the top polyfoam packaging material.
7. Carefully lift Brewer off of the bottom polyfoam and place it upright on a flat, steady surface.
8. Lift plastic bag off of Brewer.
9. Record the serial number for this Brewer on page 3 of this guide. The serial number can be found on the side of the Brewer box or on the bottom of the Brewer.
10. Place the Brewer upright on a flat, steady surface. Remove tape holding Water Reservoir in place.

We recommend you save all packing materials in case future shipping of the product is necessary.

WARNING:
Keep all plastic bags away from children.

Features OfficePRO® Premier — Model B155 Brewer



OfficePRO® Premier B155 Brewer

A. Water Reservoir Lid
B. Water Reservoir
C. Water Reservoir Lock Tab Slots
D. Handle
E. K-Cup® Pack Holder Funnel
F. K-Cup® Pack Holder (E and F are the K-Cup® Pack Holder Assembly)
G. K-Cup® Pack Assembly Housing
H. Lid
I. Drip Tray Base
J. Drip Tray
K. Drip Tray Plate
L. LCD Screen
M. BREW Button
N. Housing
O. Power Switch
P. Power Cord

SECTION 1 Set-Up & First Brew

IMPORTANT: You cannot use your Keurig® Brewer until it has been set up for its first use.

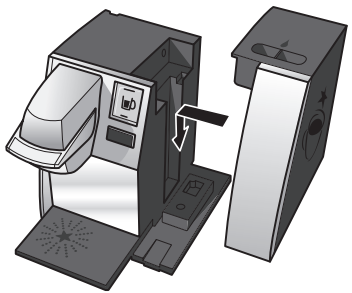
NOTE: If Brewer has been exposed to temperatures below freezing, allow Brewer at least two hours to reach room temperature before brewing. A frozen or extremely cold Brewer will not operate.

Setting Up Your Brewer

fig. 1

1. Remove all pieces of packing tape from the Brewer and Drip Tray. Remove the clear plastic film from the LCD Display. Unwrap cord and plug the Brewer into a grounded outlet.
2. Turn the Brewer on, the Power Switch is located at the top left hand side of the Brewer on the back. The Brewer's LCD Display will display the power up welcome screen (fig. 1).
3. Remove the Water Reservoir from Brewer by first removing Lid from the Water Reservoir then lifting the Water Reservoir straight up and toward the right of the Brewer (may be tight). Rinse the Water Reservoir thoroughly with fresh, clean water.

fig. 2



4. Fill the Water Reservoir up to the fill mark with fresh, clean water. Replace the Water Reservoir on the Brewer making sure that the locking tabs engage with the Brewer (fig. 2). Replace Lid on Water Reservoir.
5. The Brewer will automatically fill the Internal Hot Water Tank with water and then the water will be heated. This will take about 3 minutes. During the heating period, "HEATING PLEASE WAIT" will be displayed on the LCD Screen (fig. 3).

fig. 3

6. Place a 10 oz. mug on the Drip Tray Plate, then fully raise and lower the Brewer Handle. The Brew Button will now be illuminated. Press the Brew Button to start a cleansing brew. **NOTE: A K-Cup® pack should not be used for this sequence.**
7. When the cleansing brew is complete, the Brewer will go into its idle state and will be ready to brew your first K-Cup® pack.

fig. 4

fig. 5

Ready to Brew Your First Cup

1. The LCD Display will be in its idle state (fig. 4).
2. Lift the Handle. The K-Cup® Pack Holder will open toward you (fig. 5).
3. Select a K-Cup® pack.
   NOTE: Do not remove the foil lid or puncture the K-Cup® pack.

4. Place a K-Cup® pack in the K-Cup® Pack holder (fig. 6).
   CAUTION: There are two sharp needles that puncture the K-Cup® pack, one above the K-Cup® Pack Holder and the other in the bottom of the K-Cup® Pack Holder. To avoid risk of injury, do not put your fingers in the K-Cup® Pack Assembly Housing.
5. Lower the Handle to close the Lid over the K-Cup® Pack Holder. (When it is closed completely, the BREW Button will flash up to 60 seconds.)
6. Place a mug on the drip tray and select your brew size (fig. 7), then press BREW (fig. 8).
   NOTE: If you do not press BREW within 60 seconds the Brewer will return to its idle state and the Brew Button will cease to flash to prevent accidental activation. Re-activate by raising the handle fully and then closing it.

fig. 6

fig. 7

7. There may be a short pause prior to coffee being dispensed. The entire brew process lasts for approximately 1 minute and ends with a burst of air to remove all liquid from the K-Cup® pack.
   CAUTION: There is extremely hot water in the K-Cup® Pack Holder during the brew process. To avoid risk of injury, do not lift the Handle or open the K-Cup® Pack Assembly Housing during the brew process.
8. The end of brew is indicated by "KEURIG BREWED ENJOY".
9. Lift the Handle, remove and dispose of the used K-Cup® pack.
   CAUTION: K-Cup® pack will be hot.
10. Enjoy your first cup of Keurig Brewed® gourmet coffee, tea or hot cocoa!
11. Your Brewer may display "HEATING PLEASE WAIT" as it heats water for the next brew cycle.

fig. 8

Stopping the Brew Process

If you need to stop the brewing after the process has started, press and release the Power Switch to turn the Brewer 'OFF'. The flow of coffee, tea or hot cocoa will stop and the heating element and the LCD Screen will shut off.
NOTE: You may get more coffee, tea or hot cocoa in your cup during your next brew. We recommend that you perform a cleansing brew with water only after a terminated brew. Then your next brew will be the volume you have selected.

Adding Water

fig. 9

The LCD Display of your Brewer will indicate when the water level in the Reservoir is low or if the Water Reservoir has been removed by displaying the words "FILL WATER RESERVOIR" (fig. 9). The Brewer will not allow you to brew when "FILL WATER RESERVOIR" is displayed (fig. 9).

The Water Reservoir can be filled in two ways.

1. Remove the Water Reservoir from Brewer by first removing Lid from the Water Reservoir, then lifting the Water Reservoir straight up and toward the right of the Brewer. Fill with water. Place the Water Reservoir back on the Brewer and replace the Lid.

IMPORTANT: Do not remove the Water Reservoir during the brewing process.

2. Lift off the Water Reservoir Lid and pour water directly into the Water Reservoir while it is still attached to the Brewer, then replace the Lid.

Brewing Hot Water

Your Brewer is able to produce hot water for making hot cocoa from a packet, or for use in cooking, etc. Simply follow the instructions on page 7, "Ready To Brew Your First Cup" without adding a K-Cup® pack.

NOTE: After brewing a hot cocoa K-Cup® pack, we recommend running a hot water brew cycle without a K-Cup® pack.

Purging the Brewer

If your Brewer has not been used for more than one week, you should purge the water from the internal water tank.

1. If there is water in the Water Reservoir, remove the Lid, then lift the Water Reservoir straight up and away from Brewer. Discard water, rinse and refill with water. Place the Water Reservoir back on the Brewer and replace the Lid. (If there is no water in the Water Reservoir, simply refill.)
2. Be sure the Brewer is turned 'ON'. Raise and lower the Handle on the Brewer without inserting a K-Cup® pack.
3. The LCD Display will be in its idle state (fig. 4).

fig. 10

4. Place a large mug on the drip tray and select Large Mug (10 oz. serving) brew size from the Select Brew Size Menu (fig. 10).
5. Discard water.
6. Repeat steps 2 - 5 two more times to completely purge water from the Internal Hot Water Tank.

SECTION 2 Menu Controls & Indicators

Menu Mode

To enter the MENU MODE the Brewer's power must be off.
Press and hold your finger on the display while pressing and releasing the power switch. Continue pressure on the display for **5 seconds (**fig. 11). The MENU screen will appear. (fig. 12).

Press any line item to enter the set up for that particular feature.
Please reference the Menu navigation on page 11.

If you are experiencing any problems with your Brewer, please contact Customer Service at 1.866.901.BREW (2739).

fig. 11

fig. 12

Menu Key Navigation

Home
Press HOME at any time to return to your Brewer to an idle state.

Clock
Setting the clock is optional. To program the clock, follow the instructions on page 12.

Brew Temp
The brew temperature is pre-set at 193˚F. You do not have to set the brew temperature but you can adjust it up or down by 5˚. Simply follow the instructions on page 12.

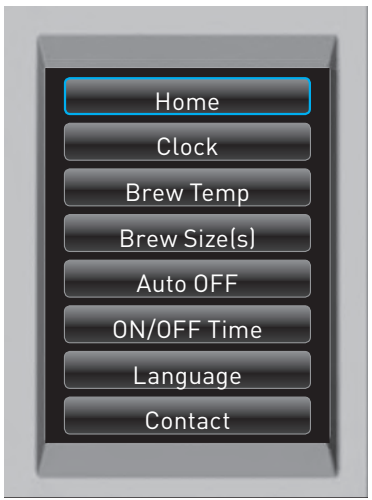
Brew Size(s)
Four brew sizes are available: 4 oz., 6 oz., 8 oz., and 10 oz. To program the brew sizes see page 13.

Auto OFF
Auto Off allows you to program your Brewer to automatically turn off two hours after the last brew. See page 14 for programming instructions.

ON/OFF Time
You can leave your Brewer on all the time and use the Power button to turn it off. Or you can program the Brewer to brew at a specific time as shown on page 13.

Language
This Brewer is shipped with English as the default language. To change the language, follow the instructions on page 14.

Contact
The contact setting features allows you to program the contact information you need for Brewer support and help. To program, follow the instructions on page 14.



Setting the Clock

Setting the clock is optional. When the clock is set, the time will appear in the LCD Control Center. **NOTE: You must set the clock if you will be programming the Auto On/Off Time feature.**

fig. 13

1. From the Menu Mode, press "CLOCK".
2. The set clock screen will display "DISABLED" if the Brewer is new or if electrical power has been interrupted. Press "DISABLED" to set a time. Press H repeatedly to advance the hour in steps or hold it down to scroll through the hours quickly. When you have set the hour then press the M to set the minutes, press repeatedly to advance by a minute each time or keep it pressed to scroll quickly (fig. 13).
3. Press "OK" when you are finished. The Clock is now set.
4. The correct time should now be displayed in the LCD Home Screen.

NOTE: If power is interrupted to the Brewer, follow the procedure above to reset the time as the clock will not be visible . Brew size and brew temperature menu settings will be restored automatically. All other settings will be restored automatically after clock is set.

NOTE: To disable the clock, press the time. However, the 'On/Off' time setting will also be disabled.

Programming Brew Temperature (188° – 198° F)

The Brewer brews at a preset temperature of 193°F. You can adjust this temperature up or down by 5°. Simply follow the instructions below.

fig. 14

1. From the Menu Mode, press "BREW TEMP".
2. The LCD Display will now display the Brew Temperature programming options (fig. 14). The temperature 193°F (initial setting) will be displayed at the top of the LCD Display to indicate the current temperature setting.
3. Press the + symbol to increase the temperature and the – symbol to lower the temperature one degree at a time.
4. Once you have reached your desired brew temperature, press "OK". The Brew Temperature is now set.
5. To change the brew temperature, repeat steps 1 through 4.

NOTE: At high altitudes (over 5,000 feet) if boiling occurs, use the temperature adjustment (-5°) to lower the temperature.

Programming Your Brew Size

All brew sizes are enabled in the default setting. If you want to disable any brew size, just press on the appropriate icon(s). Please follow instructions outlined below.

fig. 15

1. From the Menu Mode, press "SET BREW SIZE(S)".
2. The LCD will display all enabled brew sizes. To disable a brew size press the icon. The check mark will change to an "X" indicating that the brew size is disabled (fig. 15).
3. Once you have selected your desired brew size(s), press "OK". The brew size(s) are now set.

NOTE: You can not delete all brew sizes. To enable a brew size you have already disabled, just press its icon and then press "OK". The default brew size is always 8 oz. This brew size cannot be changed or disabled.

Programming On/Off Features

The Brewer provides three modes so that you can enjoy gourmet coffee, tea or hot cocoa on your own schedule.

fig. 16

1. **Leave it ON all the time.** The Brewer can be left on all the time so that it is always ready to brew a fresh cup of gourmet coffee, tea or hot cocoa. To turn the Brewer off at any time, simply press and release the Power Switch. Press and release the Power Switch again to restore power to the Brewer. You will have to wait for the water to heat up before the Brewer is ready to brew.
2. Program the Brewer for a specific On/Off Time. **NOTE: To use this programming feature, the clock must be set to the correct time.**

a. After setting the correct time (see "Setting The Clock" page 12), return to the Menu Mode and press "ON/OFF TIME".

b. To set the ON time, press "DISABLED". The display will change to a time of day. Press "H" to set the hours and "M" to set the minutes. Once the desired time is set, press "OK" to accept this time.

c . To set the OFF time, press "DISABLED". The display will change to a time of day. Press "H" to set the hours and "M" to set the minutes. Once the desired time is set, press "OK" to accept this time (fig. 16).

fig. 17

3. Set the Brewer to "AUTO OFF" to automatically turn off 2 hours after the last brew.

a. From the Menu Mode, press "AUTO OFF". The LCD Display will now display the "AUTO OFF" programming option (fig. 17).

b. To enable the "AUTO OFF" feature, press "ON". "ENABLED" will appear on the screen and press "OK". To disable the "AUTO OFF" feature, press "OFF". "DISABLED" will appear on the screen and press "OK".

fig. 18

Language Settings

The Brewer is shipped with English as the default language. To change the default to Francais or Espanol, follow the instructions outlined below.

Set Language

1. From the Menu Mode, press "LANGUAGE".
2. The LCD Display will now display the Language programming options (fig. 18).
3. Press the desired Language button, then press OK to confirm your selection.

fig. 19

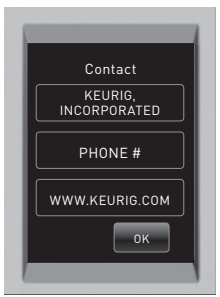


fig. 20

Setting Contact Screen

The contact screen is pre-programmed with the following information: Keurig, Incorporated. and www.keurig.com.

You can reprogram the brewer with your contact information. The contact screen will appear in the screen saver.

1. From the Menu Mode, press "CONTACT". The LCD screen will display the Keurig default contact information (fig. 19).
2. Press the Upper (Company Name) Box. The Keypad will appear along with the current information (fig. 20). **NOTE: Unless changed by the user, Keurig contact information will be present on the display.**

a. Press Delete Key repeatedly to remove current information. Enter new information using the Keypad.

NOTE: To select Upper Case, Lower Case, Numerals, Upper Case Accents, Lower Case Accents, press the Keypad Change Key located at the bottom center of the screen.

fig. 21

fig. 22

b. Press "OK" to save your changes and return to the Main Contact Screen.
NOTE: Pressing the Back Arrow Key will return to the Main Contact Screen without saving changes.

3. Press the Middle (Phone Number) Box. The Numeral Keypad Mode will appear along with the current information (fig. 21).

a. Delete current phone number and enter new information using the Keypad.

b. Press "OK" to save your changes and return to the Main Contact Screen.

4. Press the Lower Box. This box can be customized to contain any information such as web/email address, contact name, etc (fig. 22).

a. Enter new information using the Keypad.

b. Press "OK" to save your changes and return to the Main Contact Screen.

c. In Main Contact Screen (fig. 19), press "OK" to save the updated screen as the default and return to the Menu Screen.

SECTION 3 Cleaning & Maintenance

Cleaning External Parts

Regular cleaning of the Brewer's external components is recommended.

1. Never immerse the Brewer in water or other liquids. The Housing and other external components may be cleaned with a soapy, damp, non-abrasive cloth.

2. The Drip Tray can accumulate up to 12 ounces of overflow. The Drip Tray and Drip Tray Plate should be periodically inspected and rinsed clean. To remove the Drip Tray Assembly, simply slide it toward you, keeping it level at all times to avoid spilling. The Drip Tray and Drip Tray Plate should not be placed in the dishwasher. They should be cleaned with a damp, soapy, non-abrasive cloth and rinsed thoroughly.

fig. 23

Cleaning the K-Cup® Pack Holder Assembly

1. **Cleaning the Parts**—The K-Cup® Pack Holder Assembly can be placed onto the top shelf of a dishwasher. **NOTE: Use low temperature cycles in the dishwasher.** To remove the K-Cup® Pack Holder Assembly from the Brewer, open the cover by lifting the Handle. Grasp the top of the K-Cup® Pack Holder with one hand while pushing up on the bottom of the K-Cup® Pack Holder from underneath with the other until it releases (fig. 23). After cleaning, align the K-Cup® Pack Holder with the opening

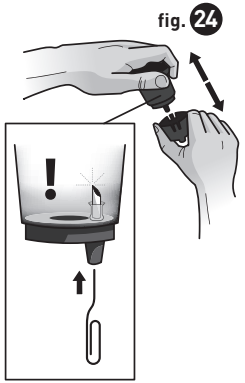


fig. 24

using the two front ribs as a guide, and snap them into place from the top.

2. **Cleaning the Funnel**—The Funnel can be removed from the K-Cup® Pack Holder by pulling on it until it pops off (fig. 24). The Funnel is dishwasher safe. To replace it, just snap it back onto the K-Cup® Pack Holder.
3. **Cleaning the Exit Needle**—The Exit Needle is located on the inside bottom of the K-Cup® Pack Holder. Should a clog arise due to coffee grinds, it can be cleaned using a paper clip or similar tool. Remove the K-Cup® Pack Holder Assembly and detach Funnel. Insert the paper clip (as shown in fig. 24) into the Needle to loosen the clog, then flush with water. The K-Cup® Pack Holder Assembly can be placed onto the top shelf of a dishwasher. **NOTE: Use low temperature cycles in the dishwasher.**

CAUTION: There are sharp needles that puncture the K-Cup® pack above the K-Cup® Pack Holder and in the bottom of the K-Cup® Pack Holder. To avoid risk of injury, do not put your fingers in the K-Cup® Pack Assembly Housing.

Cleaning the Water Reservoir & Water Reservoir Lid

The Water Reservoir Lid or Water Reservoir should not be put into the dishwasher. They should be cleaned with a damp, soapy, non-abrasive cloth and rinsed thoroughly. Do not dry the inside of the Water Reservoir with a cloth as lint may remain. **CAUTION: Please rinse the Water Reservoir thoroughly after cleaning to ensure that no cleaners or cleaning solutions remain in this area as they may contaminate the water supply in the Brewer.**

De-Scaling Your Brewer

Mineral content in water varies from place to place. Depending on the mineral content of the water in your area, calcium deposits or scale may build up in your Brewer. Scale is non-toxic, but left unattended, it can hinder Brewer performance. De-scaling your Brewer helps maintain the heating element and other internal parts of the Brewer that come in contact with water.

The Brewer should be de-scaled every 3-6 months to ensure optimal performance. It is possible for calcium deposits to build up faster, making it necessary to de-scale more often.

De-Scaling Instructions

A. PREPARE

Step 1: Make sure you have at least 90 oz. of undiluted white vinegar on hand. You will also need an empty sink and a large ceramic mug (do not use a paper cup).

Step 2: Empty the water in the Water Reservoir.

Step 3: Disable "Auto Off" and programmed "On Off" time (pages 13-14).

B. FILL AND CLEAN

Step 1: Pour the vinegar into the Water Reservoir to fill it.

Step 2: Place a large mug on the Drip Tray Plate and run a water brew cycle. **DO NOT USE A K-CUP® PACK,** just select the Large Mug brew size. Pour the contents of the large mug into the sink.

Step 3: Repeat the brew process 3 times.

Step 4: Let the Brewer stand for at least 4 hours while still on.

C. RINSE

Step 1: Ensure the Water Reservoir is filled with fresh water.

Step 2: Place a large mug on the Drip Tray Plate and run a water brew cycle. Pour the contents of the large mug into the sink.

Step 3: Repeat brew process until the Water Reservoir is empty.

Step 4: You may need to perform additional water brew cycles if you notice any residual taste or odor.

Service

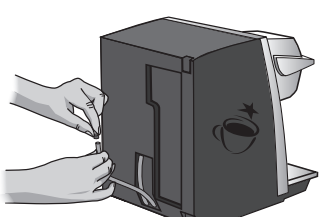
Beyond these recommended cleaning and maintenance procedures this Brewer is not user serviceable. For service, please refer to the Warranty section of this guide.

Storage

Draining the Brewer

1. Turn off the Brewer, unplug it, and allow the Brewer to cool approximately 30 minutes.
2. Empty the Water Reservoir by first removing the Lid from the Water Reservoir then lifting the Water Reservoir straight up and toward the right of the Brewer (may be tight). Rinse and Empty the Water Reservoir.
3. Turn the Brewer around so the back is facing out. Unscrew the small knob to release the back panel, remove the panel from the Brewer, and set it aside. If the screw is tight, you may need to use a flathead screw driver. Pull the tube downward until the end is free (fig25). Over a large pitcher, remove the plug and drain the water from the Internal Hot Water Tank into the pitcher. **CAUTION: If the Brewer was not allowed to cool sufficiently, the water draining from the tube may be very hot.** Re-cap the tube. **NOTE: To avoid losing parts, when finished, re-insert the tube and screw the panel back onto the Brewer.**

fig. 25



SECTION 4 Troubleshooting

Situation	Solution
Brewer does not have power	• Plug Brewer into an independent outlet. • Check to be sure that it is plugged in securely. • Plug into a different outlet. • Reset your home's circuit breaker if necessary. • Make sure that the Power Switch has been turned on and LCD Display is illuminated.
Brewer will not brew	• After placing the K-Cup® pack in the K-Cup® Pack Holder, make sure the Handle is pushed down securely and the LCD Control Center reads "READY TO BREW" with the BREW Button flashing, then press the BREW Button. • The Exit Needle may be clogged (refer to page 16). LCD Messages • If the water reservoir is empty and needs to be refilled, the LCD Screen will direct you to "Lift Water Reservoir, Fill Water Reservoir, Replace Water Reservoir" with slideshow of images. Follow these instructions. • In pour-over mode, if the water flow has been interrupted, the LCD screen will state "Water Flow Interrupted. To Reset, Please Lift and Remove Water Reservoir". When reservoir has been removed screen states "If necessary, please fill water reservoir to Max Fill line. Then replace". Follow these instructions. • If the messages persist after following these instructions, contact Customer Service at 1.866.901.BREW (2739).
Chlorine or mineral taste in coffee	• Consider using bottled water,filtered water, or the Keurig™ Water Filter Starter Kit (available at www.keurig.com).
Brewing a partial cup	• The Exit Needle may be clogged (refer to page 16). • Clean the K-Cup® Pack Holder assembly if necessary and rinse under faucet (refer to pages 15-16). • The Water Reservoir may have been removed during brewing. Replace the Water Reservoir and perform a water brew without a K-Cup® pack. • "De-Scale" the Brewer (refer to pages 16-17). • If you have repeated the de-scale procedure on your Brewer two times and it is still only brewing a partial cup, contact Customer Service at 1.866.901.BREW (2739).
The time is not displayed on the LCD Message Center	• The time will not be displayed on the LCD unless you have set it. To set the clock, follow the procedure on page 12. • If power is interrupted to the Brewer, you will need to set the clock again using the procedure on page 12.
Brewer shuts off or turns on automatically	• Check to make sure that the Auto Off timer and/or On/Off time features have not been set. To do this, press the MENU Button below "MENU" and scroll through the programming options. "OFF" should be displayed for Auto Off timer and On/Off. If "OFF" is not displayed, follow directions on pages 13-14 to reset.

If any problems persist, contact Customer Service at 1.866.901.BREW (2739)

SECTION 5 Warranty

Limited One Year Warranty

Keurig warrants that your Brewer will be free of defects in materials or workmanship **under normal** use for one year from the date of purchase. It is recommended that you fill out and return the warranty card enclosed with your Brewer so that your purchase information will be stored in our system. Keurig will, at its option, repair or replace the Brewer without charge upon its receipt of proof of the date of purchase. If a replacement Brewer is necessary to service this warranty, the replacement Brewer may be new or reconditioned. If a replacement Brewer is sent, a new limited one year warranty will be applied to the replacement Brewer.

This warranty only applies to Brewers operated in the United States and Canada. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state and, in the case of Canada, from province to province.

What is not covered by the Limited Warranty?

THIS WARRANTY DOES NOT COVER CONSEQUENTIAL OR INCIDENTAL DAMAGES SUCH AS PROPERTY DAMAGE AND DOES NOT COVER INCIDENTAL COSTS AND EXPENSES RESULTING FROM ANY BREACH OF THIS WARRANTY, EVEN IF FORESEEABLE. Some states or provinces do not allow the exclusion or limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you depending on the state or province of purchase.

Nor does this warranty cover damages caused by services performed by anyone other than Keurig or its authorized service providers, use of parts other than genuine Keurig parts, or external causes such as abuse, misuse, inappropriate power supply or acts of God.

Other Limitations

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY OTHER EXPRESS WARRANTY, WHETHER WRITTEN OR ORAL. IN ADDITION, KEURIG HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES WITH RESPECT TO YOUR PROFESSIONAL SERIES B155 BREWER, INCLUDING ANY IMPLIED WARRANTY OF MERCHANT ABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Some states or provinces do not allow disclaimers of such implied warranties or limitations on how long an implied warranty lasts, so the above limitation may not apply to you depending on the state or the province of purchase.

How do you obtain warranty service?

Keurig® Brewers are high-quality appliances and, with proper care, are intended to provide years of satisfying performance. However, should the need arise for warranty servicing, simply call Keurig Customer Service at our toll free phone number 1.866.901.BREW (2739). Please do not return your Brewer for servicing without first speaking to Keurig Customer Service to obtain an Authorization to Return number (ATR). Keurig® Brewers returned without an ATR number will be returned to the sender without servicing.

Keurig, Incorporated
55 Walkers Brook Drive
Reading, MA 01867
1.866.901.BREW (2739)

SCM1000SS

12.25" x 20.25" x 14.75" (H x W x D)

Commercially approved microwave with stainless steel exterior and interior

Highlights:

Commercially approved to NSF standards

Stainless steel exterior and interior

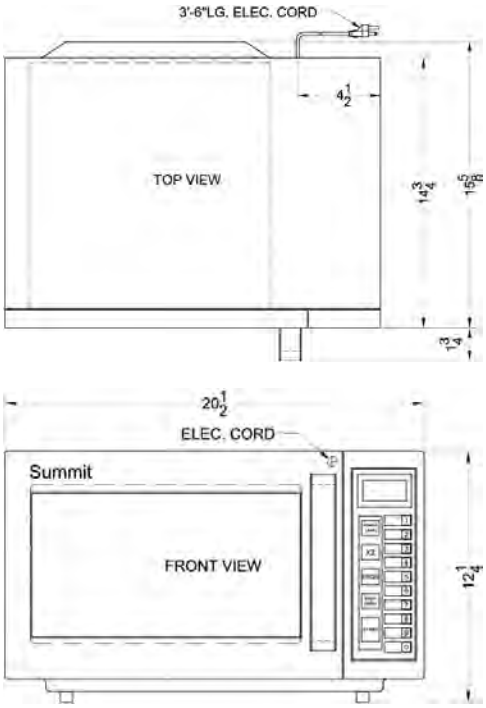
Intuitive digital controls allow you to store settings for faster cooking

Product Features:

Stainless steel construction	Interior and exterior in brushed stainless steel
Commercially listed	Approved to NSF standards for use in the foodservice industry
Digital controls	Easy time settings with touch buttons
Saved cooking settings	Save your commonly used cooking programs in a few quick steps
Operations count	Includes function to display how many times the oven has been used
Child lock	Easy to set optional locking function
Digital display	Convenient timer readout

SCM1000SS Specifications:

Overview	
Height of Cabinet	12.25" (31 cm)
Width	20.25" (51 cm)
Depth	14.75" (37 cm)
Capacity	0.9 cu.ft. (25 L)
Cabinet	Stainless Steel
US Electrical Safety	ETL
Sanitation	ETL-S
Voltage/Frequency	115 V AC/60 Hz
Weight	39.0 lbs. (18 kg)
Shipping Weight	41.0 lbs. (19 kg)
Parts & Labor Warranty	90 Days
Microwave	
Type	Countertop
Wattage	1000.0
Controls	Digital
Digital Display	Yes



SUMMIT APPLIANCE DIVISION, FELIX STORCH, INC. | ISO 9001:2015 Certified
770 Garrison Avenue Bronx, NY 10474 USA **TEL** 718-893-3900 **FAX** 844-478-8799 info@summitappliance.com **www.summitappliance.com**

NO. 122 DISPENSER, WATER, FILTERED

Aqua Bar II Standard Cooler

Contemporary Design, Innovative Features & Versatility

Features:

- Tri-temp: Hot, Cook and Cold
- 4 gallon stainless steel storage reservoir, perfect for reverse osmosis and filter applications
- High chilling capacity - 43 x 6 oz cups at 50^{0}F per hour
- Large faucet alcove for filling sports bottles and carafes
- Optional in-tank UV accessory for continuous sanitization (purchased separately)
- Optional in-cabinet leak detector accessory with inlet water shut off (purchased separately)
- Dual electrical float system with back-up safety
- Certified to NSF/ANSI 372 for low lead content
- Energy Star certified
- UL Listed
- 3 year limited warranty

Model:

- Standard Tri-temp: POU2LRHK

OASIS® Water Friendly Solutions

Quality & Innovation Since 1910

Certified WBENC Women's Business Enterprise

Aqua Bar II Standard Specifications

Cabinet: ABS plastic front and top with powder coat finished removable metal side panels. Holes are pre-drilled on cabinet side for cup dispenser.

Cold Water Refrigeration Unit: Convection cooled condenser. Internal, spring mounted, hermetically sealed compressor with automatic overload protector requires no lubrication. Refrigerant is controlled by a capillary tube.

Cold Water Thermostat: Temperature is controlled by an adjustable thermostat with “off” position that is easily accessible

Cold Water Reservoir: Four gallon, Non-removable type 300 series stainless steel with external copper refrigerant coil. Encased in pre-fitted molded plastic foam insulation.

Cold Water Capacity: 2.0 gallons of 50^0F water per hour (43 x 6oz cups).

Hot Water Tank: Tank is constructed of type 300 series stainless steel with 500 watt element.

Hot Water Capacity: 45 x 6 oz. cups of piping hot water per hour. 1 1/2 quart storage tank.

Hot Water Thermostat: Fixed thermostat with safety limiter.

Hot Water Safety Faucet: Self-closing activation requires a two-step action to prevent accidental dispensing.

Drip receptor: Durable dishwasher safe drip tray lifts out for easy cleaning.

Electrical: 115 volts, 60 hertz. 1/20 hp water cooler compressor. Three wire service cord & polarized plug.

Dimensions: W 12 3/4” x D 16 3/4” x H 44 3/4”
Approximate Net Weight: 60 lbs.

Optional water Filtration and Reverser Osmosis (RO): Aqua Bar II deluxe is filter and RO ready and is available with the Oasis three stage green filter system with RO.

Lead-Free: Components in the water cooler are lead-free as defined by the Safe Drinking Water Act Amendments of 1986 and the Lead Contamination Control Act of 1988. Model listed by Underwriter’s Laboratories to U.S. and Canadian Standards.

Warranty: Limited 3-year warranty (within the Continental Limits of the U.S. and Canada). Three years on the sealed refrigeration system, one year on most component parts. Detailed warranty certificate enclosed with each cooler; sample copy available upon request.

Specifications are subject to change without notice

www.oasiscoolers.com / 800.950.3226
Oasis International / 222 East Campus View Blvd. / Columbus, OH 43235

Oasis is a registered trademark of LVD Acquisition, LLC dba Oasis International,
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SCFM162

33" x 55.75" x 27.5" (H x W x D)

Commercially listed 16 cu.ft. manual defrost chest freezer

Highlights:

Commercially approved for use in foodservice establishments

Manual defrost operation and static cooling system

Added security with a factory installed lock

Product Features:

Commercially approved	UL-S listed to ANSI-NSF Standard 7 for commercial use
Manual defrost operation	Static cooling system
Factory installed lock	Keyed lock on the handle offers added security
One piece interior liner	Seamless interior ensures easier cleanup
Adjustable thermostat	Dial thermostat for easy temperature management
Storage baskets	Two removable plastic baskets offer convenient storage
Stainless steel front corner protectors	External "bumpers" are factory installed to protect the unit's front corners from dents
White exterior	Textured white finish fits well in any establishment
100% CFC free	Environmentally friendly design without ozone-damaging chemicals

SUMMIT APPLIANCE DIVISION, FELIX STORCH, INC. | ISO 9001:2015 Certified
770 Garrison Avenue Bronx, NY 10474 USA **TEL** 718-893-3900 **FAX** 844-478-8799 info@summitappliance.com **www.summitappliance.com**

SCFM162 Specifications:

Overview	
Height of Cabinet	33.0" (84 cm)
Width	55.75" (142 cm)
Depth	27.5" (70 cm)
Capacity	16.0 cu.ft. (453 L)
Defrost Type	Manual
Door	White
Cabinet	White
US Electrical Safety	UL
Canadian Electrical Safety	ULC
Sanitation	UL-S
Amps	5.0
Voltage/Frequency	115 V AC/60 Hz
Weight	170.0 lbs. (77 kg)
Shipping Weight	177.0 lbs. (80 kg)
Parts & Labor Warranty	1 Year
Compressor Warranty	5 Years
Refrigerator Features	
Door Swing	Lift-Up
Thermostat Type	Dial
Refrigerant Type	R134a
Temperature Range	-10 to 10°F
Dimensions	
Interior Height	29.13" (74 cm)
Interior Width	42.75" (109 cm)
Interior Depth	22.25" (57 cm)
Compressor Step Height	10.38" (26 cm)
Compressor Step Width	9.38" (24 cm)

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BKRF18SS

67.63" x 29.63" x 30" (H x W x D)

18 cu.ft. break room refrigerator-freezer with stainless steel doors and NIST calibrated alarm/thermometers

Highlights:

Perfect for break room applications

Includes NIST calibrated thermometers that provide a current and high/low temperature of the refrigerator and freezer compartments

True frost-free operation saves on maintenance by preventing icy buildup

Product Features:

NIST calibrated thermometers	Two thermometers provide an external readout of the current and high/low refrigerator and freezer temperature to the nearest tenth of a degree
High/low temperature alarms	Both thermometers include an audible alarm that can be set by the user
Frost-free operation	No-frost convenience requires no manual defrosting
Adjustable glass shelves	Rearrange refrigerator space to accommodate all sizes or remove shelves for simple cleanup
Interior light	Automatically illuminates when you open the door
Crisper drawers	Clear twin crispers with humidity control
Door storage	Keep bottles and condiments in easy reach
Gallon door storage	Lower refrigerator door shelf can hold gallon-sized containers
Adjustable thermostat	Dial thermostat located inside for easy temperature management

BKRF18SS Specifications:

Overview	
Height of Cabinet	67.63" (172 cm)
Width	29.63" (75 cm)
Depth	30.0" (76 cm)
Depth with Handle	32.13" (82 cm)
Capacity	18.0 cu.ft. (510 L)
Defrost Type	Frost-Free
Door	Stainless Steel
Cabinet	Black
US Electrical Safety	CSA
Energy Usage/Year	404.0kWh/year
Amps	6.0
Voltage/Frequency	115 V AC/60 Hz
Weight	210.0 lbs. (95 kg)
Shipping Weight	220.0 lbs. (100 kg)
Parts & Labor Warranty	1 Year
Compressor Warranty	5 Years
Refrigerator-Freezer	
Door Swing	RHD
Reversible	Yes
Adjustable Shelves	Yes
Crisper Qty	2
Crisper Finish	Transparent
Crisper Cover	Glass
Interior Light	Yes
Refrigerator - Shelf Type	Glass
Refrigerator - Shelf Qty	2
Refrigerator - Full Door Shelves	3
Refrigerator - Half Door Shelves	1
Refrigerator - Temperature Range	36 to 46ºF
Freezer - Shelf Type	Wire
Freezer - Shelf Qty	1
Freezer - Full Door Shelves	2
Gallon Door Storage	Yes
Thermostat Type	Dial

Fan Type	Interior
Refrigerant Type	R134a
Refrigerant Amount	4.25 oz.
High Side PSI	300.0
Low Side PSI	140.0
Freezer - Temperature Range	0 to 10ºF

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FF6L7NZ

33.5" x 23.63" x 23.5" (H x W x D)

Commercially approved Nutrition Center series all-refrigerator in white for freestanding use, with front lock and digital temperature display

Highlights:

Commercially approved to NSF-7 standards

Digital temperature display and audible alarm allows easier temperature monitoring as recommended by JCAHO

Thermometer is NIST calibrated in our ISO/IEC 17025:2005 laboratory

Product Features:

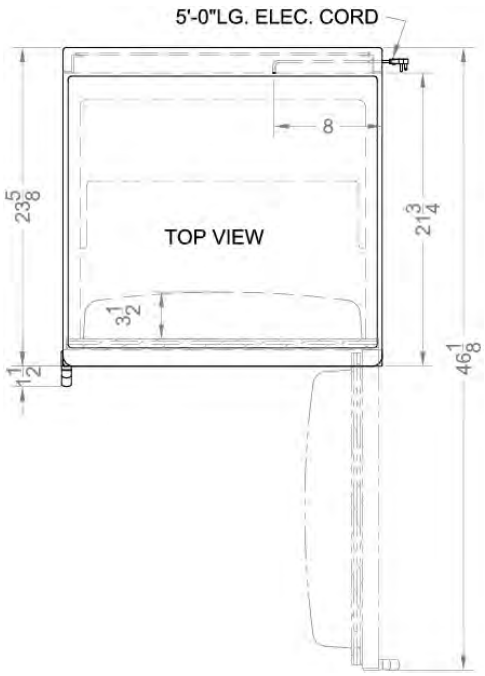
Commercially approved	ETL-S listed to NSF-7 commercial standards for food and beverage storage
24" footprint	Conveniently sized to offer sufficient capacity in a slim fit
NIST calibrated temperature display	Thermometer provides continuous display of the current and high/low temperature to the nearest tenth of a degree, with a readout switchable from Celsius to Fahrenheit at the touch of a button
High/low temperature alarm	Audible alarm sounds if the interior temperature rises or falls out of set range
Versatile display	Temperature display can be switched from Celsius to Fahrenheit at the touch of a button
Factory installed lock	Top-mounted keyed lock for convenient security, with two keys included
Automatic defrost	Reduced maintenance with auto defrost system
Adjustable epoxy-coated wire shelves	Rearrange your refrigerator space to accommodate all shapes and sizes or remove shelves for a simple clean-up
Door storage	Three door racks, including a covered rack and bottom shelf that allows you to store tall bottles in easier reach

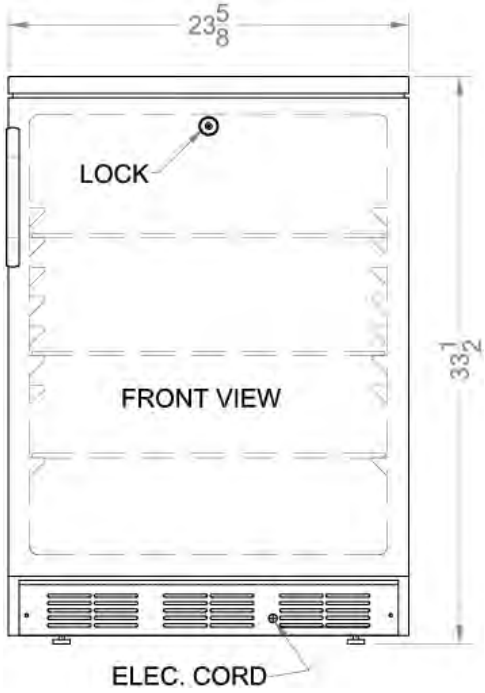
accucold

FF6L7NZ Specifications:

Overview	
Height of Cabinet	33.5" (85 cm)
Width	23.63" (60 cm)
Depth	23.5" (60 cm)
Depth with Handle	25.13" (64 cm)
Depth with door at 90°	46.13" (117 cm)
Capacity	5.5 cu.ft. (156 L)
Defrost Type	Automatic
Door	White
Cabinet	White
US Electrical Safety	ETL
Canadian Electrical Safety	ETL-C
Sanitation	ETL-S
Amps	1.3
Voltage/Frequency	115 V AC/60 Hz
Weight	100.0 lbs. (45 kg)
Shipping Weight	105.0 lbs. (48 kg)
Parts & Labor Warranty	1 Year
Compressor Warranty	5 Years
Refrigerator Features	
Door Swing	RHD
Reversible	Yes
Crisper Qty	1
Crisper Finish	Opaque
Crisper Cover	Glass
Shelf Type	Wire
Shelf Qty	3
Full Door Shelf Qty	3
Adjustable Shelves	Yes
Thermostat Type	Dial
Refrigerant Type	R134a
Refrigerant Amount	1.8oz.
High Side PSI	285.0
Low Side PSI	70.0
Level Legs Qty	2
Interior Light	Yes
Temperature Range	35 to 39ºF
Dimensions	

Interior Height	27.75" (70 cm)
Interior Width	20.0" (51 cm)
Interior Depth	17.5" (44 cm)
Compressor Step Height	7.0" (18 cm)
Compressor Step Width	20.0" (51 cm)
Compressor Step Depth	6.0" (15 cm)





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NO. 161.01 WASHER, BOWL, PASS-THRU

Auto-Chlor SYSTEM

A4 WaterSaver™

Single Rack • In Line • Low Energy Dishmachine

- Auto-Chlor System's proprietary WaterSaver™ design uses as little as 1.09 gallons/rack
- Powerful 1 HP pump delivers high pressure spray and mechanical cleaning action for single pass cleaning performance
- Built in water pressure regulator provides consistent water usage and cleaning results
- Exclusive fill-through-the-pump feature flushes and cleans the wash pump and spray system with every cycle
- External sump and screen provide easy access for cleaning
- Regularly scheduled 28-day service ensures sparkling results, minimizes mechanical problems and reduces operating costs
- Benefiting from more than 75 years of improvements and dishwashing experience and knowledge

Energy Efficient

- Exceeds Energy Star requirements
- Low temperature chemical sanitizing saves energy

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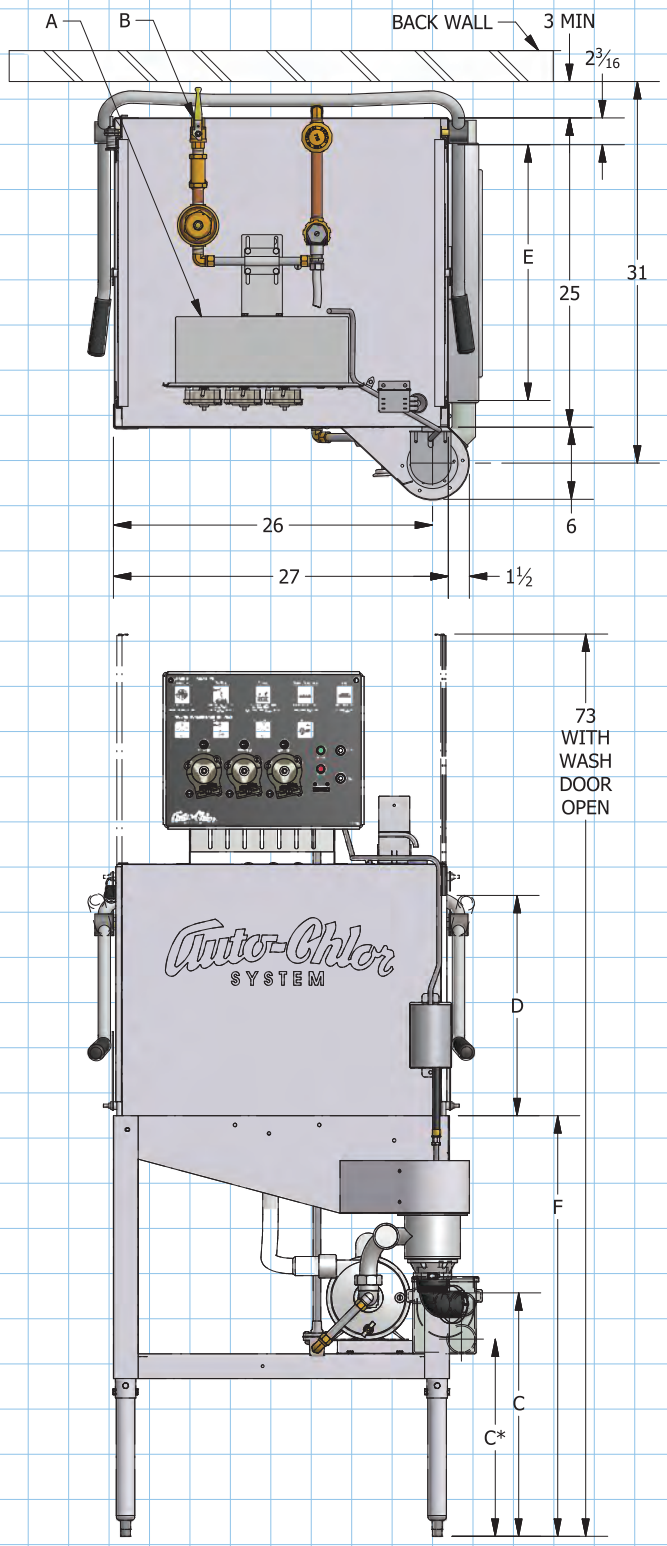
Total Service.
Total Satisfaction.

Auto-Chlor® SYSTEM
autochlor.com

Auto-Chlor SYSTEM

A4 WaterSaver™

Single Rack • In Line • Low Energy Dishmachine



Specifications

Standard 90 second cycle, 38 rack/hr

A - Electrical -115 VAC, 60Hz, 1 PH
- 20A Dedicated Circuit Recommended
- Connects to Grounded Wall Outlet or ½" Conduit depending on local building codes

B - Water Consumption 1.09 gal/rack (41.3 GPH)
- Water Supply Flow Rate 7.5 GPM Minimum
- Water Supply Temp 120˚F Minimum
- Water Supply Connection ½" NPT female
- Backflow protection provided by ASSE 1001 Vacuum Breaker

C - Drain Connection 2" MPT
- 20" above floor

C* - Optional Scrap Accumulator
- Connection 2" MPT
- Centerline 15½" above floor

D - Wash Cavity Clearance 17" Max Height

E - Rack Clearance - 20 ⅛" between tracks
- Rack Size 20" x 20"

F - Table Height at Machine Entrance 34"

Available Options:
- Auto-Start
- Leg Extensions : 3"
- Vapor Removal System (VRX)
- 72 second cycle, 47 Racks/hr, 51 GPH
- 60 second cycle, 55 Racks/hr, 60 GPH
- Tall Hood 27" Max. Height Wash Cavity

Optional Supplemental Water Heaters Available
An optional integrated water heating system is available for this model dishmachine. The integrated system mounts within the framework of the machine so no additional floor space is required. The integrated heater is ideal for facilities with insufficient water heating capacity, on-demand style water heaters, or remotely located heaters. The heater can operate on 50A 208-240V circuits using either single or three phase power. Contact your local Auto-Chlor System representative for more information.

Note: This unit does not produce heat or steam

Total Service. Total Satisfaction.

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ACM30002

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Auto-Chlor® SYSTEM

A4 WaterSaver™

Single Rack • In Line • Low Energy Dishmachine

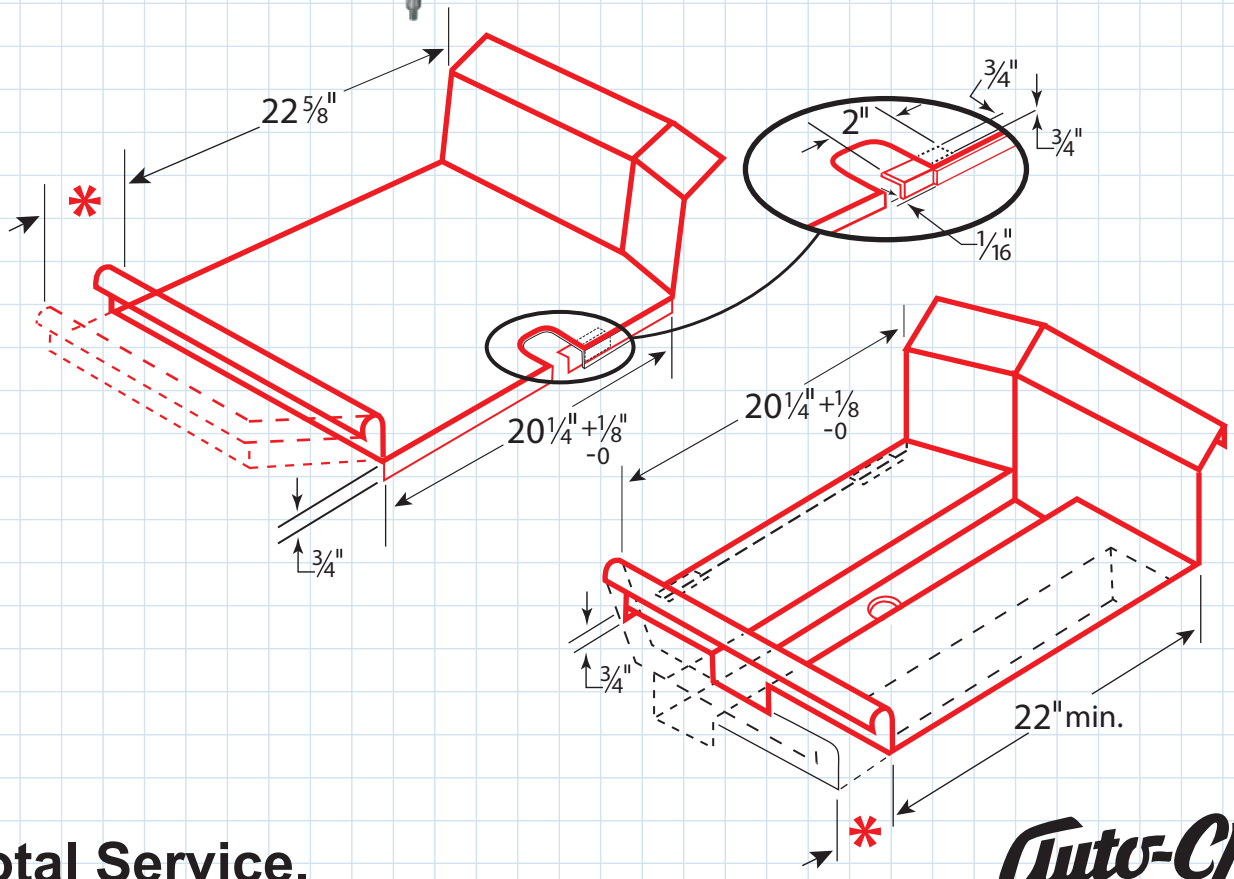
INLINE TABLE LAYOUT

Installation Specifications

*** NOTE:**

Dotted lines show how tables can be made to any desired width. Drain trough and/or pre-wash sink (dotted line) and some type of guide to center racks should be provided in "soiled dish" table.

Drawing shows right-to-left operation. For left-to-right feed, construct tables in reverse.



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Total Satisfaction.

Auto-Chlor® SYSTEM
autochlor.com

EVOLUTION SEPTIC ASSIST®

FOOD WASTE DISPOSER DESIGNED FOR SEPTIC SYSTEM

TRITURADOR DE DESPERDICIOS DE ALIMENTOS DISEÑADO PARA SISTEMAS SÉPTICOS

AnswerLine®
1-800-558-5700

www.insinkerator.com

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to address practices not related to personal injury.

CAUTION without the safety alert symbol, is used to address practices not related to personal injury.

PELIGRO indica una situación peligrosa que, si no se evita, provocará lesiones graves o incluso la muerte.

ADVERTENCIA indica una situación riesgosa, la cual, si no se evita, puede ocasionar lesiones graves o incluso la muerte.

PRECAUCIÓN empleado junto con el símbolo de alerta, indica una situación riesgosa, la cual, si no se evita, puede provocar heridas leves o moderadas.

AVISO hace referencia a prácticas que no presentan riesgos de generar lesiones personales.

PRECAUCIÓN empleado sin el símbolo de alerta, hace referencia a prácticas que no presentan riesgos de generar lesiones personales.

76137 Rev B

The Evolution Series® by InSinkErator® is a new standard in sound and grind performance. Featuring exclusive patented **SoundSeal®** and **MultiGrind®** technologies, no food waste disposer grinds more with less noise.

Evolution Series® de InSinkErator® es el nuevo estándar dentro de la tecnología de conductos y trituración. Con las exclusivas tecnologías **SoundSeal®** y **MultiGrind®**, ningún triturador de desperdicios tritura más con menos ruido.

Sound Seal® Technology

1. **Quiet Collar® Sink Baffle**
2. **Anti-Vibration Mount®**
3. **Anti-Vibration Tailpipe Mount™**
4. **SoundLimiter™ Insulation**

Sound Seal® Tecnología

1. **Deflector del fregadero Quiet Collar®**
2. **Anti-Vibration Mount®**
3. **Anti-Vibration Tailpipe Mount™**
4. **Aislamiento SoundLimiter™**

Multi Grind® Technology

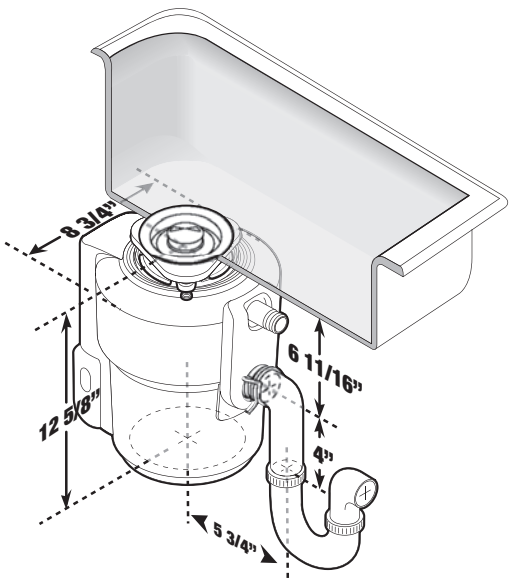
5. **GrindShear Ring®**
6. **Quick Lock® Sink Mount**
7. **Stainless Steel Grind Components**
8. **3/4 HP Heavy Duty Dura-Drive® Motor**
9. **Bio-Charge® Technology**

Multi Grind® Tecnología

5. **GrindShear Ring®**
6. **Montaje del fregadero Quick Lock®**
7. **Componentes de trituración de acero inoxidable**
8. **Motor Dura-Drive® de 3/4 HP para trabajos pesados**
9. **Bio-Charge® Tecnología**

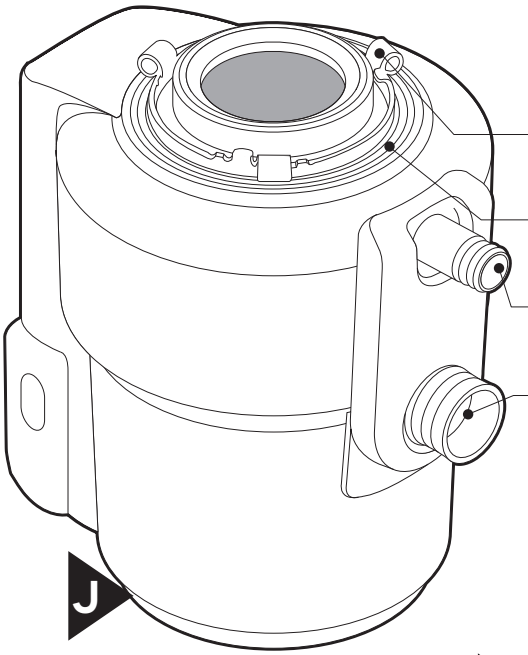
⚠ **Read all warnings before proceeding.**

⚠ **Lea todas las advertencias antes de continuar.**



Dimensions/Dimensiones

Includes/Incluye



- **A** Stopper / Tapón
- **B** Quiet Collar® Sink Baffle / Deflector del fregadero Quiet Collar®
- **C** Sink Flange / Brida del fregadero
- **D** Fiber Gasket / Junta de fibra
- **E** Backup Flange / Brida de apoyo
- **F** Mounting Ring / Anillo de montaje
- **G** 1-1/2" Screws / Tornillos de 1-1/2" (3,81 cm)
- **H** 1-1/8" Screws / Tornillos de 1-1/8" (2,85 cm)
- **I** Snap Ring / Anillo de cierre

Lower Mounting Ring
Anillo de montaje inferior

Anti-Vibration Mount®
Anti-Vibration Mount®

Dishwasher Inlet
Entrada del lavavajillas

Anti-Vibration Tailpipe Mount™

Anti-Vibration Tailpipe Mount™

J Disposer/Triturador

K Jam-Buster™ Wrench / Llave Jam-Buster™

Failure to use the spring type hose clamp provided voids warranty./ La garantía pierde validez si no usa la abrazadera de manguera tipo resorte incluida.

L Spring Type Hose Clamp / Abrazadera de manguera tipo resorte

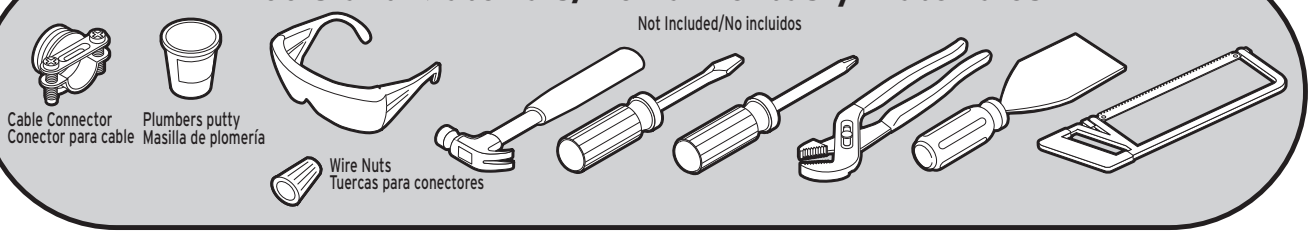
M Discharge Tube / Tubo de descarga

N Discharge Tube / Tubo de descarga

O Bio-Charge® Bottle / Botella Bio-Charge®

Tools and Materials/Herramientas y materiales

Not Included/No incluidos



Removal of old disposer/Extracción del triturador viejo

1 If you are replacing an existing disposer, continue to Step 2. If there is no existing disposer, disconnect sink drain and skip to Step 10.

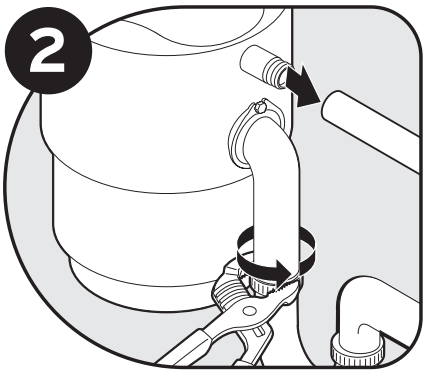
Si tiene que reemplazar un triturador existente, continúe con el Paso 2. Si no existe un triturador, desconecte el desagüe del fregadero y continúe con el Paso 10.

⚠ WARNING/ADVERTENCIA

SHOCK HAZARD
Turn off electric power at fuse box or circuit breaker.

PELIGRO DE DESCARGA ELÉCTRICA
Desconecte el suministro eléctrico desde la caja de fusibles o del interruptor de circuito.

2



Disconnect drain trap from waste discharge tube. Disconnect dishwasher if connected to the disposer.

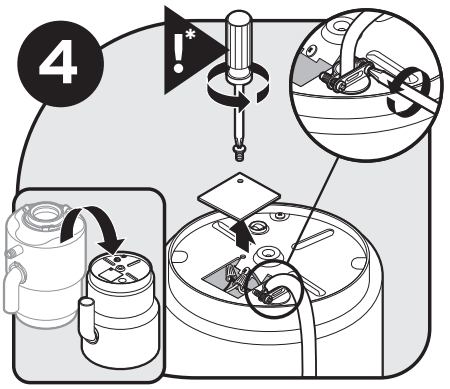
Desconecte la trampa de desagüe del tubo de descarga de desperdicios. Desconecte el lavavajillas si está conectado al triturador.

3

Support disposer, insert end of Jam-Buster™ Wrench (K) into right side of mounting lug, and turn. Disposer will fall free.

Apoye el triturador, inserte el extremo de la Llave Jam-Buster™ (K) en el lado derecho de uno de los salientes de montaje y gire. El triturador se liberará.

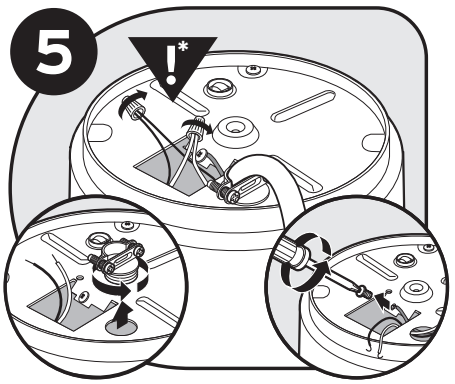
4



*** WARNING: SHOCK HAZARD**
With the electrical supply turned off, flip disposer over and remove electrical cover plate. Save cable connector if applicable.

*** ADVERTENCIA: PELIGRO DE DESCARGA ELÉCTRICA.** Con la energía eléctrica apagada, voltee el triturador y retire la placa de la cubierta eléctrica. Guarde el conector del cable si corresponde.

5



*** WARNING: SHOCK HAZARD**
With the electrical supply turned off, disconnect the disposer wires from the electrical supply.

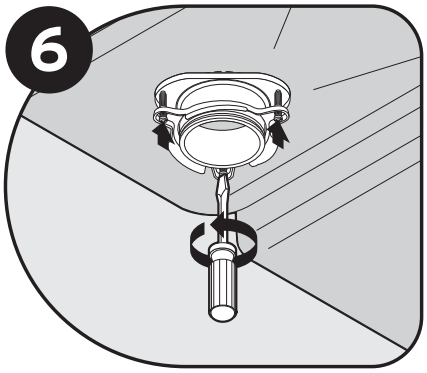
*** ADVERTENCIA: PELIGRO DE DESCARGA ELÉCTRICA.** Con la energía eléctrica apagada, desconecte los cables del triturador del suministro eléctrico.

If the new disposer mounting is the same as the old one, you can go to step 15.

Note: For sinks thicker than 3/8", you will need to replace existing 1-1/2" screws with 1-1/8" screws (H). See Step 14.

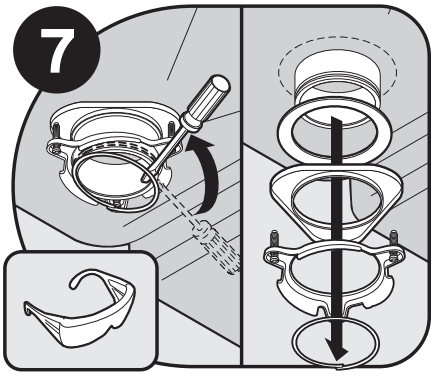
Si el montaje del triturador nuevo es el mismo que el viejo, puede ir al Paso 15.

Nota: Para los fregaderos con espesor mayor de 3/8" (0,95 cm), deberá reemplazar los tornillos existentes de 1-1/2" (3,81 cm) por tornillos de 1-1/8" (2,85 cm) (H). Consulte el Paso 14.



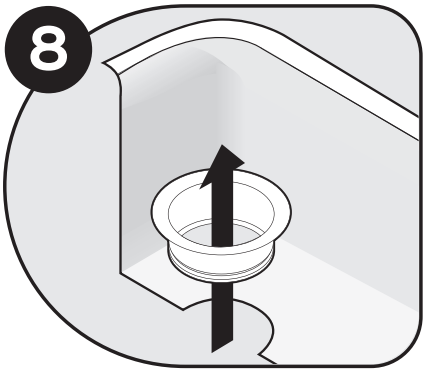
Loosen the 3 screws on the mounting assembly.

Afloje los 3 tornillos en el conjunto de montaje.



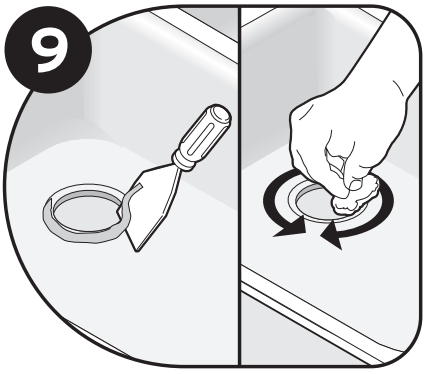
Using a screwdriver, remove the snap ring.

Retire el anillo de cierre con un destornillador.



Remove flange from sink.

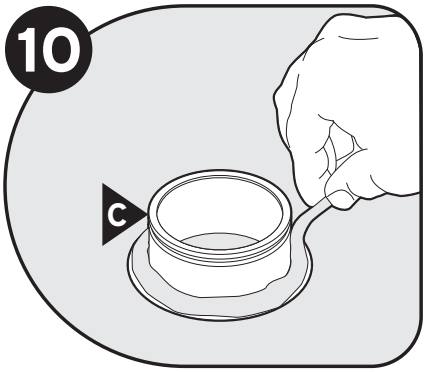
Retire la brida del fregadero.



Remove old plumber's putty from sink with putty knife.

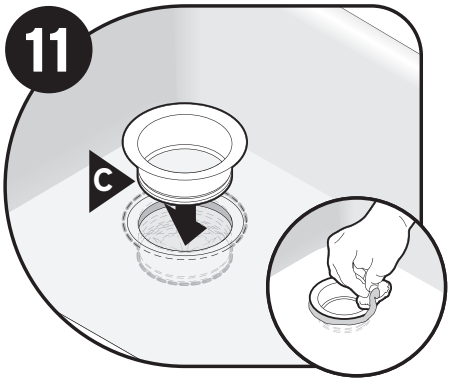
Retire la masilla de plomería vieja del fregadero con una espátula.

Installation/Instalación



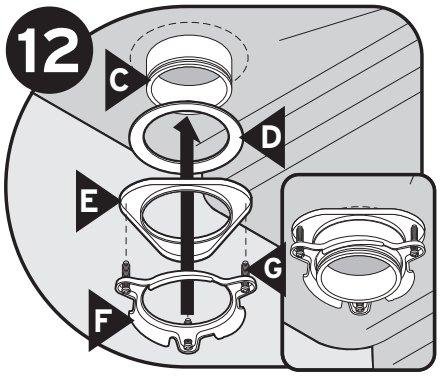
Evenly apply 1/2" thick rope of plumber's putty around flange (C).

Aplique una tira gruesa de masilla de plomería, de 1/2" (1,27 cm), en forma uniforme alrededor de la brida (C).



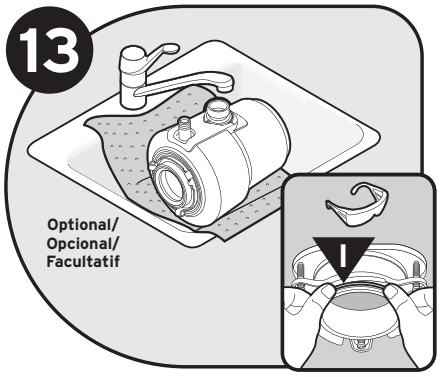
Press flange (C) firmly into sink drain. Remove excess putty.

Presione la brida (C) firmemente en el desagüe del fregadero. Retire la masilla sobrante.



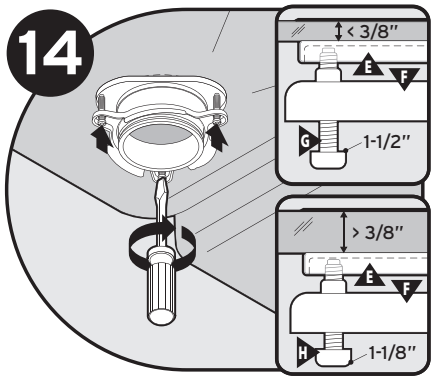
Insert fiber gasket (D), backup flange (E) and mounting ring (F).

Inserte la junta de fibra (D), la brida de soporte (E) y el anillo de montaje (F).



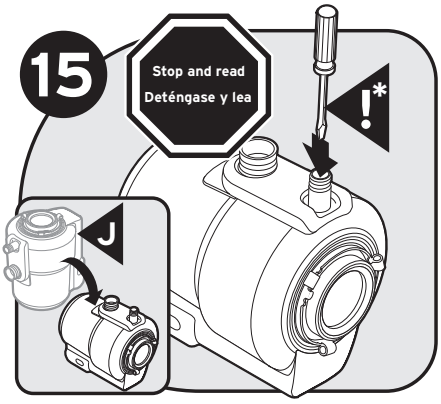
Hold in place while inserting snap ring (I). Place a weight such as the disposer on the sink flange to hold it in place. Use a towel to prevent scratching sink. Pull snap ring open and press firmly until it snaps into place.

Sosténgalos en su lugar mientras inserta el anillo de cierre (I). Coloque un peso, por ejemplo el triturador, sobre la brida del fregadero para mantenerla en su lugar. Utilice una toalla para evitar que se raye el fregadero. Abra el anillo de cierre y presione firmemente hasta que se coloque en el lugar.



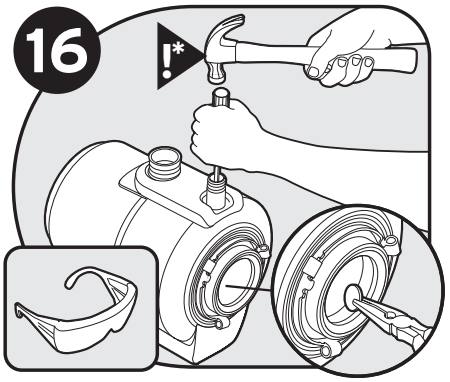
Tighten 1-1/2" screws (G) evenly and firmly against backup flange. Use shorter 1-1/8" screws (H) if sink is more than 3/8" thick.

Ajuste los tornillos de 1-1/2" (3,81 cm) (G) en forma uniforme y firme contra la brida de soporte. Utilice tornillos más cortos de 1-1/8" (2,85 cm) (H) si el fregadero tiene más de 3/8" (0,95 cm) de espesor.



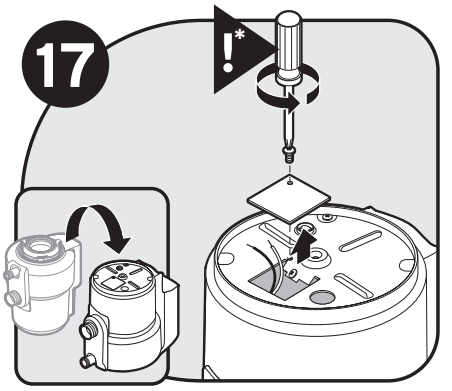
*** CAUTION: DISHWASHER CONNECTION ONLY** If you do not need to attach the dishwasher, go to Step 17. Turn disposer (J) onto side and insert screwdriver into dishwasher inlet.

*** PRECAUCIÓN: SÓLO PARA CONEXIÓN DEL LAVAVAJILLAS.** Si no es necesario conectar el lavavajillas, pase al Paso 17. Voltee el triturador (J) sobre un lado e introduzca el destornillador en la entrada del lavavajillas.



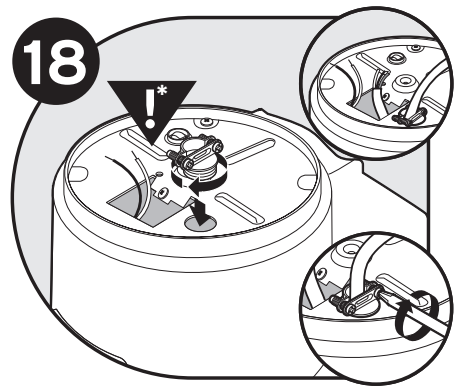
*** CAUTION: DISHWASHER CONNECTION ONLY** Knock out drain plug and remove plug from inside of disposer.

*** PRECAUCIÓN: SÓLO PARA LA CONEXIÓN DEL LAVAVAJILLAS.** Extraiga de un golpe el tapón de desagüe del interior del triturador.



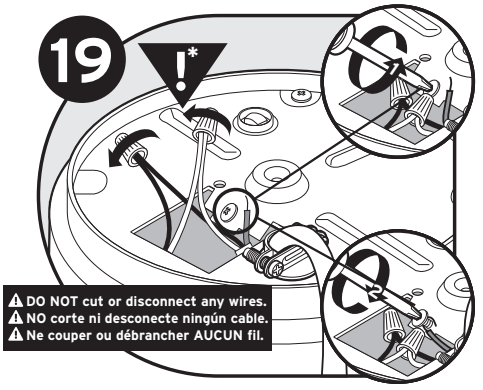
*** WARNING: SHOCK HAZARD.** Turn disposer over and remove electrical cover plate. Pull out wires. **DO NOT REMOVE CARDBOARD SHIELD.**

*** ADVERTENCIA: PELIGRO DE DESCARGA ELÉCTRICA.** Dé vuelta el triturador y retire la placa de cubierta eléctrica. Saque los cables. **NO RETIRE LA PROTECCIÓN DE CARTÓN.**



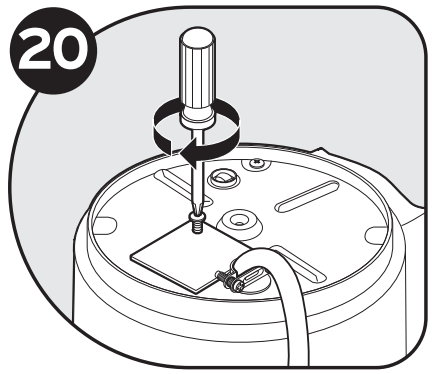
*** WARNING: SHOCK HAZARD.** With electrical supply turned off, insert cable connector (not included) and run electrical cable through access hole on bottom of disposer. Tighten cable connector.

*** ADVERTENCIA: PELIGRO DE DESCARGA ELÉCTRICA.** Con la corriente eléctrica apagada, introduzca el conector del cable (no incluido) y pase el cable eléctrico a través del orificio de acceso en la parte inferior del triturador. Ajuste el conector del cable.



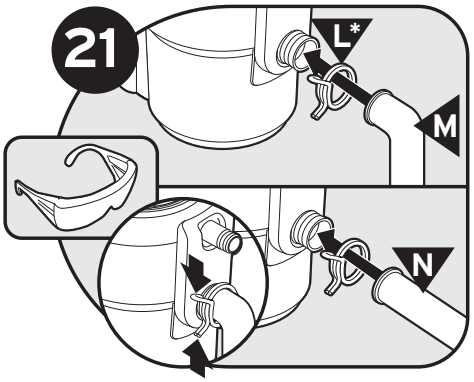
*** WARNING! Improper grounding can result in electric shock hazard.** Connect white wire from disposer to neutral (white) wire from power source and black wire from disposer to hot (black, red) wire from power source with wire nuts (not included); ground wire to green grounding screw. Unit must be grounded for safe and proper installation.

*** ADVERTENCIA: La conexión incorrecta a tierra puede representar un riesgo de descarga eléctrica.** Conecte el cable blanco del triturador al cable neutro (blanco) de la fuente de energía, y el cable negro del triturador al cable vivo (negro, rojo) de la fuente de energía, use para ello tuercas para cable (no incluidas); finalmente, una el cable de conexión a tierra con el tornillo verde conectado a tierra. La unidad debe estar conectada a tierra para una instalación segura y adecuada.



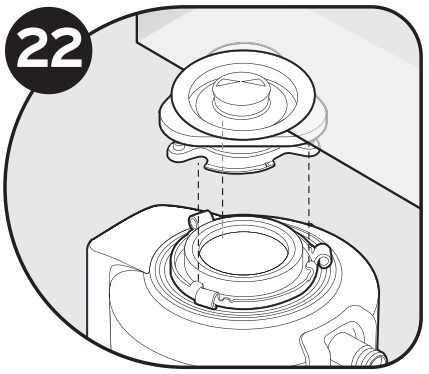
Push wires into disposer **(do not displace cardboard shield)** and replace electrical cover plate.

Coloque los cables dentro del triturador **(no retire la protección de cartón)** y reemplace la placa de la cubierta eléctrica.



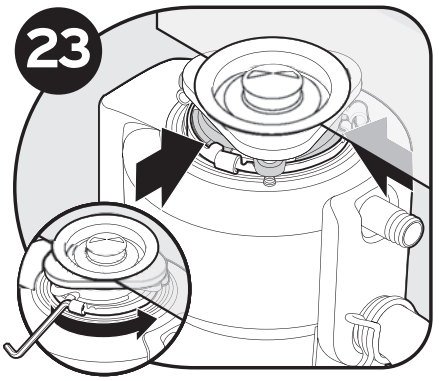
Place tube (M or N) into Anti-Vibration Tailpipe Mount™. Use provided tubes for best results. Secure with spring type hose clamp (L). ***Important: Failure to use the spring type hose clamp provided voids warranty.**

Coloque el tubo (M o N) dentro del Anti-Vibration Tailpipe Mount™. Utilice los tubos provistos para obtener mejores resultados. Fije con la abrazadera de manguera tipo resorte (L). ***Importante: La garantía pierde validez si no usa la abrazadera de manguera tipo resorte incluida.**



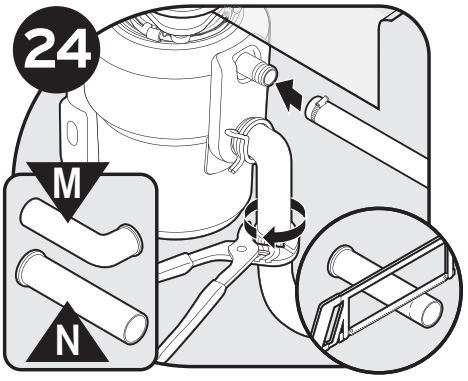
Hang disposer by aligning 3 mounting tabs with slide-up ramps on mounting ring.

Sostenga el triturador y alinee los 3 apéndices de montaje con rampas deslizables sobre el anillo de montaje.



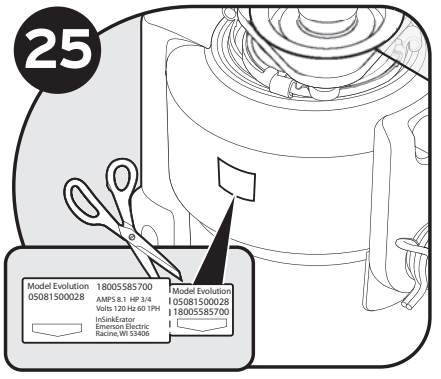
Turn mounting ring until all 3 mounting tabs lock over the ridges on the slide-up ramps.

Gire el anillo de montaje hasta que los 3 apéndices de montaje se cierren sobre los bordes de las rampas deslizables.



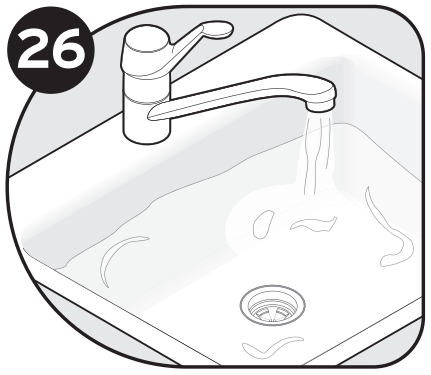
You may need to trim tube for proper fit. Reconnect plumbing (and dishwasher connection if used). Make sure Anti-Vibration Tailpipe Mount™ is straight.

Es posible que deba recortar el tubo para una colocación adecuada. Reconecte la plomería (y la conexión del lavavajillas, si utiliza uno). Asegúrese de que el Anti-Vibration Tailpipe Mount™ esté derecho.



Detach removable portion of spec label and place on a visible location.

Corte la parte desmontable de la etiqueta de especificaciones y colóquela en un lugar visible.



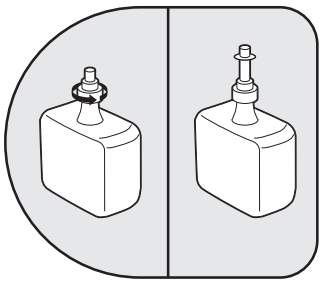
Insert Quiet Collar® Sink Baffle into sink opening. Fill sink with water, then test for leaks. Install Bio-Charge® Bottle. See following section.

Inserte el deflector del fregadero Quiet Collar® en la abertura del fregadero. Llene el fregadero con agua y luego verifique que no haya fugas. Instale la botella Bio-Charge®. Vea la sección siguiente.

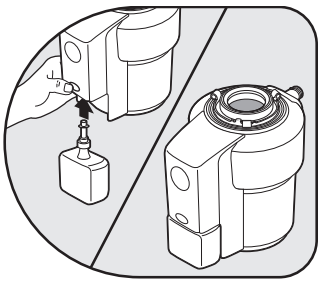
ENGLISH

Installing and Replacing the Bio-Charge® Bottle

Installing Bio-Charge® Bottle
Use only InSinkErator® Bio-Charge®. See Changing Bio-Charge® Bottle for safety instructions and information on obtaining Bio-Charge® replacements. Do not squeeze the Bio-Charge® Bottle; squeezing the bottle may cause Bio-Charge® to discharge and spill.

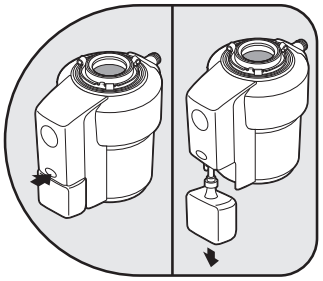


Unscrew Bio-Charge® dispenser cap nozzle counterclockwise until nozzle pops upward to dispensing position. Do not remove dispenser cap nozzle.



Aligning bottle with concave side toward disposer, press and hold the button while pushing bottle upward into holder. Release button. Pull bottle down slightly to ensure it is engaged.

Replacing Bio-Charge® Bottle
To keep your septic system operating at peak efficiency, replace the Bio-Charge® Bottle when it is empty. To change Bio-Charge® Bottle:



Make sure disposer is off. Press button on disposer just above bottle and pull bottle down to remove it. (Do not refill or reuse empty bottle.)

Bio-Charge® is available wherever InSinkErator® Septic Assist is sold. For Bio-Charge® reorder, questions, or comments call toll free 1 (888) 527-1493.

4 YEAR IN-HOME FULL SERVICE WARRANTY

This warranty is provided by InSinkErator®, a division of Emerson Electric Co., ("InSinkErator" or "Manufacturer" or "we" or "our" or "us") to the original consumer owner of the InSinkErator product with which this warranty is provided (the "InSinkErator Product"), and any subsequent owner of the residence in which the Product was originally installed ("Customer" or "you" or "your").

InSinkErator warrants to Customer that your InSinkErator Product will be free from defects in materials and workmanship, subject to the exclusions described below, for a period of 4 years (the "Warranty Period"), commencing on the later of: (a) the date your InSinkErator Product is originally installed, (b) the date of purchase, or (c) the date of manufacture as identified by your InSinkErator Product serial number. You will be required to show written documentation supporting (a) or (b). If you are unable to provide documentation supporting either (a) or (b), the Warranty Period commencement date will be determined by Manufacturer, in its sole and absolute discretion, based upon your InSinkErator Product serial number.

What is Covered
This warranty covers defects in materials or workmanship, subject to the exclusions below, in InSinkErator Products used by a consumer Customer for residential use only, and includes all replacement parts and labor costs. YOUR SOLE AND EXCLUSIVE REMEDY UNDER THIS LIMITED WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF THE INSINKERATOR PRODUCT.

What is not Covered
This limited warranty does not extend to and expressly excludes:
- Losses or damages or the inability to operate your InSinkErator Product resulting from conditions beyond the Manufacturer's control including, without limitation, accident, alteration, misuse, abuse, neglect, negligence (other than Manufacturer's), failure to install, maintain, assemble, or mount the InSinkErator Product in accordance with Manufacturer's instructions or local electrical and plumbing codes.
- Wear and tear expected to occur during the normal course of use, including without limitation, cosmetic rust, scratches, dents or comparable and reasonably expected losses or damages. In addition to the above exclusions, this warranty does not apply to InSinkErator Products installed in a commercial or industrial application.

No Other Express Warranty Applies
This warranty is the sole and exclusive warranty provided to the Customer identified above. No other express warranty, written or verbal, applies. No employee, agent, dealer, or other person is authorized to alter this limited warranty or make any other warranty on behalf of Manufacturer. The terms of this warranty shall not be modified by the Manufacturer, the original owner, or their respective successors or assigns.

What we will do to Correct Problems
If your InSinkErator Product does not operate in accordance with the documentation provided to you, or you have questions concerning your InSinkErator Product or how to determine when service is needed, please call the toll free InSinkErator AnswerLine™ at 1 (800) 558-5700, or visit our website at www.insinkerator.com. You may also notify us at: InSinkErator Service Center, 4700 21st Street, Racine, Wisconsin 53406 USA.

The following information must be provided as part of your warranty claim: your name, address, phone number, your InSinkErator Product model and serial number, and if necessary, upon request, written confirmation of either: (a) the date shown on your installation receipt, or (b) the date shown on your purchase receipt.

Manufacturer or its authorized service representative will determine, in its sole and absolute discretion, if your InSinkErator Product is covered under this warranty. You will be given the contact information for your closest authorized InSinkErator Service Center. Please contact your InSinkErator Service Center directly to receive in home warranty repair or replacement service. Only an authorized InSinkErator service representative may provide warranty service. InSinkErator is not responsible for warranty claims arising from work performed on your InSinkErator Product by anyone other than an authorized InSinkErator service representative.

If a covered claim is made during the Warranty Period, Manufacturer will, through its authorized service representative, either repair or replace your InSinkErator Product. Cost of replacement parts or a new InSinkErator Product, and cost of labor for repair or installation of the replacement InSinkErator Product are provided at no cost to you. Repair or replacement shall be determined by Manufacturer or its authorized service representative in their sole discretion. All repair and replacement services will be provided to you at your home. If Manufacturer determines that your InSinkErator Product must be replaced rather than repaired, the warranty on the replacement InSinkErator Product will be limited to the unexpired term remaining in the original Warranty Period.

Limitation of Liability
TO THE EXTENT PERMITTED BY LAW, IN NO EVENT SHALL MANUFACTURER OR ITS AUTHORIZED SERVICE REPRESENTATIVES BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, INCLUDING ANY ECONOMIC LOSS, WHETHER RESULTING FROM NONPERFORMANCE, USE, MISUSE OR INABILITY TO USE THE INSINKERATOR PRODUCT OR THE MANUFACTURER'S OR ITS AUTHORIZED SERVICE REPRESENTATIVE'S NEGLIGENCE. MANUFACTURER SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE AND IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL MANUFACTURER'S LIABILITY TO YOU EXCEED THE PRICE PAID BY THE ORIGINAL OWNER FOR THE INSINKERATOR PRODUCT.

The term "consequential damages" shall include, but not be limited to, loss of anticipated profits, business interruption, loss of use or revenue, cost of capital or loss or damage to property or equipment.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

OPERATING INSTRUCTIONS

1. Remove stopper from sink opening and run cold water.
2. Turn on wall switch to start disposer.
3. Slowly insert food waste into disposer. **CAUTION!** Position stopper to minimize possible ejection of material while grinding.
4. After grinding is complete, turn disposer off and run water for a few seconds to flush drain line.

DO...

- First turn on cold water and then turn on the disposer. Continue running cold water for several seconds after grinding is completed to flush the drain line.
- Grind hard materials such as small bones, fruit pits, and ice. A scouring action is created by the particles inside the grind chamber.
- Grind peelings from citrus fruits to freshen up drain smells.
- Use a disposer cleaner, degreaser, or deodorizer as necessary to relieve objectionable odors caused by grease build-up.

⚠ CAUTION

Regularly inspect disposer and plumbing fittings for water leaks, as water leaks can cause property damage. Manufacturer cannot be held responsible for property damage as a result of water leaks.

DON'T...

- ***POUR GREASE OR FAT DOWN YOUR DISPOSER OR ANY DRAIN. IT CAN BUILD UP IN PIPES AND CAUSE DRAIN BLOCKAGES. PUT GREASE IN A JAR OR CAN AND DISPOSE IN THE TRASH.***
- Use hot water when grinding food waste. It is OK to drain hot water into the disposer between grinding periods.
- Fill disposer with a lot of vegetable peels all at once. Instead, turn the water and disposer on first and then feed the peels in gradually.
- Grind large amounts of egg shells or fibrous materials like corn husks, artichokes, etc., to avoid possible drain blockage.
- Turn off disposer until grinding is completed and only sound of motor and water is heard.

USER-MAINTENANCE INSTRUCTIONS

CLEANING DISPOSER

Over time, food particles may accumulate in the grind chamber and baffle. An odor from the disposer is usually a sign of food buildup. To clean disposer:

1. Place stopper in sink opening and fill sink halfway with warm water.
2. Mix 1/4 cup baking soda with water. Turn disposer on and remove stopper from sink at same time to wash away loose particles.
3. Remove Quiet Collar® Sink Baffle and clean by hand or in dishwasher. Do not operate disposer without Quiet Collar® Sink Baffle in place.

Disposers may also be cleaned with Disposer Care®. This product is not sold by InSinkErator®, but is generally available in major home centers, hardware, and grocery stores. For more information on Disposer Care®, contact Summit Brands at 1-888-476-6688 or www.summitbrands.com.

RELEASING DISPOSER JAM

If motor stops while disposer is operating, disposer may be jammed. To release jam:

1. Turn off disposer and water.
2. Insert one end of self-service Jam-Buster™ Wrench into center hole on bottom of disposer (see Figure A). Work Jam-Buster™ Wrench back and forth until it turns one full revolution. Remove Jam-Buster™ Wrench.
3. Reach into disposer with tongs and remove object(s). Allow disposer motor to cool for 3 - 5 minutes, then lightly push red reset button on disposer bottom (see Figure B). (If motor remains inoperative, check service panel for tripped circuit breakers or blown fuses.)

Figure A

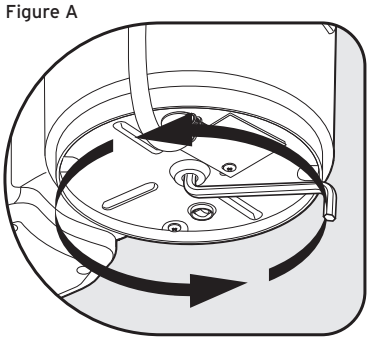
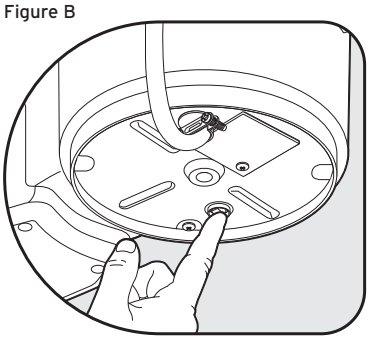


Figure B



INSTRUCTIONS PERTAINING TO RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS

IMPORTANT SAFETY INSTRUCTIONS

⚠ WARNING **When using electric appliances, basic precautions are always to be followed, including:**

- Read all instructions before using the appliance.
- To reduce the risk of injury, close supervision is required when an appliance is used near children.
- Do not put fingers or hands into a waste disposer.
- Turn the power switch to the off position before attempting to clear a jam, removing an object from the disposer or pressing reset button.
- When attempting to loosen a jam in a waste disposer, use the self-service Jam-Buster™ Wrench.
- When attempting to remove objects from a waste disposer, use long-handled tongs or pliers.
- To reduce the risk of injury by materials that are expellable by a waste disposer, do not operate the disposer without the Quiet Collar® Sink Baffle in place. Do not put the following into a disposer: clam or oyster shells, caustic drain cleaners or similar products, glass, china, or plastic, metal (such as bottle caps, steel shot, tin cans, or utensils), hot grease or other hot liquids.
- When not operating a disposer, leave the stopper in place to reduce the risk of objects falling into the disposer.
- This product is designed to dispose of normal household food waste; inserting materials other than food waste into disposer could cause personal injury and/or property damage.
- To reduce the risk of injury, do not use the sink containing the disposer for purposes other than food preparation (such as baby bathing or washing hair).
- Do not dispose of the following in the disposer: paints, solvents, household cleaners and chemicals, automotive fluids, plastic wrap.
- Replace Quiet Collar® Sink Baffle when worn to help prevent entry or ejection of material and water.
- FIRE HAZARD: Do not store flammable items such as rags, paper or aerosol cans near disposer. Do not store or use gasoline or other flammable vapors and liquids in vicinity of disposer.

SAVE THESE INSTRUCTIONS

⚠ WARNING

Personal Injury: Do not position your head or body under disposer; unit could fall during removal or installation.

⚠ CAUTION

Do not use plumber's putty on any other disposer connection other than sink flange. Do not use thread sealants or pipe dope. These may harm disposer and cause property damage.

⚠ CAUTION

Do not operate disposer without Anti-Vibration Tailpipe Mount™ as water leaks may result.

⚠ WARNING

Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the disposer is properly grounded. If the plug provided with the disposer does not fit the outlet, do not modify the plug or attempt to force the plug into the outlet – have a proper outlet installed by a qualified electrician.

- This disposer must be properly grounded.
- Do not attach ground wire to gas supply line.
- Disconnect power before installing or servicing disposer.
- If three-prong grounded plug is used, plug must be inserted into three-hole grounded receptacle.
- All wiring must comply with local electrical codes.
- Do not reconnect electrical current at main service panel until proper grounds are installed.

GROUNDING INSTRUCTIONS

For all grounded, cord-connected disposers:
This disposer must be grounded to reduce the risk of electric shock in the event of a malfunction or breakdown. Grounding provides a path of least resistance for electric current. This disposer is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

For permanently connected disposers:
This disposer must be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the disposer.

Food waste disposers provide an environmentally responsible alternative to transporting food waste to landfills. And they can help reduce greenhouse gas emissions. At capable wastewater treatment plants, food waste can be converted to biosolids and used as fertilizer. Capable plants can also recycle food waste into renewable energy. (Check the plant in your area.)

For U.S. www.insinkerator.com/green For Canada www.insinkerator.ca

InSinkErator® may make improvements and/or changes in the specifications at any time, in its sole discretion, without notice or obligation and further reserves the right to change or discontinue models.

The mounting collar configuration is a trademark of Emerson Electric Co.

The Emerson logo is a trademark and service mark of Emerson Electric Co.
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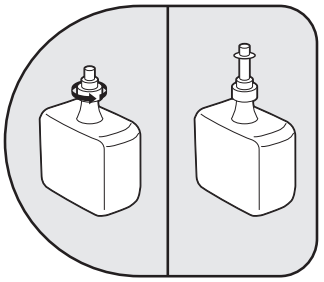
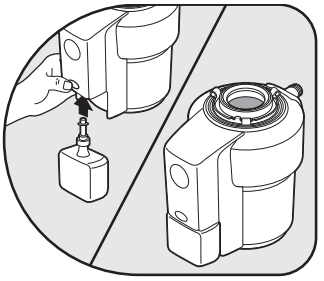
ESPAÑOL

La instalación y el cambiar de la Botella Bio-Charge®

Instale la Botella Bio-Charge®
Use únicamente Bio-Charge® de InSinkErator. Vea Cambio de la Botella Bio-Charge® para las instrucciones de seguridad y para información de cómo obtener los reemplazos del Bio-Charge®. No apriete la Botella Bio-Charge®; apretar la botella puede causar la salida y derrame del Bio-Charge®.

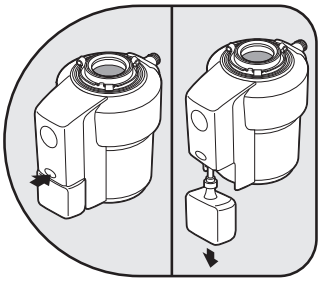


Desatornille la boquilla de la tapa dispensadora del Bio-Charge® hasta que la boquilla se mueva a la posición de dispensamiento. No retire la boquilla de la tapa dispensadora.



Alinee la botella con el lado cóncavo mirando al triturador y mantenga oprimido el botón mientras empuja la botella hacia el soporte de arriba. Suelte el botón. Hale la botella suavemente hacia abajo para asegurarse de que esté acoplada.

Cambio de la Botella Bio-Charge®
Para mantener su sistema séptico funcionando al máximo de eficiencia, reemplace la Botella Bio-Charge® cuando esté vacía o casi vacía. Para cambiar la Botella Bio-Charge®:



Asegúrese de que el triturador está apagado. Oprima el botón del triturador ubicado encima de la botella y hale la botella hacia abajo para retirarla. (No vuelva a llenar o a usar botellas vacías).

Bio-Charge® se encuentra disponible en donde se venda el Triturador Séptico InSinkErator®. Para volver a ordenar Bio-Charge®, preguntas o comentarios, llame al teléfono de llamada gratuita 1 (888) 527-1493.

GARANTÍA TOTAL DE SERVICIO POR 4 AÑOS EN SU HOGAR

Esta es una garantía que InSinkErator®, una división de Emerson Electric Co., ("InSinkErator", "Fabricante", "nosotros", "nos" o "nuestro") brinda al cliente original propietario del producto InSinkErator (el "Producto InSinkErator") y a cualquier otro propietario posterior de la residencia en la que se instaló originalmente el Producto ("Cliente", "usted" o "su").

InSinkErator le garantiza al Cliente que su Producto InSinkErator no tendrá defectos en el material o la mano de obra, sujetos a las exclusiones descritas a continuación, durante un período de 4 años (el "Período de garantía"), que comienza luego de: (a) la fecha en la que se instaló originalmente su Producto InSinkErator, (b) la fecha de compra o (c) la fecha de fabricación indicada por el número de serie de su Producto InSinkErator. Deberá presentar la documentación escrita correspondiente para justificar (a) o (b). En caso de que no pueda presentar la documentación para justificar (a) o (b), la fecha de inicio del Período de Garantía quedará a consideración del Fabricante, bajo su único y absoluto criterio, basado en el número de serie del Producto InSinkErator.

Qué cubre la garantía
Esta garantía cubre los defectos en el material o la mano de obra, sujetos a las exclusiones descritas a continuación, en lo que respecta a los Productos InSinkErator a los que el Cliente confiera un uso doméstico únicamente, e incluye todas las piezas de repuesto y los gastos de reparación. SU ÚNICO Y EXCLUSIVO RECURSO SEGÚN LOS TÉRMINOS DE ESTA GARANTÍA LIMITADA SERÁ LA REPARACIÓN O EL REEMPLAZO DEL PRODUCTO INSINKERATOR.

Qué no cubre la garantía
Esta garantía limitada no se extiende y excluye expresamente lo siguiente:
- Pérdidas, daños o incapacidad de operar el Producto InSinkErator, como resultado de circunstancias fuera del control del Fabricante, sin limitaciones, tales como: accidente, alteración, mal uso, abuso, abandono, negligencia (de otra persona que no sea el Fabricante), instalación, mantenimiento, ensamblaje o montaje inadecuados del Producto InSinkErator que no respeten las instrucciones del Fabricante o los códigos eléctricos y/o de plomería locales.
- Desgaste como resultado del uso normal del producto, lo que incluye sin limitaciones, oxidación de la superficie, rayones, abolladuras o pérdidas o daños similares y razonables. Además de las exclusiones antes descritas, esta garantía no se aplica en caso de que los Productos InSinkErator se instalen para fines industriales o comerciales.

No se aplica ninguna otra garantía expresa
Esta es la única y exclusiva garantía que se le brinda al Cliente descrito anteriormente. No se aplica ninguna otra garantía expresa, oral o escrita. No se autoriza a ningún empleado, agente, distribuidor u otra persona a alterar esta garantía limitada o a brindar cualquier otra garantía en nombre del Fabricante. Ninguna persona podrá modificar los términos de esta garantía, independientemente de si se trata del Fabricante, el propietario original o sus respectivos sucesores o beneficiarios.

Qué haremos para solucionar los problemas
Si su Producto InSinkErator no funciona de acuerdo con la documentación que usted recibió, o si tiene dudas acerca de su Producto InSinkErator o no sabe cómo determinar cuándo necesita servicio técnico, comuníquese con la línea de ayuda gratuita InSinkErator AnswerLine® al 1 (800) 558-5700 o bien, visite nuestra página web en www.insinkerator.com. También puede escribirnos a: Centro de Servicio InSinkErator, 4700 21st Street, Racine, Wisconsin, 53406, EE. UU.

En el reclamo de garantía debe especificar la siguiente información:
su nombre, dirección, número de teléfono, modelo y número de serie de su Producto InSinkErator y, si es necesario o si se lo solicitan, una confirmación por escrito de: (a) la fecha que figura en su recibo de instalación, o (b) la fecha que figura en su recibo de compra.

El Fabricante o el representante de servicio autorizado determinarán, bajo su único y absoluto criterio, si esta garantía cubre su Producto InSinkErator. Se le proporcionará la información de contacto del Centro de Servicio Autorizado de InSinkErator más cercano. Comuníquese directamente con dicho centro para recibir servicios de reparación o reemplazo cubiertos por la garantía en su hogar. El representante de servicio autorizado de InSinkErator es el único capaz de brindarle el servicio de garantía. InSinkErator no se hace responsable por los reclamos de garantía que surjan como consecuencia de trabajos realizados en su Producto InSinkErator por cualquier otra persona que no sea el representante de servicio autorizado de InSinkErator.

Si un reclamo cubierto se realiza durante el Período de Garantía, el Fabricante reparará o reemplazará su Producto InSinkErator por intermedio de su representante de servicio autorizado. Usted no deberá afrontar el costo de las piezas de repuesto o de un nuevo Producto InSinkErator, ni el costo de mano de obra para la reparación o instalación del Producto InSinkErator de reemplazo. El Fabricante o su representante de servicio autorizado, bajo su exclusivo criterio, determinarán si es necesaria la reparación o el reemplazo del producto. Recibirá todos los servicios de reparación o reemplazo en su hogar. Si el Fabricante determina que se debe reemplazar su Producto InSinkErator en vez de repararlo, la garantía del Producto InSinkErator de reemplazo se limitará al plazo vigente de la garantía original.

Limitación de responsabilidad
EN LA MEDIDA EN QUE LO PERMITA LA LEY, EL FABRICANTE O SUS REPRESENTANTES DE SERVICIO AUTORIZADOS NO SERÁN RESPONSABLES POR DAÑOS INCIDENTALES, ESPECIALES, INDIRECTOS O CONSECUENTES, TALES COMO DAÑOS PATRIMONIALES, YA SEA QUE SEAN CONSECUENCIA DEL INCUMPLIMIENTO, USO, MAL USO O INCAPACIDAD DE USAR EL PRODUCTO INSINKERATOR, O DE LA NEGLIGENCIA DEL FABRICANTE O SUS REPRESENTANTES DE SERVICIO AUTORIZADOS. EL FABRICANTE NO SERÁ RESPONSABLE POR LOS DAÑOS CAUSADOS POR EL RETRASO EN EL RENDIMIENTO Y EN NINGÚN CASO, SIN IMPORTAR EL TIPO DE RECLAMO O LAS MEDIDAS IMPLEMENTADAS (AUNQUE SE BASEN EN EL CONTRATO, UNA CONTRAVENCIÓN, LA NEGLIGENCIA, LA RESPONSABILIDAD ESTRICTA, OTRO AGRAVIO, ETC.), SU RESPONSABILIDAD EXCEDERÁ EL PRECIO QUE EL PROPIETARIO ORIGINAL HAYA PAGADO POR EL PRODUCTO INSINKERATOR.

El término "daños consecuentes" debe incluir, entre otros, la pérdida de ganancias anticipadas, la interrupción de los negocios, la falta de uso o ingresos, el costo del capital, o la pérdida o daño a la propiedad o al equipo.

Algunos estados prohíben la exclusión o limitación de los daños incidentales o consecuentes, de modo que estas limitaciones pueden no aplicarse en su caso. Esta garantía le otorga derechos legales específicos y también puede tener otros derechos que varían según el estado.

INSTRUCCIONES DE OPERACION

1. Retire el tapón del fregadero y haga correr agua fría.
2. Encienda el interruptor de pared para arrancar el triturador.
3. Introduzca lentamente los desperdicios de comida dentro del triturador. **¡PRECAUCIÓN!** Coloque el tapón para disminuir la posibilidad de que los materiales salgan despedidos durante la trituración.
4. Luego de que la trituración esté completa, apague el triturador y deje correr el agua durante unos segundos para enjuagar la línea de drenaje.

LO QUE DEBE HACER

- Primero haga correr el agua fría y luego encienda el triturador. Después de que termine la trituración, deje correr el agua durante varios segundos para enjuagar la línea de drenaje.
- Triture materiales duros como huesos pequeños, carozos de frutas y hielo. Las partículas crean una acción de restregado en el interior de la cámara de trituración.
- Triture cáscaras de frutas cítricas para refrescar el olor del drenaje.
- Utilice un limpiador, desengrasante o desodorante para trituradores cuando sea necesario a fin de eliminar malos olores causados por la acumulación de grasa.

⚠ PRECAUCIÓN

Revise periódicamente el triturador y los acoples de plomería para ver si hay fugas de agua, ya que éstas pueden ocasionar daños a la propiedad. El fabricante no es responsable de los daños a la propiedad resultantes de las fugas de agua.

LO QUE NO DEBE HACER

- ***NO VIERTA GRASA NI ACEITE EN EL TRITURADOR NI EN NINGÚN DRENAJE. ESTOS MATERIALES SE PUEDEN ACUMULAR EN LAS CAÑERÍAS Y TAPAR EL DRENAJE. COLOQUE LA GRASA EN UN FRASCO O LATA Y DESÉCHELO EN LA BASURA.***
- No use agua caliente para triturar desperdicios de comidas. Puede dejar correr agua caliente en el triturador entre períodos de trituración.
- No llene el triturador con demasiadas cáscaras de vegetales al mismo tiempo. Primero abra la llave del agua y encienda el triturador y luego coloque las cáscaras gradualmente.
- No triture grandes cantidades de cáscaras de huevo ni materiales fibrosos como barbas del choclo, alcachofas, etc., pues ello podría obstruir el drenaje.
- No apague el triturador hasta que la trituración esté completa y sólo se escuche el sonido del motor y del agua.

INSTRUCCIONES DE MANTENIMIENTO PARA EL USUARIO

LIMPIEZA DEL TRITURADOR

Con el tiempo, las partículas de comida se pueden acumular en la cámara de trituración y el deflector. Los malos olores provenientes del triturador son generalmente un signo de acumulación de grasa y comida causada por el flujo de agua insuficiente durante y después del uso del triturador. Para limpiar el triturador:

1. Apague el triturador y desconecte la corriente eléctrica.
2. Coloque el tapón en la abertura del fregadero y llénelo con agua tibia hasta la mitad.
3. Mezcle 1/4 de taza de bicarbonato de sodio con agua. Encienda el triturador y retire el tapón del fregadero al mismo tiempo para eliminar las partículas sueltas.
4. Retire el deflector del fregadero Quiet Collar® y límpielo a mano o en el lavavajillas. No opere el triturador sin el deflector del fregadero Quiet Collar® en su lugar.

Los trituradores también se pueden limpiar con Disposer Care®. InSinkErator no vende este producto, pero gene-ralmente se lo consigue en las principales tiendas de artículos para el hogar, en ferreterías y en tiendas de abarrotes. Si desea obtener más información sobre Disposer Care®, comuníquese con Summit Brands al 1-888-476-6688 o visite www.summitbrands.com.

CÓMO LIBERAR LAS OBSTRUCCIONES DEL TRITURADOR

Si el motor se detiene durante el funcionamiento del triturador, podría estar bloqueado. Para liberar las obstrucciones:

1. Apague el triturador y cierre la llave de agua.
2. Inserte un extremo de la llave incorporada Jam-Buster™ en el orificio central, en el fondo del triturador (ver Figura A). Mueva la llave Jam-Buster™ hacia adelante y hacia atrás hasta que gire una vuelta completa. Quite la llave Jam-Buster™.
3. Introduzca unas tenazas dentro del triturador y retire el objeto u objetos. Deje enfriar el motor durante 3 a 5 minutos y luego oprima suavemente el botón de reposición rojo ubicado en la parte inferior del triturador (ver Figura B). (Si el motor no funciona, revise el panel de servicio para ver si hay interruptores de circuito activados o fusibles quemados.)

Figura A

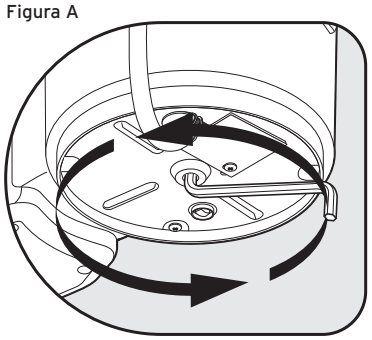
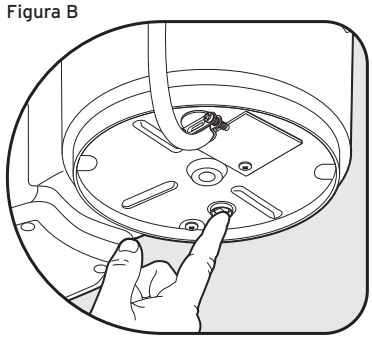


Figura B



INSTRUCCIONES CORRESPONDIENTES A RIESGO DE INCENDIO, DESCARGAS ELÉCTRICAS O LESIONES A PERSONAS (GUARDE ESTAS INSTRUCCIONES)

INSTRUCCIONES IMPORTANTES PARA SU SEGURIDAD

⚠ ADVERTENCIA **Al usar artefactos electrodomésticos, siempre se deben tomar precauciones básicas, las que incluyen:**

- Lea todas las instrucciones antes de utilizar el aparato.
- Para reducir el riesgo de lesiones, se requiere estrecha supervisión cuando se usa un artefacto cerca de niños.
- No ponga los dedos ni las manos dentro de un triturador de desperdicios.
- Coloque el interruptor de encendido en la posición de apagado antes de tratar de eliminar un atasco, retirar un objeto del triturador de desperdicios o presionar el botón de reposición.
- Cuando intente desatascar un triturador de desperdicios de comida, utilice la llave incorporada Jam-Buster™.
- Al tratar de extraer objetos de un triturador de desperdicios use tenazas o pinzas de mango largo.
- Para reducir el riesgo de sufrir lesiones pormateriales que salgan despedidos del triturador dedesperdicios, no lo opere sin tener el deflector del fregadero Quiet Collar® en su lugar. No coloque lossiguientes elementos dentro de un triturador: conchas de almejas u ostras, limpiadores de drenajecáusticos o productos similares, vidrio, loza o plástico, metales (como tapas de botellas, granalla de acero, latas o utensilios), grasa caliente u otros líquidos calientes.
- Cuando el triturador no esté en funcionamiento, deje la tapón del drenaje en su lugar para reducir el riesgo de que algún objeto caiga en el triturador.
- Este producto está diseñado para deshacerse de desperdicios normales de los alimentos hogareños; insertar materiales que no son desperdicios en el triturador podría ocasionar lesiones personales o daños a la propiedad.
- Para reducir el riesgo de lesiones, no utilice el fregadero o pileta que contiene el triturador para tar eas que no sean de preparación de los alimentos (como bañar a un bebé o lavarse el cabello).
- No elimine ninguno de los siguientes elementos en el triturador: pinturas, solventes, limpiadores de uso doméstico, productos químicos, líquidos para automóviles o envolturas de plástico.
- Para evitar que cualquier material ingrese o salga despedido y que se salpique agua, reemplace el deflector del fregadero Quiet Collar® cuando éste se desgaste.
- PELIGRO DE INCENDIO: No guarde artículos inflamables, como trapos, papel o aerosoles, cerca del triturador. No guarde ni utilice gasolina ni otros vapores o líquidos inflamables cerca del triturador.

GUARDE ESTAS INSTRUCCIONES

⚠ ADVERTENCIA

Lesiones personales: No coloque la cabeza ni el cuerpo debajo del triturador, ya que la unidad podría caerse mientras lo retira o instala.

⚠ PRECAUCIÓN

No opere el triturador sin el Dispositivo Anti-Vibration Tailpipe Mount™ ya que puede haber fugas de agua.

INSTRUCCIONES PARA LA CONEXIÓN A TIERRA

Instrucciones para todos los trituradores con conexión a tierra conectados por cable:
El triturador debe estar conectado a tierra a fines de reducir el riesgo de descarga eléctrica en caso de mal funcionamiento o avería. La conexión a tierra proporciona una vía de menor resistencia para la corriente eléctrica. Este triturador está equipado con un cable que tiene un conductor de conexión a tierra del equipo y un enchufe de conexión a tierra. El enchufe debe estar conectado a un tomacorriente que esté instalado correctamente y con conexión a tierra de acuerdo con todos los reglamentos y códigos locales.

Instrucciones para los trituradores de desperdicios de comida de conexión permanente:
El triturador debe estar conectado a un sistema de cableado permanente de metal y con conexión a tierra, o bien el conductor de conexión a tierra del equipo debe funcionar junto con los conductores de circuito y estar conectado al cable o terminal con conexión a tierra del equipo del triturador.

⚠ PRECAUCIÓN

No utilice masilla de plomería ni ninguna otra conexión del triturador que no sea la brida del fregadero. No utilice sellador de rosca ni grasa para rosca de cañerías. Estos productos pueden dañar el triturador y ocasionar daños a la propiedad.

⚠ ADVERTENCIA

La conexión incorrecta del conductor de conexión a tierra del equipo puede representar un riesgo de descarga eléctrica. Consulte a un electricista calificado o especialista en reparaciones si tiene dudas sobre la conexión a tierra del triturador. Si el enchufe que viene con el triturador no coincide con el tipo de tomacorriente, no altere el enchufe ni lo fuerce para que entre en el tomacorriente; pídale a un electricista calificado que instale un tomacorriente adecuado.

- Ce broyeur doit être correctement mis à la terre.
- Ne pas fixer de fil de mise à la terre au tuyau d'alimentation du gaz.
- Couper l'alimentation électrique avant d'installer ou de réparer le broyeur.
- Si une fiche de mise à la terre à trois branches est utilisée, celle-ci doit être insérée dans une prise de trois trous mise à la terre.
- Tout le câblage utilisé doit être conforme aux codes de l'électricité locaux en vigueur.
- Ne pas remettre le courant au panneau principal avant que des conducteurs de mise à la terre ne soient installés.

Los trituradores de desperdicios de comida proporcionan una alternativa ecológica para evitar el transporte de los desperdicios de comida a basureros. Y pueden ayudar a reducir las emisiones de los gases que provocan el efecto invernadero. En las plantas de tratamiento de aguas residuales adecuadas, los desperdicios de comida pueden transformarse en biosólidos y utilizarse como fertilizantes. Estas plantas también pueden reciclar los desperdicios de comida para producir energía renovable. (Constátelo con la planta de su área).

Para EEUU www.insinkerator.com/green Para Canadá www.insinkerator.ca

InSinkErator® se réserve le droit, à sa seule discrétion, d'apporter en tout temps des améliorations ou des modifications aux spécifications sans préavis ou obligation de sa part, ou de modifier ou de supprimer des modèles.

La configuration du collier de fixation est une marque de commerce de Emerson Electric Co.

LG LAUNDRY

WM1388HW

2.2 cu.ft. Compact Front Load Washer

NO. 166.01 WASHER, U/C

KEY FEATURES

2.3 cu.ft. Capacity

Compact Front Load Washer

14 Wash Programs

1,400 RPM

Internal Heater

NFC Tag On

ENERGY STAR® Qualified

PRODUCT FEATURES

CAPACITY	
Capacity	2.3 cu. ft.
ENERGY	
ENERGY STAR® Qualified	•
APPEARANCE	
Design Look	Front Control
Touch LED Display	•
Dial-A-Cycle™	•
WASH/DRY PROGRAMS	
No. of Programs	14
Wash Programs	Cotton/Normal, Bulky/Large, Baby Wear, Perm. Press, Delicates, Hand Wash/Wool, Speed Wash, Tub Clean, Sanitary, Heavy Duty, Drain+Spin, Color Care, Sports Wear, Downloaded Course
No. of Options	10
Options	Prewash, Rinse+Spin, Delay Wash(Time Delay), Water Plus, Extra Rinse, Child Lock, Signal (Beeper) On/Off, Custom PGM, PGM Save, Signal
No. of Wash/Rinse Temps	5 Extra Hot, Hot, Warm, Cold, Tap Cold (All Cold Rinses)
Spin Speeds	Extra High (1,400 max.), High, Medium, Low, No Spin
No. of Water Levels	Automatically adjusts to the size of load
No. of Soil Levels	3
Internal Heater	•
CONVENIENCE FEATURES	
TrueBalance™ Anti-Vibration System"	•
4 Tray Dispenser	•
LoDecibel™ Quiet Operation	•
End of Cycle Beeper	•
LoadSense	•
Forced Drain System	•
SMART THINQ™ TECHNOLOGY	
SmartDiagnosis™	•
NFC Tag On Technology	•

MOTOR AND AGITATOR	
Motor Type	Inverter Direct Drive Motor
Motor Speed	Variable
Max RPM	1,400
Axis	Horizontal
MATERIALS AND FINISHES	
NeveRust™ Stainless Steel Drum	•
Cabinet	PCM
Control Panel	Plastic
Top Plate	TBD
Door Rim	Glass/Chrome
Door Cover	Black Tinted Cover
Door Opening	13.8"
Available Colors	White (W)
POWER SOURCE	
Ratings	TBD
Electrical Requirements	120V, 10 Amps
Type	Electric
ACCESSORIES	
Hose Included	•
DIMENSIONS	
Product (WxHxD)	24" x 33 1/2" x 25 1/4" (45" D with door open)
Carton (WxHxD)	26" x 35 3/4" x 27 3/4"
Weight (Product/Carton)	147.7 lbs / 156.5 lbs
LIMITED WARRANTY	
	1 Year Parts and Labor, 10 Years Motor, Lifetime on Drum
UPC CODES	
WM1388HW Washer (White)	048231 016971
DLEC888W Dryer (White)	048231 018371

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LG LAUNDRY

DLEC888W

24" 4.2 cu.ft. Compact Electric Condensing Dryer

NO. 166.02 DRYER, COMMERCIAL, U/C

KEY FEATURES

4.2 cu.ft. Capacity

24" Wide Compact Electric Condensing Dryer

14 Dryer Programs

10 Options

Sensor Dry System

NFC Tag On

Wrinkle Care Option

Delicates Cycle

Stackable with Matching Washer (WM1388HW)
(Stacking Kit is included with the product)

PRODUCT FEATURES

CAPACITY	
Capacity	4.2 cu. ft.
APPEARANCE	
Design Look	Front Control Panel
Intelligent Electronic Controls with Touch LED Display	•
Dial-A-Cycle	•
DRYER PROGRAMS	
No. of Programs	14
Programs (Sensor Dry)	Cotton, Mixed Fabric, Easy Care, Bulky Item, Jeans, Skin Care, Quick Dry
Programs (Manual Dry	Sports Wear, Delicate, Wool, Download Cycle Cool Air, Gentle Air, Warm Air
No. of Options	10
Options	Gentle, Damp Dry Beep, More Time, Less Time, Time Delay, Custom Program Wrinkle Care, Drum Light, Child Lock, Time Dry
Temperature Settings	High, Medium High, Medium, Low, Ultra Low
Drying Levels	Very Dry, More Dry, Normal Dry, Less Dry, Damp Dry
Manual Dry Times	60 min., 20 min., More Time/Less Time
CONVENIENCE FEATURES	
End of Cycle Signal	•
Drum Light	•
Leveling Legs	4 Adjustable Legs
Remaining Time Display/Status Indicator(s)	•
SMART THINQ™ TECHNOLOGY	
NFC Tag On	•
SmartDiagnosis™	•
MATERIALS AND FINISHES	
NeveRust™ Stainless Steel Drum	•
Tub Rear	•
Cabinet	PCM
Control Panel	Plastic
Door/Rim	Glass/Chrome
Door Cover	Black Tint Cover
Available Colors	White (W)

POWER SOURCE	
Ratings	TBD
Electrical Requirements	240V, 30 Amps (Electric)
Type	Electric (product lating label 13A)
ACCESSORIES	
Stacking Kit (Comes with Dryer)	5001EL2001H
DIMENSIONS	
Product (WxHxD)	24" x 33 1/2" x 25 1/4" (45" D with door open)
Carton (WxHxD)	26" x 35 3/4" x 27 3/4"
Weight (Product/Carton) Electric	105 lbs / 115 lbs
LIMITED WARRANTY	
	1 Year Parts and Labor
UPC CODES	
DLEC888W Dryer (White)	048231 018371
WM1388HW Washer (White)	048231 016971

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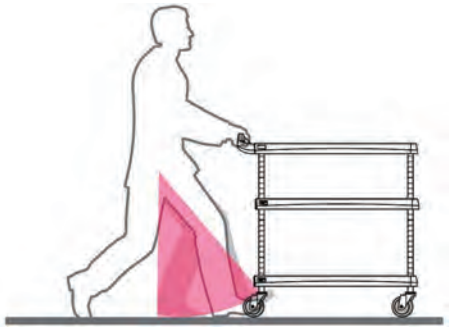
Item # NO. 173 CART, UTILITY (3 SHELF)

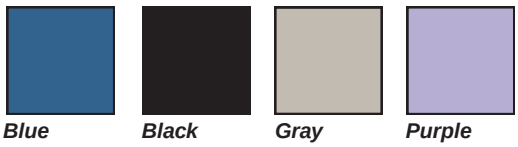
Job _____

POLYMER UTILITY CART: myCart Series™

- **User-Friendly:** Ergonomic handle and additional legroom puts more distance between the shelves and you. You can push the cart more freely without hitting your shins and feet against the cart.
- **Convenient:** The utility tray is roomy enough to store every day objects. It offers 2x the amount of space than traditional utility carts; which allows for objects to fit in comfortably.
- **Personalized:** Each cart comes with two labels for easy identification.
- **Ultimate Cleanability:** Smooth polymer shelf surfaces with contoured edges are designed to resist staining and wipe clean easily.
- **Corrosion-Proof Shelves:** All-polymer shelves will never corrode.
- **Sturdy Construction:** Impact resistant shelves are designed to withstand daily abuse.

  Weight capacities evenly distributed:
  - MY1627 and MY2030 models: 150lbs. (68kg) per shelf, not to exceed 300lb (136kg) on a 2-shelf cart and 400 lb. (181kg) on a 3-shelf cart.
  - MY2636 Models: 200lbs. (90kg) per shelf, not to exceed 400 lb. (181kg) on a 2-shelf cart and 500 lbs. (227kg) on a 3-shelf cart.
- **Contains Spills:** 7/16" (11mm) ship's edge retains small spills and prevents items from sliding off during transport.
- Specific Models with Microban® product protection: The blue MyCart has built in Microban product protection. This inhibits the growth of bacteria, mold, mildew, and fungi that cause odors, stains, and product degradation.
- **Attractive Aesthetics** allow for use in a variety of applications.
- **2-tier and 3-tier models available**
- **Easy-to-Adjust:** Optional center shelf adjusts on 1" (25mm) increments.
- **Easy, No-Tool Assembly:** Ships knocked down.
- **myCart Series™ is NSF listed** NSF





Blue *Black* *Gray* *Purple*

Microban antimicrobial product protection

*Microban® antimicrobial protection inhibits the growth of stain and odor-causing bacteria on Starsys, keeping the surface areas "cleaner between cleanings."

InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com

POLYMER UTILITY CART: myCart Series™

Short Form Specs — Base Models:

- Cart, Utility, consisting of at least 2 high-density polyethylene, injection-molded shelves and 4 chrome-plated posts. Handle shelf will have an integrated utility tray with a base width of 1.8-2.2" (46-56mm) and coved corners. Flat shelf will have a built in 3" (76mm) cutaway. All shelves will have a built-in $^{7}/_{16}$" (11mm) deep ship's edge around the perimeter. 2-shelf cart design is such that user may add an intermediate shelf if deemed necessary that adjusts on 1" (25mm) increments. Cart will include two nominal 4.625" L x .88" H (117.475 x 22.352mm) labels for easy identification.
- 1627 and 2030 models: Roll on four 4" (102mm) diameter thermoplastic, mark-resistant swivel/stem casters.
- 2636 models: Roll on four 5" (127mm) diameter thermoplastic, mark-resistant swivel/stem casters.

Construction:

- Continuous Usage Temperature: -20/120°F (-29/49°C)
- Carts are not intended for cart wash applications
- Casters
  4" (102mm) swivel caster: Thermoplastic, non-marking gray tread. Plated horn and axle.
  Replacement part: RPBC4M-4, bag of four.
  5" (127mm) swivel caster: Resilient rubber material, plated horn and axle.
  Replacement part: 5M, sold individually.

Configurations:

- 2-tier and 3-tier models
- MY1627 and MY2030 Base Model Specs: Chrome posts, 4" (102mm) non-marking swivel casters.
- MY2636 Base Model Specs: Chrome posts, 5" (127mm) swivel resilient rubber casters

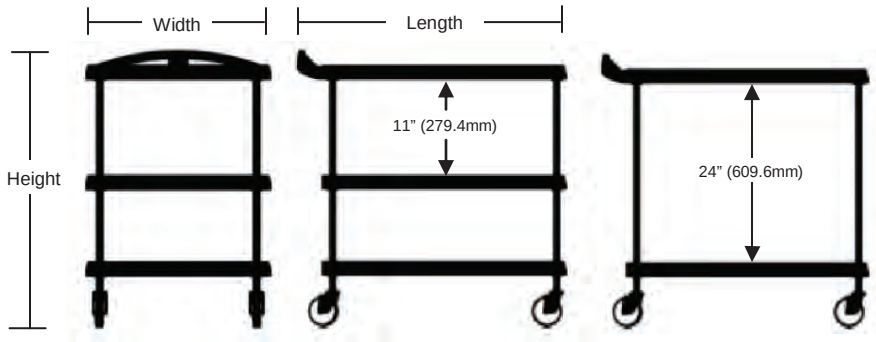
Model No. Gray	Model No. Black	Model No. Blue with Antimicrobial	Actual Width/Length/Height Including the Handle (in.)	(mm)	Description	Posts	Load Rating per Cart (lbs.)	(kg)	Approx. Pkd. Wt. (lbs.)	(kg)
MY1627-24G	MY1627-24BL	MY1627-24BU	$18^{5}/_{16}$x$31^{1}/_{2}$x$35^{1}/_{2}$	465.2x800.1x901.7	2-shelf base model	chrome-plated	300	136	28.5	12.93
MY1627-34G	MY1627-34BL	MY1627-34BU	$18^{5}/_{16}$x$31^{1}/_{2}$x$35^{1}/_{2}$	465.2x800.1x901.7	3-shelf base model	chrome-plated	400	181	34	15.42
MY2030-24G	MY2030-24BL	MY2030-24BU	$23^{7}/_{16}$x$34^{3}/_{8}$x$35^{1}/_{2}$	595.3x873.3x901.7	2-shelf base model	chrome-plated	300	136	33	14.97
MY2030-34G	MY2030-34BL	MY2030-34BU	$23^{7}/_{16}$x$34^{3}/_{8}$x$35^{1}/_{2}$	595.3x873.3x901.7	3-shelf base model	chrome-plated	400	181	41.5	18.82
MY2636-25G	MY2636-25BL	MY2636-25BU	$27^{11}/_{16}$x$40^{1}/_{4}$x$36^{7}/_{8}$	703.3x1022.4x936.6	2-shelf base model	chrome-plated	400	181	40	18.14
MY2636-35G	MY2636-35BL	MY2636-35BU	$27^{11}/_{16}$x$40^{1}/_{4}$x$36^{7}/_{8}$	703.3x1022.4x936.6	3-shelf base model	chrome-plated	500	227	51	23.13

New! Purple myCart:

Model No. Purple	Actual Width/Length/Height Including the Handle (in.)	(mm)	Description	Posts	Load Rating per Cart (lbs.)	(kg)	Approx. Pkd. Wt. (lbs.)	(kg)
MY2030-24AP	$23^{7}/_{16}$x$34^{3}/_{8}$x$35^{1}/_{2}$	595.3x873.3x901.7	2-shelf base model	chrome-plated	300	136	33	14.9
MY2030-34AP	$23^{7}/_{16}$x$34^{3}/_{8}$x$35^{1}/_{2}$	595.3x873.3x901.7	3-shelf base model	chrome-plated	400	181	41.5	18.8

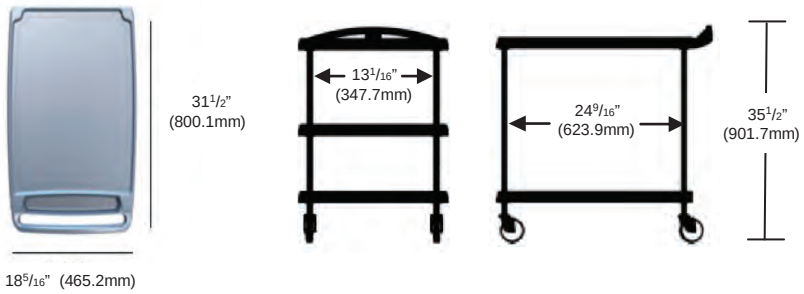
POLYMER UTILITY CART: myCart Series™

Dimensions:



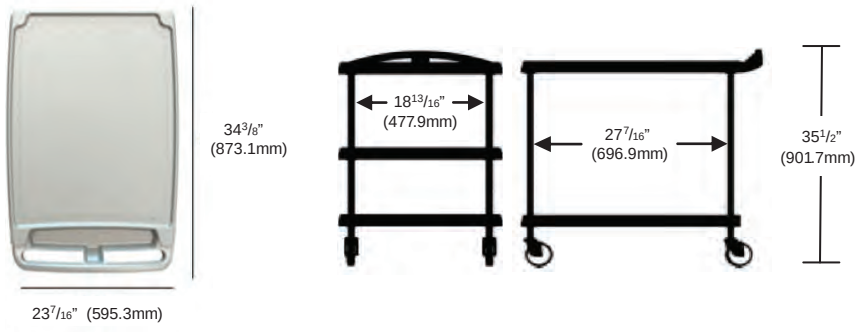
MY1627

- Easy-grip handle and utility tray
- Small footprint for tight spaces
- Accommodates Metro tote boxes and ISO totes



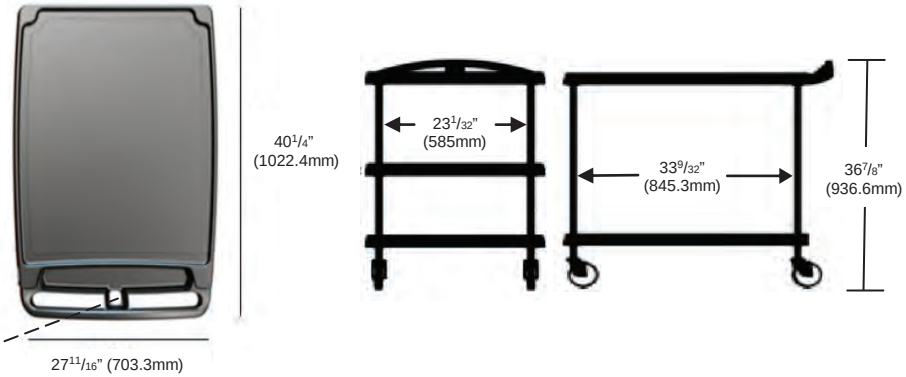
MY2030

- Cart handle has built-in recessed support channels to manage odd shaped items
- Sized for standard racks
  (1) Glass/dish rack
  (2) milk crates
  (2) bus box [on top shelf
  (1) bus box + (1) silverware tote [on mid/bottom shelf]



MY2636

- Top shelf can accommodate:
  (2) nominal 18 x 26" (457 x 660mm) polycarbonate totes side by side
  (2) Metro totes measuring 17 1/2 x 22 1/2" (445 x 571mm) side by side
- Cart handle has built in slot to hold scanners



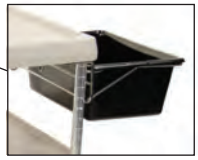
Job _____

POLYMER UTILITY CART: myCart Series™

Accessories:

Waste Basket

Utility Bin



Specifications:
Bin — ABS Thermoplastic
Wastebasket — Polyethylene

Model No.	Description	Fits Cart	Width/Height/Depth (in.)	Width/Height/Depth (mm)	Approx. Pkd. Wt. (lbs.)	Approx. Pkd. Wt. (kg)
MYWB1	Wastebasket (including holder)	MY1627	17 7/8 x 16 1/4 x 14 3/4	454 x 413 x 375	5.7	2.5
MYWB2	Wastebasket (including holder)	MY2030	23 x 16 1/4 x 14 3/4	584 x 413 x 375	5.8	2.6
MF222	Wastebasket Only	MY1627, MY230	14 3/8 x 15 3/8 x 10 3/8	365 x 391 x 264	2.8	1.3
MYUB1	Utility Bin (including holder)	MY1627	17 7/8 x 7 x 15 1/4	454 x 178 x 387	5	2.2
MYUB2	Utility Bin (including holder)	MY2030	23 x 7 x 15 1/4	584 x 178 x 387	5.1	2.3
UB1	Utility Bin Only	MY1627, MY230	16 3/8 x 6 x 11	416 x 152 x 279	2	0.9

Personalization Label

Constructed of polyester material with a clear polyester flap to protect written information from wiping off.

Model No.	Description	Length/Height (in.)	Length/Height (mm)
MYCARTLBL-10PK	Pack of 10 Personalized Labels	4 3/5 x 7/8	117.5 x 22.4

All Metro Catalog Sheets are available on our website: **www.metro.com**

InterMetro Industries Corporation
North Washington Street, Wilkes-Barre, PA 18705
Phone: 570-825-2741
Product Information. U.S. and Canada: 1.800.992.1776
Outside U.S. and Canada: www.metro.com/contactus

Printed in U.S.A Rev. 4/15

Information and specifications are subject to change without notice. Please confirm at time of order

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ADVANCE TABCO®
SMART FABRICATION™

STAINLESS STEEL

WALL SHELVES NSF

NO. 174 SHELF, WALL 36"

Item #: _____ Qty #: _____

Model #: _____

Project #: _____

FEATURES:

Brackets can be positioned to accommodate wall studs.

Furnished with a 1-5/8" Bullnose edge with a 1-1/2" turn-up edge at rear. Ends are turned down square.

MATERIAL:

16 Gauge Series - 304 stainless steel polished to a satin finish.

18 Gauge Series - 430 stainless steel polished to a satin finish.

CONSTRUCTION:

Secured to wall by means of bolts through support brackets.

Units 7 ft. and larger are furnished with 3 brackets.

	10" Wide			12" Wide			15" Wide			18" Wide			
L	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	Approx. Cu. Ft.
24"	WS-10-24-16	WS-10-24	8 lbs.	WS-12-24-16	WS-12-24	9 lbs.	WS-15-24-16	WS-15-24	11 lbs.	WS-18-24-16	WS-18-24	14 lbs.	3
36"	WS-10-36-16	WS-10-36	10 lbs.	WS-12-36-16	WS-12-36	12 lbs.	WS-15-36-16	WS-15-36	15 lbs.	WS-18-36-16	WS-18-36	21 lbs.	4
48"	WS-10-48-16	WS-10-48	12 lbs.	WS-12-48-16	WS-12-48	14 lbs.	WS-15-48-16	WS-15-48	18 lbs.	WS-18-48-16	WS-18-48	24 lbs.	5
60"	WS-10-60-16	WS-10-60	15 lbs.	WS-12-60-16	WS-12-60	17 lbs.	WS-15-60-16	WS-15-60	23 lbs.	WS-18-60-16	WS-18-60	28 lbs.	6
72"	WS-10-72-16	WS-10-72	17 lbs.	WS-12-72-16	WS-12-72	21 lbs.	WS-15-72-16	WS-15-72	28 lbs.	WS-18-72-16	WS-18-72	32 lbs.	7
84"	WS-10-84-16	WS-10-84	20 lbs.	WS-12-84-16	WS-12-84	25 lbs.	WS-15-84-16	WS-15-84	32 lbs.	WS-18-84-16	WS-18-84	36 lbs.	8
96"	WS-10-96-16	WS-10-96	23 lbs.	WS-12-96-16	WS-12-96	28 lbs.	WS-15-96-16	WS-15-96	36 lbs.	WS-18-96-16	WS-18-96	42 lbs.	10
108"	WS-10-108-16	WS-10-108	28 lbs.	WS-12-108-16	WS-12-108	32 lbs.	WS-15-108-16	WS-15-108	40 lbs.	WS-18-108-16	WS-18-108	48 lbs.	11
120"	WS-10-120-16	WS-10-120	32 lbs.	WS-12-120-16	WS-12-120	36 lbs.	WS-15-120-16	WS-15-120	44 lbs.	WS-18-120-16	WS-18-120	54 lbs.	12
132"	WS-10-132-16	WS-10-132	36 lbs.	WS-12-132-16	WS-12-132	42 lbs.	WS-15-132-16	WS-15-132	49 lbs.	WS-18-132-16	WS-18-132	60 lbs.	13
144"	WS-10-144-16	WS-10-144	40 lbs.	WS-12-144-16	WS-12-144	48 lbs.	WS-15-144-16	WS-15-144	55 lbs.	WS-18-144-16	WS-18-144	66 lbs.	14

ADVANCE TABCO®
SMART FABRICATION™
www.advancetabco.com

Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

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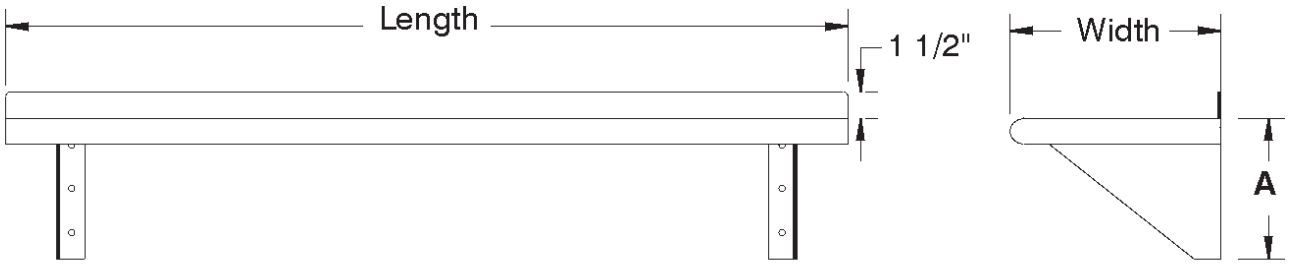
Email: customer@advancetabco.com or **Fax:** 631-242-6900

For Smart Fabrication™ Quotes:
Email: smartfab@advancetabco.com or **Fax:** 631-586-2933

DETAILS and SPECIFICATIONS

TOL ± .500”

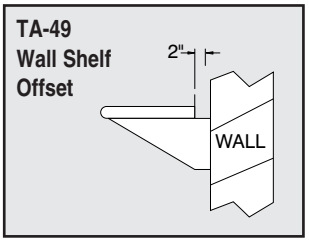
ALL DIMENSIONS ARE TYPICAL



Width	A
10”	8 1/2”
12”	10 1/2”
15”	13 1/2”
18”	16 1/2”

Wall Shelf Options

PRT-1	Printer Shelf
TA-22A	Square Edge Shelf
TA-26	Welded Shelf Brackets
TA-49	Wall Shelf 2” Offset
TA-71	Heat Lamp Provision
TA-77	Check Minder
TA-77A	Concealer for Heat Lamp (Requires TA-77)
TA-99A	14 Ga. S/S 304 Upgrade for Overshelves
TA-100A	Bullnose Edge On All 4 Sides of Shelf
TA-102	6” Cantilever Shelf Offset



Requirements for NSF Installations

1. Install at least 60” above floor.
2. Limit to dry storage.
3. Avoid contact with liquids.
4. For “Ganging-Up” installation, allow at least 2” between units or mount units side by side and seal joints with an approved sealant.

ADVANCE TABCO

SMART FABRICATION™

200 Heartland Boulevard, Edgewood, NY 11717-8380

ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

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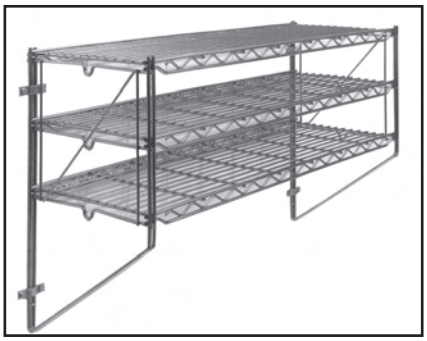
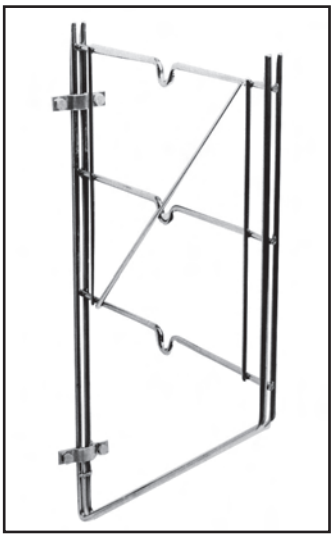
Item # NO. 174.01 SHELF, WIRE, WALL MOUNT

Job _____





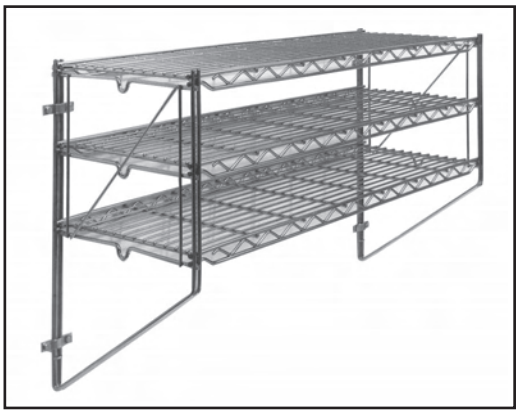
REGULAR ERECTA SHELF®
SHELVING ACCESSORIES

- **Wall Mounts:** Used to create wall-mounted shelving units with 12" or 18" (305 or 460mm) regular Erecta Shelf® shelves of any length. Models are available to accommodate from one to five shelves. Each mount consists of shelf support and mounting brackets. Wall bolts or screws not included; they must be selected according to type of wall. Order shelves from sheet #10.50.

Dimensions:

Width (in.)	Width (mm)	Height (in.)	Height (mm)	Capacity	Model No. Chrome	Approx. Pkd. Wt. (Pr.) (lbs.)	(kg)
12	305	10 3/4	273	1 shelf	12WB1C	2 1/2	1
12	305	20 13/16	529	1 to 3 shelves	12WB3C	5	2
12	305	30 7/16	783	1 to 5 shelves	12WB5C	7 3/4	3 1/4
18	460	11 3/4	298	1 shelf	18WB1C	3	1 1/2
18	460	21 5/8	549	1 to 3 shelves	18WB3C	6	2 3/4
18	460	31 5/8	803	1 to 5 shelves	18WB5C	8 1/2	4

For additional mounting brackets (single) order. **Model No. 9975C**
Double mounting brackets are also available for use where continuous wall shelving is to be installed. **Model No. 9976C**



- **Wall Kit:** Kit includes two shelves, shelf supports, and mounting brackets. Wall bolts and screws not included; they must be selected according to type of wall.

Model No.	Shelf Length (in.)	Shelf Length (mm)	Overall Length (in.)	Overall Length (mm)	Shelf Width (in.)	Shelf Width (mm)	Overall Width (in.)	Overall Width (mm)	Overall Height (in.)	Overall Height (mm)	Approx. Pkd. Wt. (lbs.)	(kg)
12WS12C	24	610	26 1/4	670	12	305	13	330	21	530	18 1/2	8 1/4
12WS32C	36	910	38 1/4	970	12	305	13	330	21	530	25 1/4	11 1/2
12WS52C	48	1220	50 3/4	1275	12	305	13	330	21	530	32	14 3/4

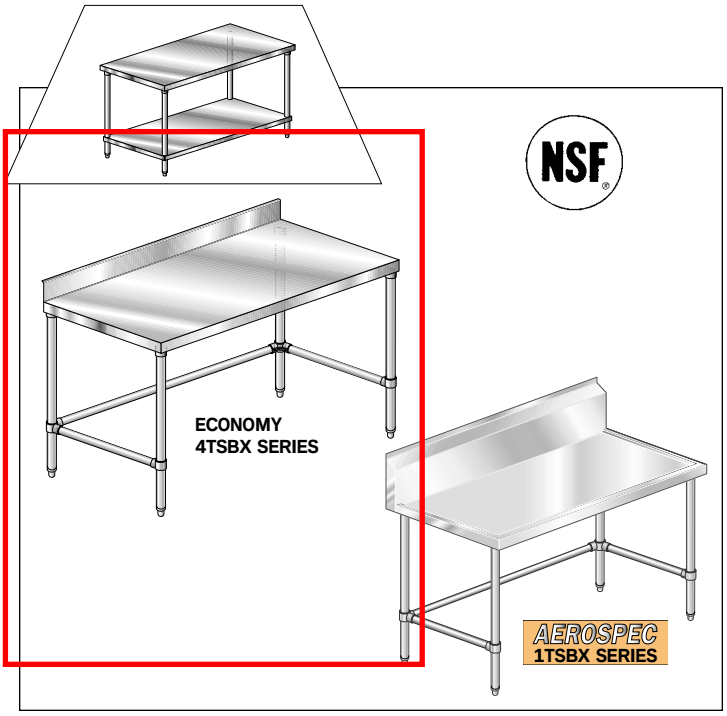
Kit packaged in one box and UPS shippable.

InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com

EMERSON

WORK TABLE

TSBX SERIES 4" & 10" Backsplash, S/S Legs and Crossbracing



Item#_____Project_____

Quantity	ECONOMY 16GA 430 Model #	DELUX 16GA 304 Model #	PREMIUM 14GA 304 Model #	AEROSPEC 14GA 304 Model #
24" WIDE				
____	4TSBX–2424	3TSBX–2424	2TSBX–2424	1TSBX-2424
____	4TSBX–2430	3TSBX–2430	2TSBX–2430	1TSBX-2430
____	4TSBX–2436	3TSBX–2436	2TSBX–2436	1TSBX-2436
____	4TSBX–2448	3TSBX–2448	2TSBX–2448	1TSBX-2448
____	4TSBX–2460	3TSBX–2460	2TSBX–2460	1TSBX-2460
____	4TSBX–2472	3TSBX–2472	2TSBX–2472	1TSBX-2472
____	4TSBX–2484	3TSBX–2484	2TSBX–2484	1TSBX-2484
____	4TSBX–2496	3TSBX–2496	2TSBX–2496	1TSBX-2496
____	4TSBX–24108	3TSBX–24108	2TSBX–24108	1TSBX-24108
____	4TSBX–24120	3TSBX–24120	2TSBX–24120	1TSBX-24120
____	4TSBX–24132	3TSBX–24132	2TSBX–24132	1TSBX-24132
____	4TSBX–24144	3TSBX–24144	2TSBX–24144	1TSBX-24144
30" WIDE				
____	4TSBX–3024	3TSBX–3024	2TSBX–3024	1TSBX-3024
____	4TSBX–3030	3TSBX–3030	2TSBX–3030	1TSBX-3030
____	4TSBX–3036	3TSBX–3036	2TSBX–3036	1TSBX-3036
____	4TSBX–3048	3TSBX–3048	2TSBX–3048	1TSBX-3048
____	4TSBX–3060	3TSBX–3060	2TSBX–3060	1TSBX-3060
____	4TSBX–3072	3TSBX–3072	2TSBX–3072	1TSBX-3072
____	4TSBX–3084	3TSBX–3084	2TSBX–3084	1TSBX-3084
____	4TSBX–3096	3TSBX–3096	2TSBX–3096	1TSBX-3096
____	4TSBX–30108	3TSBX–30108	2TSBX–30108	1TSBX-30108
____	4TSBX–30120	3TSBX–30120	2TSBX–30120	1TSBX-30120
____	4TSBX–30132	3TSBX–30132	2TSBX–30132	1TSBX-30132
____	4TSBX–30144	3TSBX–30144	2TSBX–30144	1TSBX-30144
36" WIDE				
____	4TSBX–3636	3TSBX–3636	2TSBX–3636	1TSBX-3636
____	4TSBX–3648	3TSBX–3648	2TSBX–3648	1TSBX-3648
____	4TSBX–3660	3TSBX–3660	2TSBX–3660	1TSBX-3660
____	4TSBX–3672	3TSBX–3672	2TSBX–3672	1TSBX-3672
____	4TSBX–3684	3TSBX–3684	2TSBX–3684	1TSBX-3684
____	4TSBX–3696	3TSBX–3696	2TSBX–3696	1TSBX-3696
____	4TSBX–36108	3TSBX–36108	2TSBX–36108	1TSBX-36108
____	4TSBX–36120	3TSBX–36120	2TSBX–36120	1TSBX-36120
____	4TSBX–36132	3TSBX–36132	2TSBX–36132	1TSBX-36132
____	4TSBX–36144	3TSBX–36144	2TSBX–36144	1TSBX-36144

MATERIAL

TOP

- 1⅞" turn down on 3 sides.
- Rear has a 4" splash.
- Two heavy gauge steel box channels on 24" wide tables for rigidity.
- Three heavy gauge steel box channels on 30" tables for rigidity.
- Four heavy gauge steel box channels on 36" tables for rigidity.
- Sound deadened between table top and channels.

Crossbracing

- 1¼" O.D. 16 gauge 304 series stainless steel crossbracing, 1⅝" I.D. aluminum castings at all leg intersections.

LEGS

- 1⅝" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable, impact resistant, white metal feet.

DESIGN FEATURES

- Crossbracing is fully adjustable and flexible in design.
- All tables fully cartoned.
- Easily assembled.

EXCLUSIVE AERO SAFETY EDGE

- Table hemmed to eliminate cuts from rough edges.

CONSTRUCTION

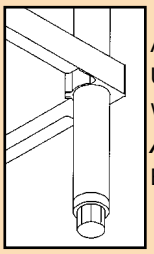
- Top is polished to a #4 mill finish.
- Heliarc welded construction creates uniform, rock-solid unit.
- Gussets fully welded for extra rigidity.
- All tables shipped K.D.

AEROSPEC

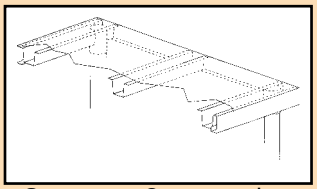
- 1TSBX TABLES ARE ***AEROSPEC DESIGNED.***
  In addition to above specifications;
- Three sides have a "V" countertop edge to inhibit spillage.
- Backsplash is 10" high including a 2" return on a 45 deg. angle.
- Stainless steel gussets in lieu of galvanized.
- Stainless steel feet in lieu of white metal.

SEE PAGES SP-6A & SP-6B TO DESIGN YOUR FLEXIBLE WORKCENTER

SEE PAGES TS-5A & TS-5B TO CUSTOMIZE YOUR AERO TABLE



Adjustable Undershelf with Exclusive *AEROLOCK* Extrusion



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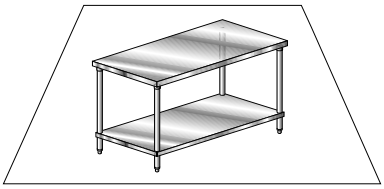
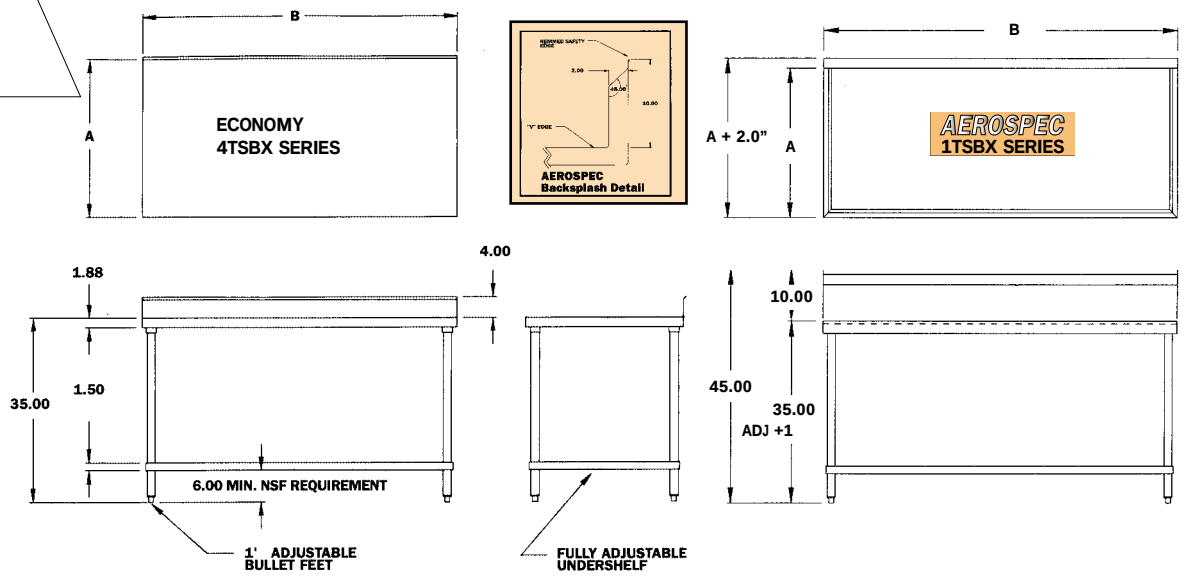
DIMENSIONAL SPECIFICATIONS

TSBX SERIES 4" & 10" Backsplash, S/S Legs and Crossbracing



- Tables over 72" in length are shipped with six legs.
- All feet have a full 1" adjustability.
- Crossbracing is fully adjustable.

NSF



A Width	B Length	ECONOMY 16GA 430 Model #	DELUX 16GA 304 Model #	PREMIUM 14GA 304 Model #	AEROSPEC 14GA 304 Model #	Ship Weight	Cubic Feet
24" WIDE							
24	24	4TSBX–2424	3TSBX–2424	2TSBX–2424	1TSBX-2424	50	3
24	30	4TSBX–2430	3TSBX–2430	2TSBX–2430	1TSBX-2430	55	3
24	36	4TSBX–2436	3TSBX–2436	2TSBX–2436	1TSBX-2436	66	4
24	48	4TSBX–2448	3TSBX–2448	2TSBX–2448	1TSBX-2448	81	5
24	60	4TSBX–2460	3TSBX–2460	2TSBX–2460	1TSBX-2460	95	7
24	72	4TSBX–2472	3TSBX–2472	2TSBX–2472	1TSBX-2472	113	8
24	84	4TSBX–2484	3TSBX–2484	2TSBX–2484	1TSBX-2484	135	9
24	96	4TSBX–2496	3TSBX–2496	2TSBX–2496	1TSBX-2496	150	11
24	108	4TSBX–24108	3TSBX–24108	2TSBX–24108	1TSBX-24108	165	12
24	120	4TSBX–24120	3TSBX–24120	2TSBX–24120	1TSBX-24120	268	13
24	132	4TSBX–24132	3TSBX–24132	2TSBX–24132	1TSBX-24132	301	15
24	144	4TSBX–24144	3TSBX–24144	2TSBX–24144	1TSBX-24144	316	16
30" WIDE							
30	24	4TSBX–3024	3TSBX–3024	2TSBX–3024	1TSBX-3024	56	3
30	30	4TSBX–3030	3TSBX–3030	2TSBX–3030	1TSBX-3024	70	4
30	36	4TSBX–3036	3TSBX–3036	2TSBX–3036	1TSBX-3036	77	5
30	48	4TSBX–3048	3TSBX–3048	2TSBX–3048	1TSBX-3048	92	7
30	60	4TSBX–3060	3TSBX–3060	2TSBX–3060	1TSBX-3060	111	8
30	72	4TSBX–3072	3TSBX–3072	2TSBX–3072	1TSBX-3072	129	10
30	84	4TSBX–3084	3TSBX–3084	2TSBX–3084	1TSBX-3084	153	12
30	96	4TSBX–3096	3TSBX–3096	2TSBX–3096	1TSBX-3096	171	13
30	108	4TSBX–30108	3TSBX–30108	2TSBX–30108	1TSBX-30108	195	15
30	120	4TSBX–30120	3TSBX–30120	2TSBX–30120	1TSBX-30120	294	17
30	132	4TSBX–30132	3TSBX–30132	2TSBX–30132	1TSBX-30132	331	18
30	144	4TSBX–30144	3TSBX–30144	2TSBX–30144	1TSBX-30144	346	20
36" WIDE							
36	36	4TSBX–3636	3TSBX–3636	2TSBX–3636	1TSBX-3636	92	6
36	48	4TSBX–3648	3TSBX–3648	2TSBX–3648	1TSBX-3648	101	8
36	60	4TSBX–3660	3TSBX–3660	2TSBX–3660	1TSBX-3660	121	10
36	72	4TSBX–3672	3TSBX–3672	2TSBX–3672	1TSBX-3672	142	12
36	84	4TSBX–3684	3TSBX–3684	2TSBX–3684	1TSBX-3684	169	14
36	96	4TSBX–3696	3TSBX–3696	2TSBX–3696	1TSBX-3696	189	16
36	108	4TSBX–36108	3TSBX–36108	2TSBX–36108	1TSBX-36108	160	18
36	120	4TSBX–36120	3TSBX–36120	2TSBX–36120	1TSBX-36120	315	20
36	132	4TSBX–36132	3TSBX–36132	2TSBX–36132	1TSBX-36132	358	22
36	144	4TSBX–36144	3TSBX–36144	2TSBX–36144	1TSBX-36144	373	24

All dimensions are typical (tol. ±½"). • For Accessories and Options see pages TS-5A & TS-5B.

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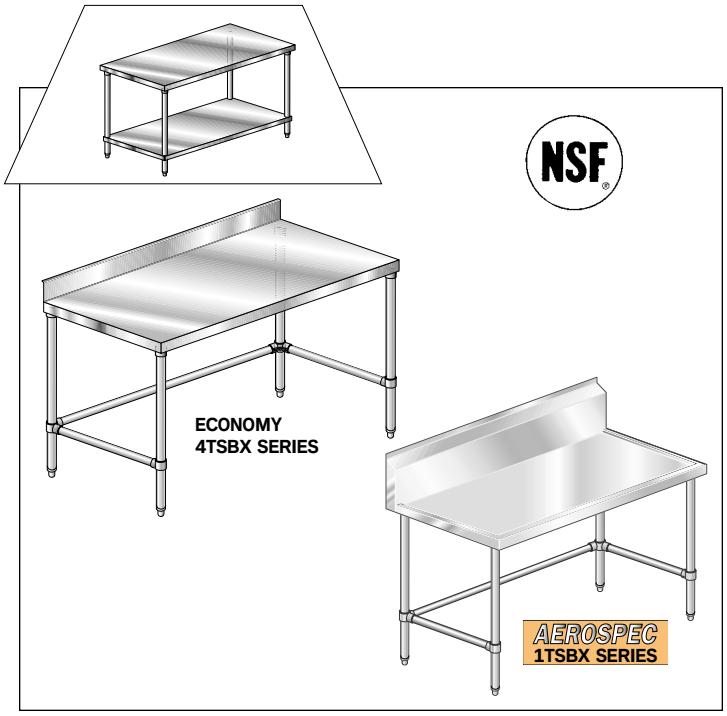
WORK TABLE

TSBX SERIES 4" & 10" Backsplash, S/S Legs and Crossbracing



Item#_____Project_____

Quantity	ECONOMY 16GA 430 Model #	DELUX 16GA 304 Model #	PREMIUM 14GA 304 Model #	AEROSPEC 14GA 304 Model #
24" WIDE				
____	4TSBX–2424	3TSBX–2424	2TSBX–2424	1TSBX-2424
____	4TSBX–2430	3TSBX–2430	2TSBX–2430	1TSBX-2430
____	4TSBX–2436	3TSBX–2436	2TSBX–2436	1TSBX-2436
____	4TSBX–2448	3TSBX–2448	2TSBX–2448	1TSBX-2448
____	4TSBX–2460	3TSBX–2460	2TSBX–2460	1TSBX-2460
____	4TSBX–2472	3TSBX–2472	2TSBX–2472	1TSBX-2472
____	4TSBX–2484	3TSBX–2484	2TSBX–2484	1TSBX-2484
____	4TSBX–2496	3TSBX–2496	2TSBX–2496	1TSBX-2496
____	4TSBX–24108	3TSBX–24108	2TSBX–24108	1TSBX-24108
____	4TSBX–24120	3TSBX–24120	2TSBX–24120	1TSBX-24120
____	4TSBX–24132	3TSBX–24132	2TSBX–24132	1TSBX-24132
____	4TSBX–24144	3TSBX–24144	2TSBX–24144	1TSBX-24144
30" WIDE				
____	4TSBX–3024	3TSBX–3024	2TSBX–3024	1TSBX-3024
____	4TSBX–3030	3TSBX–3030	2TSBX–3030	1TSBX-3030
____	4TSBX–3036	3TSBX–3036	2TSBX–3036	1TSBX-3036
____	4TSBX–3048	3TSBX–3048	2TSBX–3048	1TSBX-3048
____	4TSBX–3060	3TSBX–3060	2TSBX–3060	1TSBX-3060
____	4TSBX–3072	3TSBX–3072	2TSBX–3072	1TSBX-3072
____	4TSBX–3084	3TSBX–3084	2TSBX–3084	1TSBX-3084
____	4TSBX–3096	3TSBX–3096	2TSBX–3096	1TSBX-3096
____	4TSBX–30108	3TSBX–30108	2TSBX–30108	1TSBX-30108
____	4TSBX–30120	3TSBX–30120	2TSBX–30120	1TSBX-30120
____	4TSBX–30132	3TSBX–30132	2TSBX–30132	1TSBX-30132
____	4TSBX–30144	3TSBX–30144	2TSBX–30144	1TSBX-30144
36" WIDE				
____	4TSBX–3636	3TSBX–3636	2TSBX–3636	1TSBX-3636
____	4TSBX–3648	3TSBX–3648	2TSBX–3648	1TSBX-3648
____	4TSBX–3660	3TSBX–3660	2TSBX–3660	1TSBX-3660
____	4TSBX–3672	3TSBX–3672	2TSBX–3672	1TSBX-3672
____	4TSBX–3684	3TSBX–3684	2TSBX–3684	1TSBX-3684
____	4TSBX–3696	3TSBX–3696	2TSBX–3696	1TSBX-3696
____	4TSBX–36108	3TSBX–36108	2TSBX–36108	1TSBX-36108
____	4TSBX–36120	3TSBX–36120	2TSBX–36120	1TSBX-36120
____	4TSBX–36132	3TSBX–36132	2TSBX–36132	1TSBX-36132
____	4TSBX–36144	3TSBX–36144	2TSBX–36144	1TSBX-36144

MATERIAL

TOP

- 1⅞" turn down on 3 sides.
- Rear has a 4" splash.
- Two heavy gauge steel box channels on 24" wide tables for rigidity.
- Three heavy gauge steel box channels on 30" tables for rigidity.
- Four heavy gauge steel box channels on 36" tables for rigidity.
- Sound deadened between table top and channels.

Crossbracing

- 1¼" O.D. 16 gauge 304 series stainless steel crossbracing, 1⅝" I.D. aluminum castings at all leg intersections.

LEGS

- 1⅝" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable, impact resistant, white metal feet.

DESIGN FEATURES

- Crossbracing is fully adjustable and flexible in design.
- All tables fully cartoned.
- Easily assembled.

EXCLUSIVE AERO SAFETY EDGE

- Table hemmed to eliminate cuts from rough edges.

CONSTRUCTION

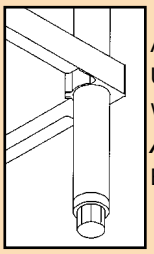
- Top is polished to a #4 mill finish.
- Heliarc welded construction creates uniform, rock-solid unit.
- Gussets fully welded for extra rigidity.
- All tables shipped K.D.

AEROSPEC

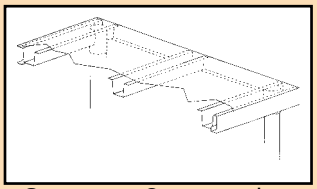
- 1TSBX TABLES ARE ***AEROSPEC DESIGNED.***
  In addition to above specifications;
- Three sides have a "V" countertop edge to inhibit spillage.
- Backsplash is 10" high including a 2" return on a 45 deg. angle.
- Stainless steel gussets in lieu of galvanized.
- Stainless steel feet in lieu of white metal.

SEE PAGES SP-6A & SP-6B TO DESIGN YOUR FLEXIBLE WORKCENTER

SEE PAGES TS-5A & TS-5B TO CUSTOMIZE YOUR AERO TABLE



Adjustable Undershelf with Exclusive *AEROLOCK* Extrusion



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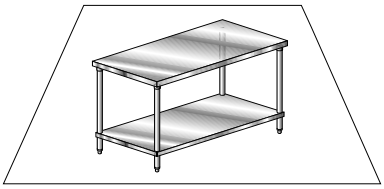
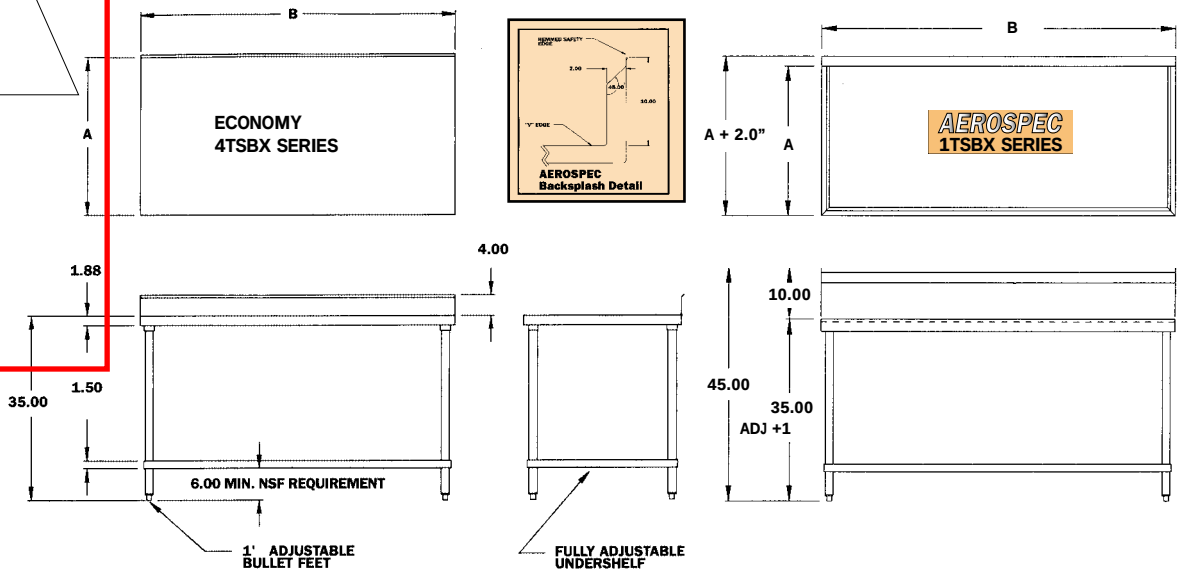
DIMENSIONAL SPECIFICATIONS

TSBX SERIES 4" & 10" Backsplash, S/S Legs and Crossbracing



- Tables over 72" in length are shipped with six legs.
- All feet have a full 1" adjustability.
- Crossbracing is fully adjustable.

NSF



A Width	B Length	ECONOMY 16GA 430 Model #	DELUX 16GA 304 Model #	PREMIUM 14GA 304 Model #	AEROSPEC 14GA 304 Model #	Ship Weight	Cubic Feet
24" WIDE							
24	24	4TSBX–2424	3TSBX–2424	2TSBX–2424	1TSBX-2424	50	3
24	30	4TSBX–2430	3TSBX–2430	2TSBX–2430	1TSBX-2430	55	3
24	36	4TSBX–2436	3TSBX–2436	2TSBX–2436	1TSBX-2436	66	4
24	48	4TSBX–2448	3TSBX–2448	2TSBX–2448	1TSBX-2448	81	5
24	60	4TSBX–2460	3TSBX–2460	2TSBX–2460	1TSBX-2460	95	7
24	72	4TSBX–2472	3TSBX–2472	2TSBX–2472	1TSBX-2472	113	8
24	84	4TSBX–2484	3TSBX–2484	2TSBX–2484	1TSBX-2484	135	9
24	96	4TSBX–2496	3TSBX–2496	2TSBX–2496	1TSBX-2496	150	11
24	108	4TSBX–24108	3TSBX–24108	2TSBX–24108	1TSBX-24108	165	12
24	120	4TSBX–24120	3TSBX–24120	2TSBX–24120	1TSBX-24120	268	13
24	132	4TSBX–24132	3TSBX–24132	2TSBX–24132	1TSBX-24132	301	15
24	144	4TSBX–24144	3TSBX–24144	2TSBX–24144	1TSBX-24144	316	16
30" WIDE							
30	24	4TSBX–3024	3TSBX–3024	2TSBX–3024	1TSBX-3024	56	3
30	30	4TSBX–3030	3TSBX–3030	2TSBX–3030	1TSBX-3024	70	4
30	36	4TSBX–3036	3TSBX–3036	2TSBX–3036	1TSBX-3036	77	5
30	48	4TSBX–3048	3TSBX–3048	2TSBX–3048	1TSBX-3048	92	7
30	60	4TSBX–3060	3TSBX–3060	2TSBX–3060	1TSBX-3060	111	8
30	72	4TSBX–3072	3TSBX–3072	2TSBX–3072	1TSBX-3072	129	10
30	84	4TSBX–3084	3TSBX–3084	2TSBX–3084	1TSBX-3084	153	12
30	96	4TSBX–3096	3TSBX–3096	2TSBX–3096	1TSBX-3096	171	13
30	108	4TSBX–30108	3TSBX–30108	2TSBX–30108	1TSBX-30108	195	15
30	120	4TSBX–30120	3TSBX–30120	2TSBX–30120	1TSBX-30120	294	17
30	132	4TSBX–30132	3TSBX–30132	2TSBX–30132	1TSBX-30132	331	18
30	144	4TSBX–30144	3TSBX–30144	2TSBX–30144	1TSBX-30144	346	20
36" WIDE							
36	36	4TSBX–3636	3TSBX–3636	2TSBX–3636	1TSBX-3636	92	6
36	48	4TSBX–3648	3TSBX–3648	2TSBX–3648	1TSBX-3648	101	8
36	60	4TSBX–3660	3TSBX–3660	2TSBX–3660	1TSBX-3660	121	10
36	72	4TSBX–3672	3TSBX–3672	2TSBX–3672	1TSBX-3672	142	12
36	84	4TSBX–3684	3TSBX–3684	2TSBX–3684	1TSBX-3684	169	14
36	96	4TSBX–3696	3TSBX–3696	2TSBX–3696	1TSBX-3696	189	16
36	108	4TSBX–36108	3TSBX–36108	2TSBX–36108	1TSBX-36108	160	18
36	120	4TSBX–36120	3TSBX–36120	2TSBX–36120	1TSBX-36120	315	20
36	132	4TSBX–36132	3TSBX–36132	2TSBX–36132	1TSBX-36132	358	22
36	144	4TSBX–36144	3TSBX–36144	2TSBX–36144	1TSBX-36144	373	24

All dimensions are typical (tol. ±½"). • For Accessories and Options see pages TS-5A & TS-5B.

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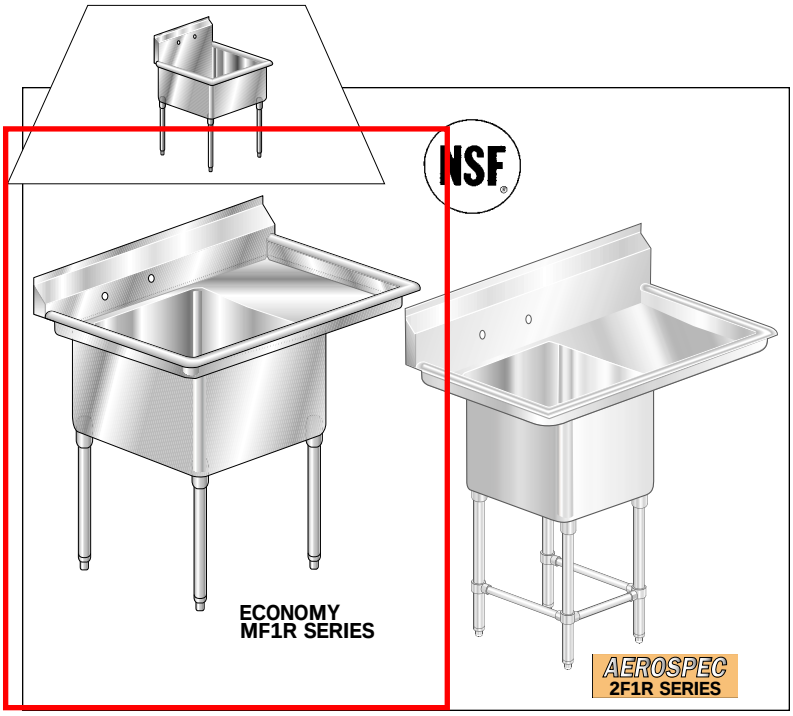
NSF SINKS

F1R SERIES, One Compartment with Right Drainboard



Item#_____Project_____

Quantity	ECONOMY MF1 Model #	DELUX 3F1 Model #	AEROSPEC 2F1 Model #
21" WIDE			
____	MF1–2116–18R	3F1–2116–18R	2F1–2116–18R
____	MF1–2116–24R	3F1–2116–24R	2F1–2116–24R
____	MF1–2116–30R	3F1–2116–30R	2F1–2116–30R
____	MF1–2116–36R	3F1–2116–36R	2F1–2116–36R
20" WIDE			
____	MF1–2020–20R	3F1–2020–20R	2F1–2020–20R
____	MF1–2020–24R	3F1–2020–24R	2F1–2020–24R
____	MF1–2020–30R	3F1–2020–30R	2F1–2020–30R
____	MF1–2020–36R	3F1–2020–36R	2F1–2020–36R
24" WIDE			
____	MF1–2418–18R	3F1–2418–18R	2F1–2418–18R
____	MF1–2418–24R	3F1–2418–24R	2F1–2418–24R
____	MF1–2418–30R	3F1–2418–30R	2F1–2418–30R
____	MF1–2418–36R	3F1–2418–36R	2F1–2418–36R
24" WIDE			
____	MF1–2424–18R	3F1–2424–18R	2F1–2424–18R
____	MF1–2424–24R	3F1–2424–24R	2F1–2424–24R
____	MF1–2424–30R	3F1–2424–30R	2F1–2424–30R
____	MF1–2424–36R	3F1–2424–36R	2F1–2424–36R
30" WIDE			
____	MF1–3020–20R	3F1–3020–20R	2F1–3020–20R
____	MF1–3020–24R	3F1–3020–24R	2F1–3020–24R
____	MF1–3020–30R	3F1–3020–30R	2F1–3020–30R
____	MF1–3020–36R	3F1–3020–36R	2F1–3020–36R

MATERIAL

BODY

- MF –16 gauge 304 stainless steel bowl, 430 body.
- 3F –16 gauge 304 stainless steel.
- 2F –14 gauge 304 stainless steel.(AEROSPEC)

LEGS

- 1⅝" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable impact resistant white metal feet.

DESIGN FEATURES

- All sinks are fully cartoned.
- Easily assembled.
- Drainboards pitched ¼" for positive drainage.

EXCLUSIVE AERO SAFETY EDGE

- Sink hemmed on the roll and backsplash to eliminate cuts from rough edges.

CONSTRUCTION

- ***Exclusive 14" bowl depth on all models (consultant's spec).***
- ***Custom style fabricated bowl for true gauge integrity.***
- All sinks have a ¾" radius at all intersecting planes (consultant's spec).
- Stainless steel gusset is machine welded 360 deg. to a stainless steel triangular plate.
- Gusset plate is fully welded directly underneath the sink for support.
- Polished to a #4 blended finish.
- All sinks with drainboards 30" or longer equipped with 2 stainless steel 1⅝" O.D. legs with stainless steel gussets and white metal feet.

PLUMBING

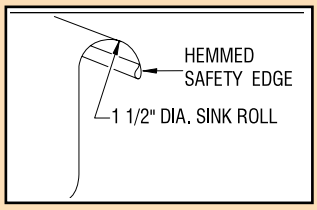
- Water supply is ½" hot and cold.
- Faucet holes are 8" o.c. (Faucets not included. See accessories).

AEROSPEC

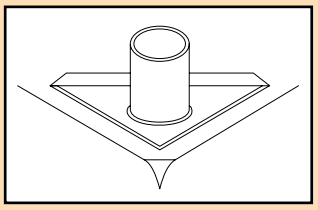
Includes all of the above and the following:

- Full 10" backsplash instead of standard 7".
- Stainless steel feet in lieu of white metal.
- Legs have stainless steel crossbracing with aluminum castings at all intersections.

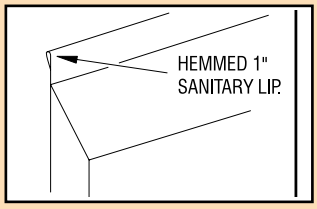
CUSTOM SIZES AVAILABLE



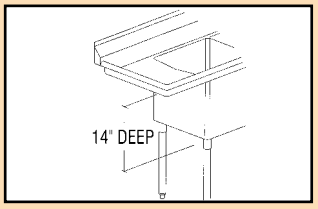
Exclusive Aero Safety Edge



Fully Welded Gusset Assembly



1" Sanitary Lip



14" Custom-Style Bowl

CONSULTANT'S SPECS AT PRODUCTION PRICES

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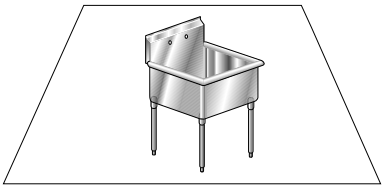
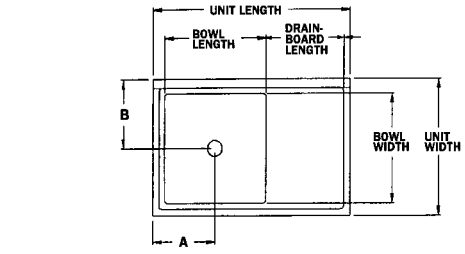
DIMENSIONAL SPECIFICATIONS

F1R SERIES, NSF Sinks, One Compartment, Right Drainboard

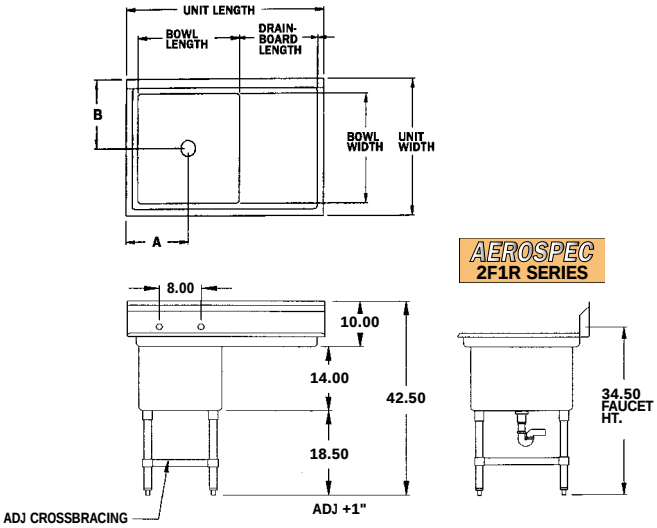


■ Supplied with stainless steel drain basket and strainer.

NSF



ECONOMY MF1R SERIES



AEROSPEC 2F1R SERIES

BOWL Width	BOWL Length	UNIT Width	UNIT Length	DRAIN BOARD Length	A Drain	B Drain	ECONOMY MF1 Model #	DELUX 3F1 Model #	AEROSPEC 2F1 Model #	Ship Weight	Cubic Feet	Sets, Faucet Holes
21" WIDE												
21	16	27	38.3	18	10.75	13.75	MF1–2116–18R	3F1–2116–18R	2F1–2116–18R	85	13	ONE
21	16	27	44.3	24	10.75	13.75	MF1–2116–24R	3F1–2116–24R	2F1–2116–24R	90	15	ONE
21	16	27	50.3	30	10.75	13.75	MF1–2116–30R	3F1–2116–30R	2F1–2116–30R	95	16	ONE
21	16	27	56.3	36	10.75	13.75	MF1–2116–36R	3F1–2116–36R	2F1–2116–36R	100	18	ONE
20" WIDE												
20	20	26	44.3	20	12.75	13.25	MF1–2020–20R	3F1–2020–20R	2F1–2020–20R	100	15	ONE
20	20	26	48.3	24	12.75	13.25	MF1–2020–24R	3F1–2020–24R	2F1–2020–24R	105	17	ONE
20	20	26	54.3	30	12.75	13.25	MF1–2020–30R	3F1–2020–30R	2F1–2020–30R	110	19	ONE
20	20	26	60.3	36	12.75	13.25	MF1–2020–36R	3F1–2020–36R	2F1–2020–36R	115	21	ONE
24" WIDE												
24	18	30	40.3	18	11.75	13.75	MF1–2418–18R	3F1–2418–18R	2F1–2418–18R	95	13	ONE
24	18	30	46.3	24	11.75	13.75	MF1–2418–24R	3F1–2418–24R	2F1–2418–24R	100	15	ONE
24	18	30	52.3	30	11.75	13.75	MF1–2418–30R	3F1–2418–30R	2F1–2418–30R	105	17	ONE
24	18	30	58.3	36	11.75	13.75	MF1–2418–36R	3F1–2418–36R	2F1–2418–36R	110	19	ONE
24" WIDE												
24	24	30	46.3	18	14.75	15.25	MF1–2424–18R	3F1–2424–18R	2F1–2424–18R	105	17	ONE
24	24	30	52.3	24	14.75	15.25	MF1–2424–24R	3F1–2424–24R	2F1–2424–24R	110	19	ONE
24	24	30	58.3	30	14.75	15.25	MF1–2424–30R	3F1–2424–30R	2F1–2424–30R	115	21	ONE
24	24	30	64.3	36	14.75	15.25	MF1–2424–36R	3F1–2424–36R	2F1–2424–36R	120	23	ONE
30" WIDE												
30	20	36	44.3	18	12.75	18.25	MF1–3020–20R	3F1–3020–20R	2F1–3020–20R	115	18	ONE
30	20	36	48.3	24	12.75	18.25	MF1–3020–24R	3F1–3020–24R	2F1–3020–24R	120	21	ONE
30	20	36	54.3	30	12.75	18.25	MF1–3020–30R	3F1–3020–30R	2F1–3020–30R	125	24	ONE
30	20	36	60.3	36	12.75	18.25	MF1–3020–36R	3F1–3020–36R	2F1–3020–36R	130	26	ONE

All dimensions are typical (tol. ±½"). • For Accessories and Options see pages FS-7A, FS-7B.

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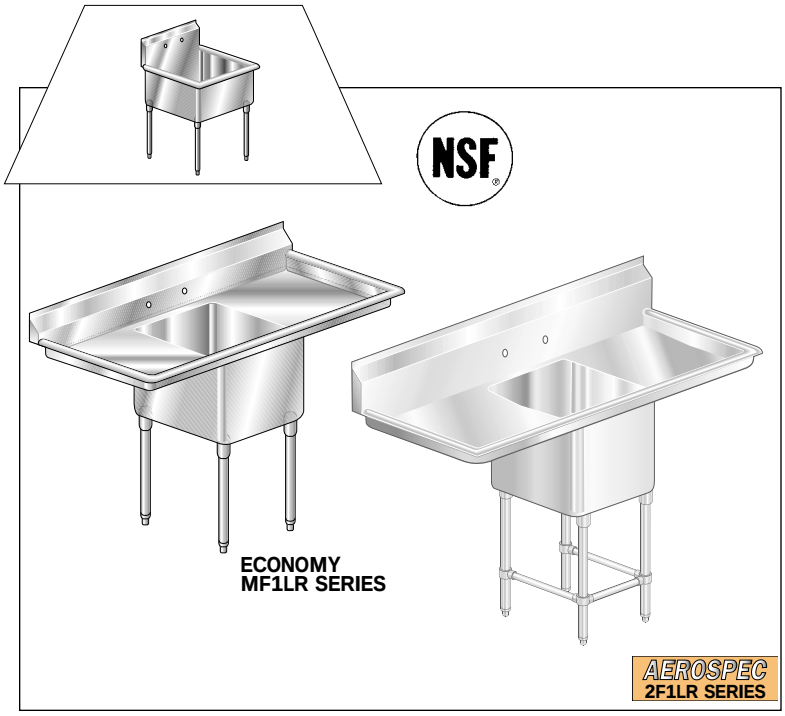
NSF SINKS

F1LR SERIES, One Compartment with Two Drainboards



Item#_____Project_____

Quantity	ECONOMY MF1 Model #	DELUX 3F1 Model #	AEROSPEC 2F1 Model #
21" WIDE			
____	MF1–2116–18LR	3F1–2116–18LR	2F1–2116–18LR
____	MF1–2116–24LR	3F1–2116–24LR	2F1–2116–24LR
____	MF1–2116–30LR	3F1–2116–30LR	2F1–2116–30LR
____	MF1–2116–36LR	3F1–2116–36LR	2F1–2116–36LR
20" WIDE			
____	MF1–2020–20LR	3F1–2020–20LR	2F1–2020–20LR
____	MF1–2020–24LR	3F1–2020–24LR	2F1–2020–24LR
____	MF1–2020–30LR	3F1–2020–30LR	2F1–2020–30LR
____	MF1–2020–36LR	3F1–2020–36LR	2F1–2020–36LR
24" WIDE			
____	MF1–2418–18LR	3F1–2418–18LR	2F1–2418–18LR
____	MF1–2418–24LR	3F1–2418–24LR	2F1–2418–24LR
____	MF1–2418–30LR	3F1–2418–30LR	2F1–2418–30LR
____	MF1–2418–36LR	3F1–2418–36LR	2F1–2418–36LR
24" WIDE			
____	MF1–2424–18LR	3F1–2424–18LR	2F1–2424–18LR
____	MF1–2424–24LR	3F1–2424–24LR	2F1–2424–24LR
____	MF1–2424–30LR	3F1–2424–30LR	2F1–2424–30LR
____	MF1–2424–36LR	3F1–2424–36LR	2F1–2424–36LR
30" WIDE			
____	MF1–3020–20LR	3F1–3020–20LR	2F1–3020–20LR
____	MF1–3020–24LR	3F1–3020–24LR	2F1–3020–24LR
____	MF1–3020–30LR	3F1–3020–30LR	2F1–3020–30LR
____	MF1–3020–36LR	3F1–3020–36LR	2F1–3020–36LR

MATERIAL

BODY

- MF –16 gauge 304 stainless steel bowl, 430 body.
- 3F –16 gauge 304 stainless steel.
- 2F –14 gauge 304 stainless steel. (AEROSPEC)

LEGS

- 1⅝" O.D. 16 gauge 304 series stainless steel tubing, complete with 1" adjustable impact resistant white metal feet.

DESIGN FEATURES

- All sinks are fully cartoned.
- Easily assembled.
- Drainboards pitched ¼" for positive drainage.

EXCLUSIVE AERO SAFETY EDGE

- Sink hemmed on the roll and backsplash to eliminate cuts from rough edges.

CONSTRUCTION

- ***Exclusive 14" bowl depth on all models (consultant's spec).***
- ***Custom style fabricated bowl for true gauge integrity.***
- All sinks have a ¾" radius at all intersecting planes (consultant's spec).
- Stainless steel gusset is machine welded 360 deg. to a stainless steel triangular plate.
- Gusset plate is fully welded directly underneath the sink for support.
- Polished to a #4 blended finish.
- All sinks with drainboards 30" or longer equipped with 2 stainless steel 1⅝" O.D. legs with stainless steel gussets and white metal feet.

PLUMBING

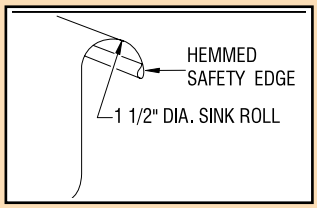
- Water supply is ½" hot and cold.
- Faucet holes are 8" o.c. (Faucets not included. See accessories).

AEROSPEC

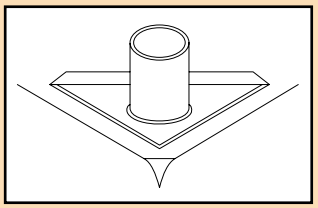
Includes all of the above and the following:

- Full 10" backsplash instead of standard 7".
- Stainless steel feet in lieu of white metal.
- Legs have stainless steel crossbracing with aluminum castings at all intersections.

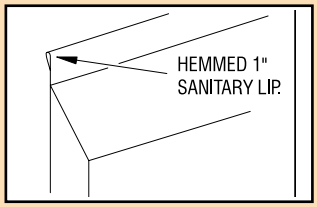
CUSTOM SIZES AVAILABLE



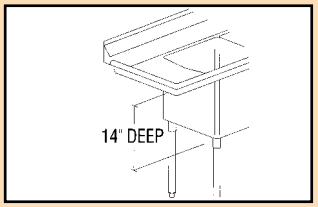
Exclusive Aero Safety Edge



Fully Welded Gusset Assembly



1" Sanitary Lip



14" Custom-Style Bowl

CONSULTANT'S SPECS AT PRODUCTION PRICES

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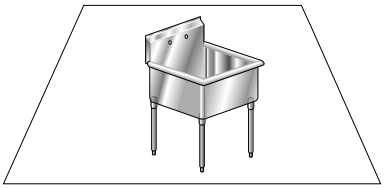
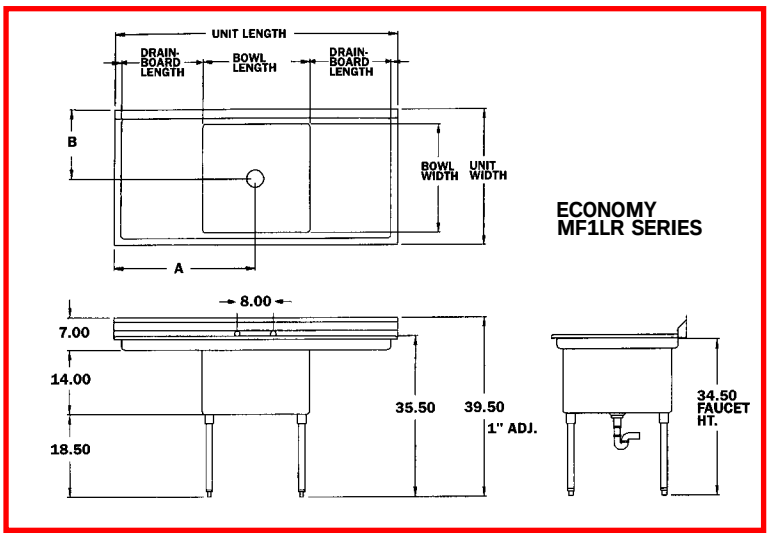
DIMENSIONAL SPECIFICATIONS

F1LR SERIES, NSF Sinks, One Compartment, Two Drainboards

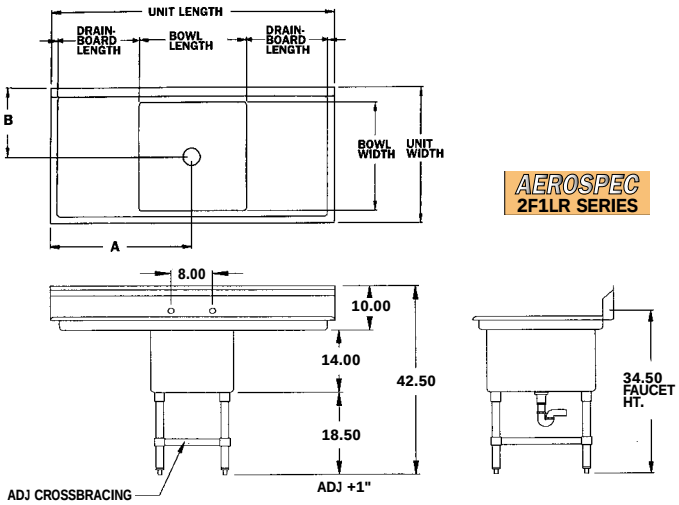


■ Supplied with stainless steel drain basket and strainer.

NSF



ECONOMY
MF1LR SERIES



AEROSPEC
2F1LR SERIES

BOWL Width	BOWL Length	UNIT Width	UNIT Length	DRAIN BOARD Length	A Drain	B Drain	ECONOMY MF1 Model #	DELUX 3F1 Model #	AEROSPEC 2F1 Model #	Ship Weight	Cubic Feet	Sets, Faucet Holes
21" WIDE												
21	16	27	57	18	27.5	13.75	MF1–2116–18LR	3F1–2116–18LR	2F1–2116–18LR	85	13	ONE
21	16	27	67	24	33.5	13.75	MF1–2116–24LR	3F1–2116–24LR	2F1–2116–24LR	90	15	ONE
21	16	27	79	30	39.5	13.75	MF1–2116–30LR	3F1–2116–30LR	2F1–2116–30LR	95	16	ONE
21	16	27	91	36	45.5	13.75	MF1–2116–36LR	3F1–2116–36LR	2F1–2116–36LR	100	18	ONE
20" WIDE												
20	20	26	63	20	31.5	13.25	MF1–2020–20LR	3F1–2020–20LR	2F1–2020–20LR	100	15	ONE
20	20	26	71	24	35.5	13.25	MF1–2020–24LR	3F1–2020–24LR	2F1–2020–24LR	105	17	ONE
20	20	26	83	30	41.5	13.25	MF1–2020–30LR	3F1–2020–30LR	2F1–2020–30LR	110	19	ONE
20	20	26	95	36	47.5	13.25	MF1–2020–36LR	3F1–2020–36LR	2F1–2020–36LR	115	21	ONE
24" WIDE												
24	18	30	59	18	28.5	13.75	MF1–2418–18LR	3F1–2418–18LR	2F1–2418–18LR	95	13	ONE
24	18	30	69	24	34.5	13.75	MF1–2418–24LR	3F1–2418–24LR	2F1–2418–24LR	100	15	ONE
24	18	30	81	30	40.5	13.75	MF1–2418–30LR	3F1–2418–30LR	2F1–2418–30LR	105	17	ONE
24	18	30	93	36	46.5	13.75	MF1–2418–36LR	3F1–2418–36LR	2F1–2418–36LR	110	19	ONE
24" WIDE												
24	24	30	63	18	31.5	15.25	MF1–2424–18LR	3F1–2424–18LR	2F1–2424–18LR	105	17	ONE
24	24	30	75	24	37.5	15.25	MF1–2424–24LR	3F1–2424–24LR	2F1–2424–24LR	110	19	ONE
24	24	30	87	30	43.5	15.25	MF1–2424–30LR	3F1–2424–30LR	2F1–2424–30LR	115	21	ONE
24	24	30	99	36	49.5	15.25	MF1–2424–36LR	3F1–2424–36LR	2F1–2424–36LR	120	23	ONE
30" WIDE												
30	20	36	63	18	31.5	18.25	MF1–3020–20LR	3F1–3020–20LR	2F1–3020–20LR	115	18	ONE
30	20	36	71	24	35.5	18.25	MF1–3020–24LR	3F1–3020–24LR	2F1–3020–24LR	120	21	ONE
30	20	36	83	30	41.5	18.25	MF1–3020–30LR	3F1–3020–30LR	2F1–3020–30LR	125	24	ONE
30	20	36	95	36	47.5	18.25	MF1–3020–36LR	3F1–3020–36LR	2F1–3020–36LR	130	26	ONE
CUSTOM SIZE												
30	20	30	49	9								

All dimensions are typical (tol. ±½"). • For Accessories and Options see pages FS-7A, FS-7B.

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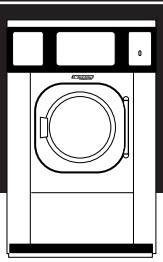
ARCHITECTURAL/MECHANICAL PRODUCT SPECIFICATIONS



EH030

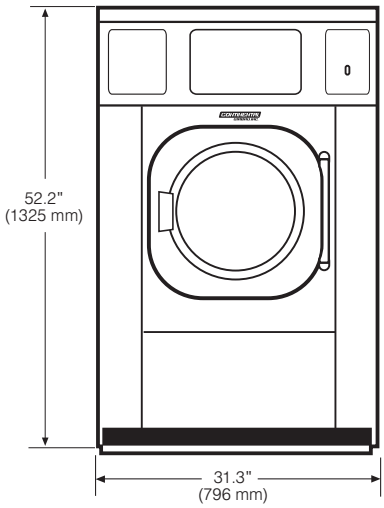
ON-PREMISE LAUNDRY E-SERIES 30-POUND CAPACITY HIGH-PERFORMANCE WASHER-EXTRACTOR

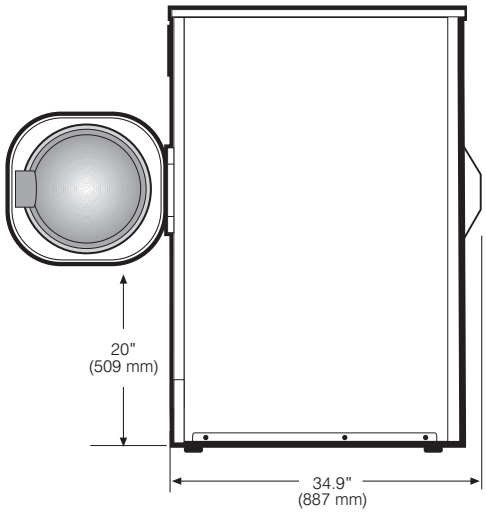
CONTINENTAL GIRBAU®
2500 State Road 44 • Oshkosh, WI 54904
920.231.8222 • FAX 920.231.4666
www.continentalgirbau.com

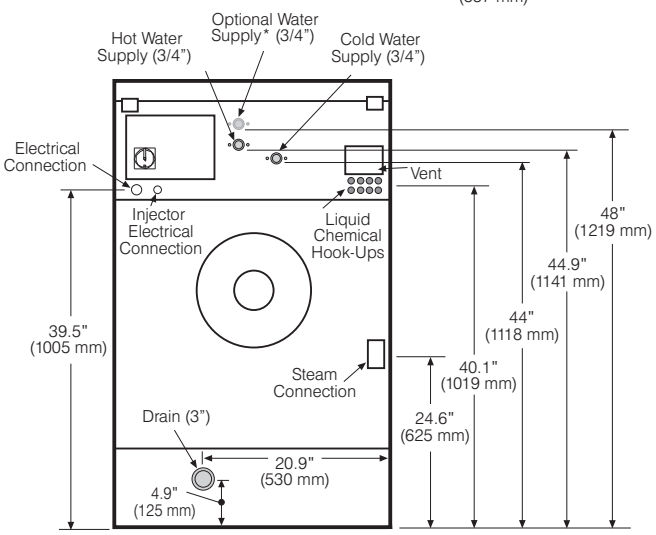
Capacity *lbs (kg)*	30 *(12.6)*
Cylinder Diameter *inch (mm)*	24.4 *(620)*
Cylinder Depth *inch (mm)*	16.4 *(416)*
Cylinder Volume *cu ft (dm³)*	4.4 *(126)*
Net Weight *lbs (kg)*	758 *(344)*
Crated Weight *lbs(kg)*	820 *(372)*
Machine Width *inch (mm)*	31.3 *(796)*
Machine Depth *inch (mm)*	34.9 *(887)*
Machine Height *inch (mm)*	52.2 *(1325)*
Door Opening *inch (mm)*	12.9 *(327)*
Floor to Door *inch (mm)*	20 *(509)*
Shipping Dimensions *inch (mm) (WxDxH)*	32.4 x 37.2 x 58.5 *(823 x 945 x 1485)*
Washing Speeds *rpm*	
Logi Control	46.5
Inteli Control	17/23/30/37/44
Spin Speeds *rpm*	48/100/400/600/800/1000
G-force	0.8/3.46/56/125/222/346
Static Force Transmitted *lbs (kg)*	902 *(409)*
Dynamic Force Transmitted *lbs (kg)*	201 *(91)*
Frequency of Dynamic Force *Hz*	16.7
Available Voltages/Wire Conductor/Amp	
Hot Water (standard)	208-240/60/1, 2W + G, 10 Amp
Electric Auxiliary Heat (optional)	208/60/1, 2W + G, 40 Amp
Electric Auxiliary Heat (optional)	240/60/1, 2W + G, 50 Amp
Electric Auxiliary Heat (optional)	208-240/60/3, 3W + G, 40 Amp
Modified Energy Factor (MEF)*	2.08
Water Consumption Factor (WCF)*	4.68
Drain Diameter *inch (mm)*	3 *(76)*
Water Inlets *inch (mm)*	2 @ 3/4 *(19)*
Recommended Water Pressure *PSI (bar)*	30-60 *(2-4)*
Water Flow *gal/min (l/min)*	16 *(60)*
Steam Connection *inch (mm)*	1/2 *(12.7)*
Steam Pressure (optional) *PSI (bar)*	29-87 *(2-6)*
Steam Flow (optional) *lbs/h (kg/h)*	176 *(80)*
Total Power *kW*	.87
Electric Heating Power (optional) *kW*	
Single Phase 240V	8.4
Three Phase 240V	12.4

* Modified Energy Factor (MEF) measured in cubic feet per kilowatt-hour per cycle. Water Consumption Factor (WCF) measured in gallons per cycle per cubic feet. MEF and WCF statistics are according to DOE test results report by Intertek, an independent testing laboratory, dated February 27, 2007.

** Specifications subject to change without notice or obligation. Call Continental Girbau Inc for dimensions not shown or for clarification.







ARCHITECTURAL/MECHANICAL PRODUCT SPECIFICATIONS

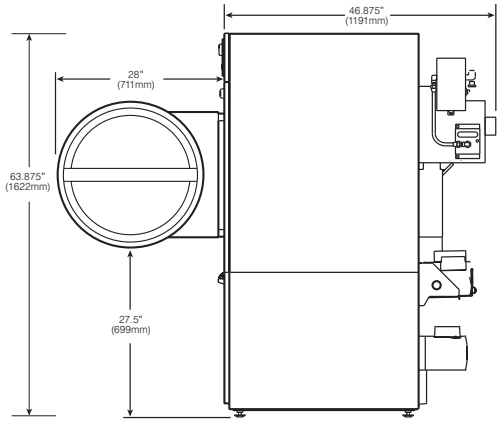
CG30-40

PRO-SERIES II DRYING TUMBLER

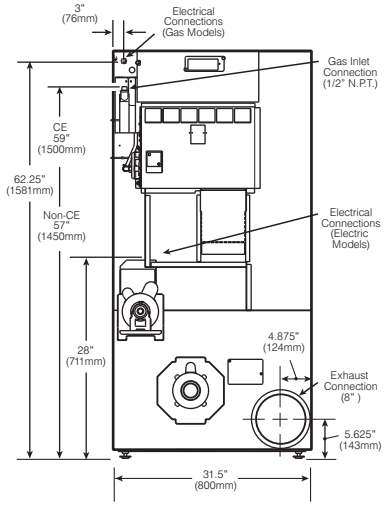
CONTINENTAL GIRBAU®
2500 State Road 44 • Oshkosh, WI 54904
920.231.8222 • FAX 920.231.4666
www.continentalgirbau.com

Capacity *lbs*	up to 40
Cylinder Diameter *inch (mm)*	30 *(762)*
Cylinder Depth *inch (mm)*	30 *(762)*
Cylinder Volume *cu ft (dm³)*	12.3 *(0.35)*
Net Weight *lbs (kg)*	360 *(163)*
Crated Weight *lbs (kg)*	394 *(179)*
Machine Width *inch (mm)*	31.5 *(800)*
Machine Depth *inch (mm)*	46.875 *(1191)*
Machine Height *inch (mm)*	63.875 *(1622)*
Door Opening *inch (mm)*	22.69 *(576)*
Floor to Door *inch (mm)*	27.5 *(699)*
Shipping Dimensions *inch (mm) (WxDxH)*	33 x 49 x 69 *(838 x 1245 x 1753)*
Motor Power *Hp (kW)*	2 @ 1/4 *(2 @ 0.19)*
Reversing Motor Power *Hp (kW)*	1/4 *(0.19)*
Exhaust Diameter *inch (mm)*	8 *(203)*
Exhaust Air Flow *cfm (l/s)*	650 *(307)*
Electric Heating *kW*	24
Gas Connection *inch (mm)*	1/2 NPT *(12.7)*
Gas Heating *BTU/h (Kcal/h)*	90,000 *(22,680)*
Steam Connection *inch*	3/4 NPT
Steam Heating *BTU/h (kW)* at 100 PSI (6.9 bar)	166,000 *(48.6)*
BHP Consumption *BHP* at 100 PSI (6.9 bar)	4.8
Available Voltages/Wire Conductor/Amp (Rev Amp)	
Gas/Steam	120/60/1, 1W + N + G, 12 208-240/60/1, 2W + N + G, 6.7 200-208/60/3, 3W + G, 3.2 (4.0) 240/60/3, 3W + G, 3.2 (4.0) 440/60/3, 3W + G, 1.6 460-480/60/3, 3W + G, 1.6 (2.0)
Electric	208/60/1, 2W + N + G, 122 240/60/1, 2W + N + G, 107 200-208/60/3, 3W + G, 71 (71) 240/60/3, 3W + G, 62 (62) 440/60/3, 3W + G, 33 460-480/60/3, 3W + G, 31 (31)

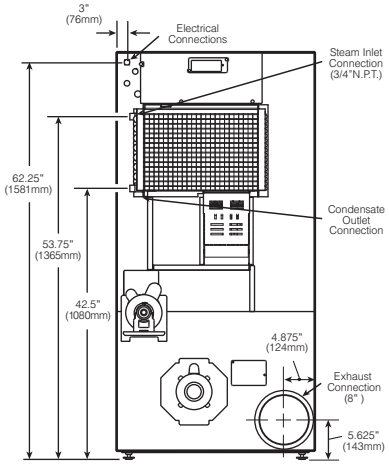
* Specifications subject to change without notice or obligation. Call Continental Girbau Inc for dimensions not shown or for clarification.



SIDE VIEW



REAR VIEW (Gas and Electric Models)



REAR VIEW (Steam Models)

ADVANCE TABCO®
SMART FABRICATION™

STAINLESS STEEL

WALL SHELVES NSF

NO. 182.91 SHELF, WALL MTD. STAINLESS STEEL

Item #: _____ Qty #: _____

Model #: _____

Project #: _____

FEATURES:

Brackets can be positioned to accommodate wall studs.

Furnished with a 1-5/8" Bullnose edge with a 1-1/2" turn-up edge at rear. Ends are turned down square.

MATERIAL:

16 Gauge Series - 304 stainless steel polished to a satin finish.

18 Gauge Series - 430 stainless steel polished to a satin finish.

CONSTRUCTION:

Secured to wall by means of bolts through support brackets.

Units 7 ft. and larger are furnished with 3 brackets.

	10" Wide			12" Wide			15" Wide			18" Wide			
L	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	16 Ga.	18 Ga.	Approx. Wt.	Approx. Cu. Ft.
24"	WS-10-24-16	WS-10-24	8 lbs.	WS-12-24-16	WS-12-24	9 lbs.	WS-15-24-16	WS-15-24	11 lbs.	WS-18-24-16	WS-18-24	14 lbs.	3
36"	WS-10-36-16	WS-10-36	10 lbs.	WS-12-36-16	WS-12-36	12 lbs.	WS-15-36-16	WS-15-36	15 lbs.	WS-18-36-16	WS-18-36	21 lbs.	4
48"	WS-10-48-16	WS-10-48	12 lbs.	WS-12-48-16	WS-12-48	14 lbs.	WS-15-48-16	WS-15-48	18 lbs.	WS-18-48-16	WS-18-48	24 lbs.	5
60"	WS-10-60-16	WS-10-60	15 lbs.	WS-12-60-16	WS-12-60	17 lbs.	WS-15-60-16	WS-15-60	23 lbs.	WS-18-60-16	WS-18-60	28 lbs.	6
72"	WS-10-72-16	WS-10-72	17 lbs.	WS-12-72-16	WS-12-72	21 lbs.	WS-15-72-16	WS-15-72	28 lbs.	WS-18-72-16	WS-18-72	32 lbs.	7
84"	WS-10-84-16	WS-10-84	20 lbs.	WS-12-84-16	WS-12-84	25 lbs.	WS-15-84-16	WS-15-84	32 lbs.	WS-18-84-16	WS-18-84	36 lbs.	8
96"	WS-10-96-16	WS-10-96	23 lbs.	WS-12-96-16	WS-12-96	28 lbs.	WS-15-96-16	WS-15-96	36 lbs.	WS-18-96-16	WS-18-96	42 lbs.	10
108"	WS-10-108-16	WS-10-108	28 lbs.	WS-12-108-16	WS-12-108	32 lbs.	WS-15-108-16	WS-15-108	40 lbs.	WS-18-108-16	WS-18-108	48 lbs.	11
120"	WS-10-120-16	WS-10-120	32 lbs.	WS-12-120-16	WS-12-120	36 lbs.	WS-15-120-16	WS-15-120	44 lbs.	WS-18-120-16	WS-18-120	54 lbs.	12
132"	WS-10-132-16	WS-10-132	36 lbs.	WS-12-132-16	WS-12-132	42 lbs.	WS-15-132-16	WS-15-132	49 lbs.	WS-18-132-16	WS-18-132	60 lbs.	13
144"	WS-10-144-16	WS-10-144	40 lbs.	WS-12-144-16	WS-12-144	48 lbs.	WS-15-144-16	WS-15-144	55 lbs.	WS-18-144-16	WS-18-144	66 lbs.	14

ADVANCE TABCO®
SMART FABRICATION™
www.advancetabco.com

Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.

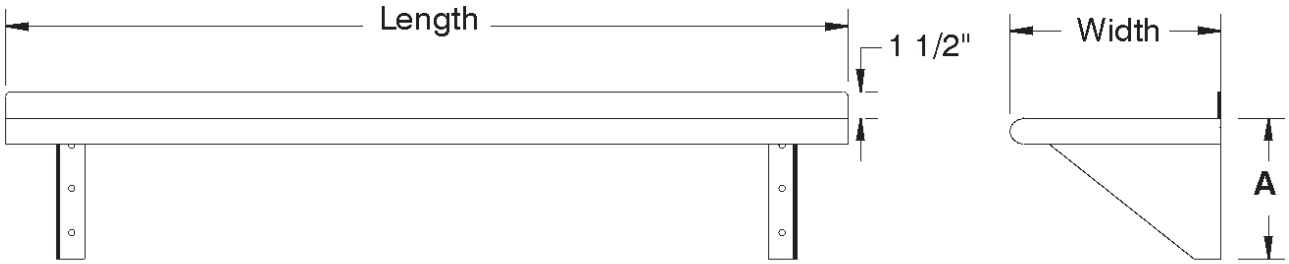
For Orders & Customer Service:
Email: customer@advancetabco.com or **Fax:** 631-242-6900

For Smart Fabrication™ Quotes:
Email: smartfab@advancetabco.com or **Fax:** 631-586-2933

DETAILS and SPECIFICATIONS

TOL ± .500”

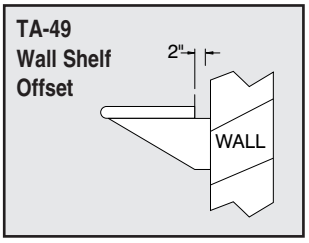
ALL DIMENSIONS ARE TYPICAL



Width	A
10”	8 1/2”
12”	10 1/2”
15”	13 1/2”
18”	16 1/2”

Wall Shelf Options

PRT-1	Printer Shelf
TA-22A	Square Edge Shelf
TA-26	Welded Shelf Brackets
TA-49	Wall Shelf 2” Offset
TA-71	Heat Lamp Provision
TA-77	Check Minder
TA-77A	Concealer for Heat Lamp (Requires TA-77)
TA-99A	14 Ga. S/S 304 Upgrade for Overshelves
TA-100A	Bullnose Edge On All 4 Sides of Shelf
TA-102	6” Cantilever Shelf Offset



Requirements for NSF Installations

1. Install at least 60” above floor.
2. Limit to dry storage.
3. Avoid contact with liquids.
4. For “Ganging-Up” installation, allow at least 2” between units or mount units side by side and seal joints with an approved sealant.

ADVANCE TABCO

SMART FABRICATION™

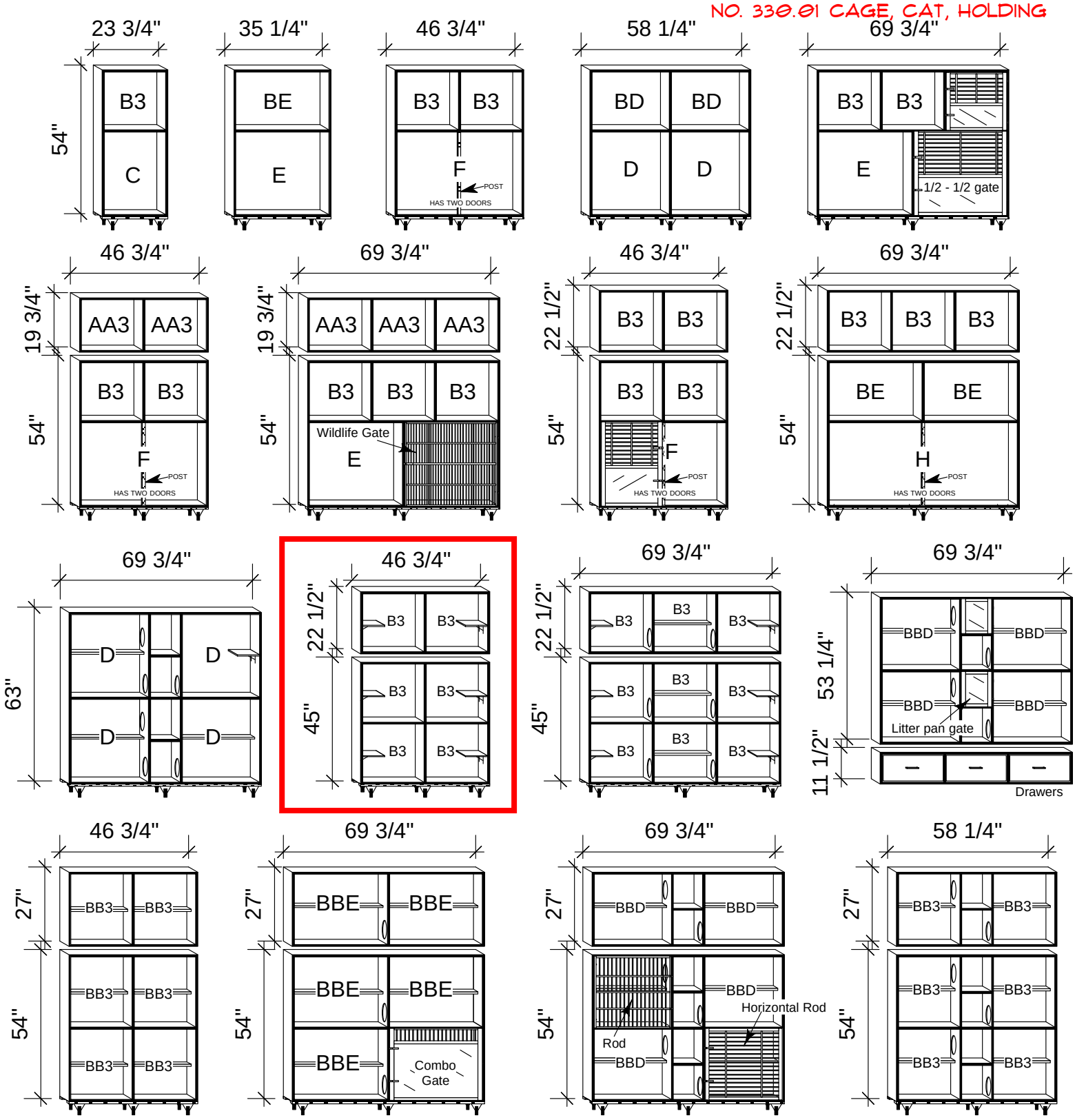
200 Heartland Boulevard, Edgewood, NY 11717-8380

ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

© ADVANCE TABCO, DECEMBER 2016

Cage Combination Examples

NO. 330.01 CAGE, CAT, HOLDING



*Multi-tiered configurations over 54" tall by 58" wide are built as 2-tiered banks with stackable strips (exceptions can be made)

Flooring: FLOOR RACKS (Polypropylene)

#1 = 16"w x 25 3/4"

#2 = 18"w x 25 3/4"

#3 = 21 3/4"w x 25 3/4"

D = 27 3/4"w x 25 3/4"

E = 33 1/4"w x 25 3/4"

Legs (per rack) $11.00

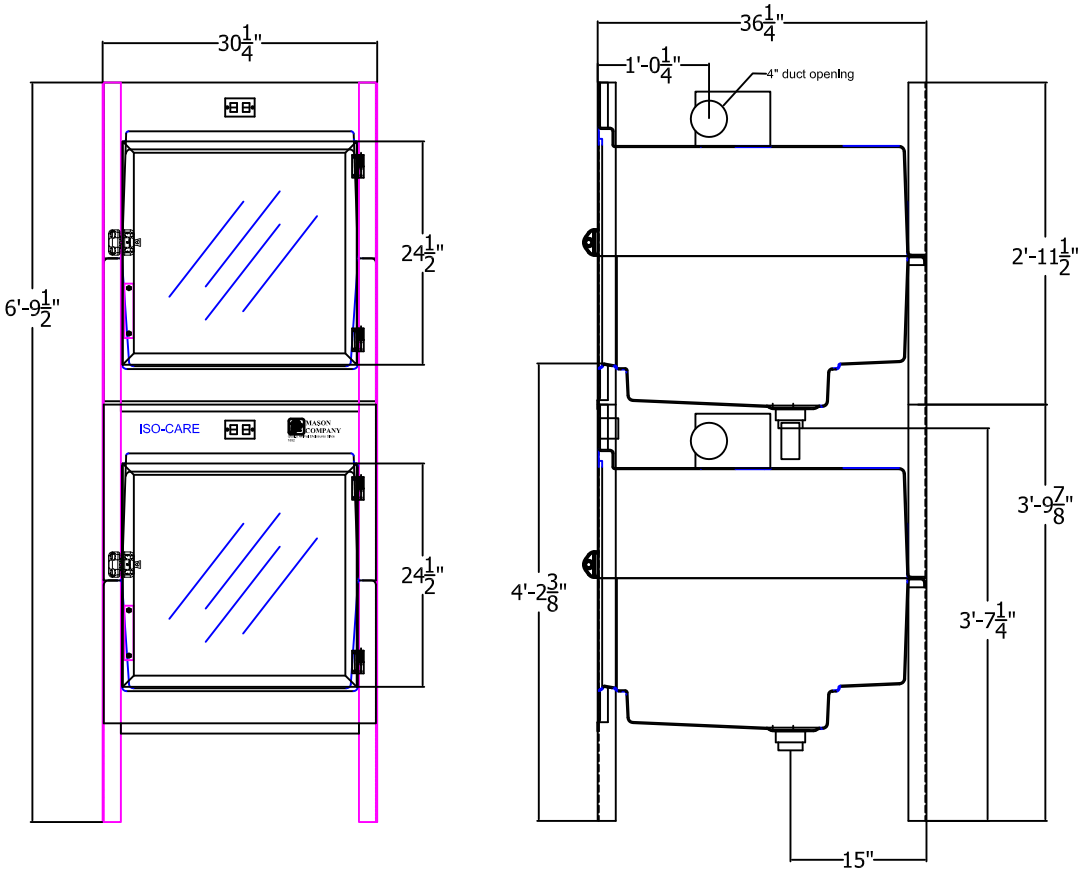
Vinyl Mat: VINYL FLOOR MAT

Roll lengths of 33' (Widths of 24", 30", & 36")

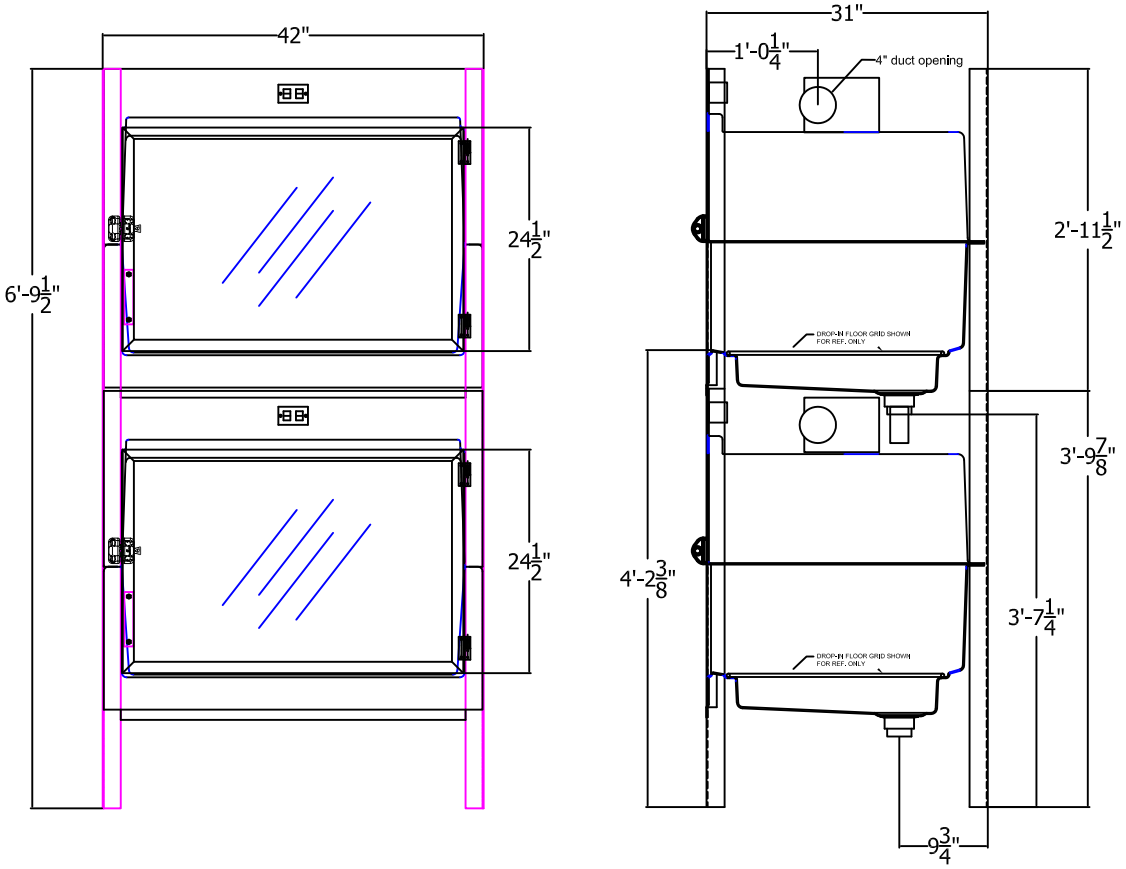
Roll colors: 24" - Black, Blue, & Green
30" - Black
36" - Black, Blue, & Green

NO. 330 CAGE, ISOLATION

30 3/4" x 36 1/4" Iso-Care Unit

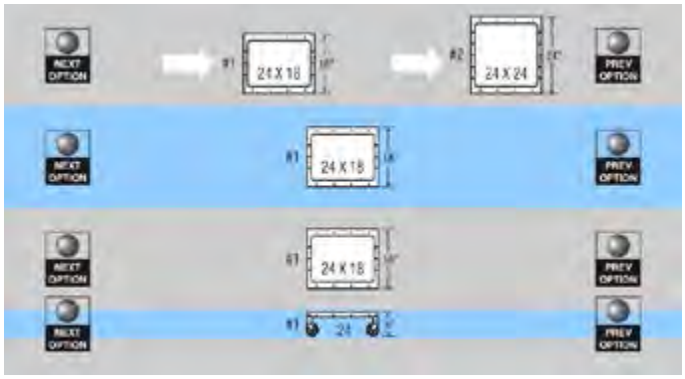


42" x 31" Iso-Care Unit



NO. 332.01 CAGE, STANDARD, STAINLESS 48
NO. 332.02 CAGE, STANDARD, STAINLESS 24
NO. 332.03 CAGE, STANDARD, STAINLESS 30
NO. 332.04 CAGE, STANDARD, STAINLESS 36

- All 20 Gauge 304 Stainless Steel Construction—23% thicker than industry average
- Heavy-duty reversible door
- One-piece stainless steel hinge plate—Multiple attachment points for stability—Prevents sagging
- 3/8" diameter frame
- 1/4" diameter crossmembers
- One-piece stainless steel corner/trim strips—Enhances strength and stability—Easier to clean
- 3/16" diameter vertical rods
- Full 1" radius corners
- Heavy-gauge latch—Padlock or door clip—Extremely quiet—Easily cleaned
- Formed Threading—Will not cross thread or strip out—Prevents self-Locking stainless steel screws from loosening with everyday use
- Easier to clean, less labor cost—Larger radius corners—Fluid retaining lip—Allows for a cleaner kennel environment
- Strong door latches and assemblies—Secure, yet easy to open and close



Configure Your Cage Bank Online

Select an assembly width and browse through the options to find the configuration that fits your needs.

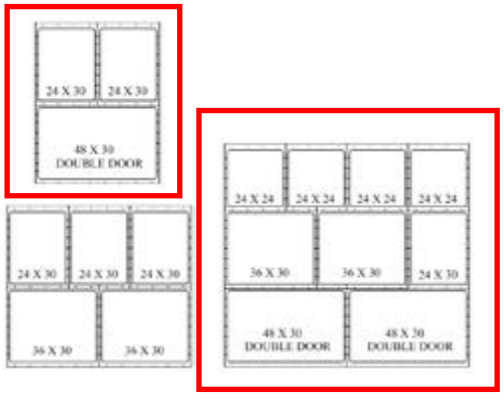
Single Doors

160-1824-00	Single Door 18"w x 24"h x 28"d	$375.00
160-2418-00	Single Door 24"w x 18"h x 28"d	$375.00
160-2424-00	Single Door 24"w x 24"h x 28"d	$386.00
160-2430-00	Single Door 24"w x 30"h x 28"d	$457.00
160-3024-00	Single Door 30"w x 24"h x 28"d	$457.00
160-3030-00	Single Door 30"w x 30"h x 28"d	$519.00
160-3630-00	Single Door 36"w x 30"h x 28"d	$543.00

Double Doors

160-4830-00	Double Door 48"w x 30"h x 28"d	$787.00
160-4830-01	Double Door w/ Spring-loaded Latch 48"w x 30"h x 28"d	$787.00
160-4836-00	Double Door w/ Gravity Latch 48"w x 36"h x 28"d	$787.00

Popular Configurations:



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For questions on these formerly VSSI inc. products or for ordering information, please contact our Carthage customer service team at: **1-800-299-9525**

Made in USA

NO. 332.02 CAGE, SMALL ANIMAL - MODEL 4
NO. 332.03 CAGE, SMALL ANIMAL - MODEL 6

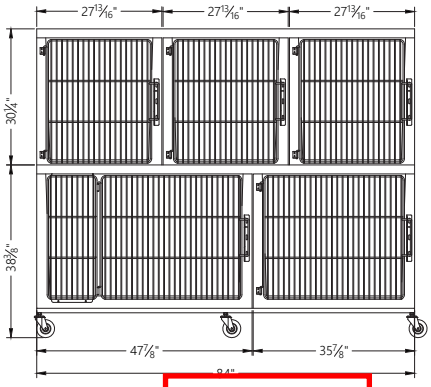
Quiet Cottages™ Fiberglass Cages

THE QUIET AND WARM ALTERNATIVE TO STAINLESS STEEL

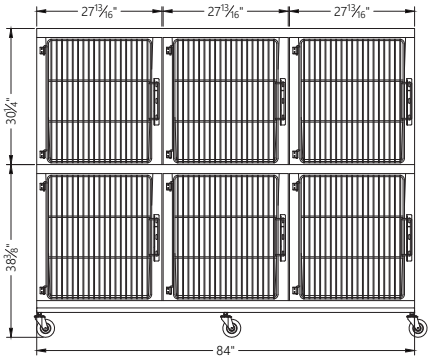
- Manufactured to provide warm, attractive and quiet animal housing areas
- Smooth molded fiberglass construction provides a gentle radius for easy cleaning and promotes a healthy living environment
- Available in several sizes and a variety of configurations
- Some models offered with drains for even quicker cleaning and drying time
- Models offered with drains have a removable 3/4'' grid grate
- Manufactured with welded stainless steel doors for durability
- Comes standard with dual point self-latching doors
- Models 1-8 and 12 come standard with swivel type casters for ease of movement
- Units are manufactured with a front debris and liquid retention lip
- Manufactured with a stainless steel support frame to maintain rigidity

Models 9, 10, and 11 all come equipped with the standard drain.

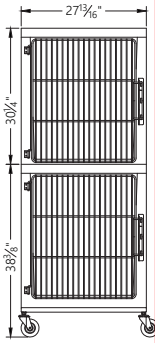
MODEL 1



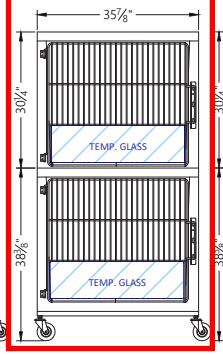
MODEL 2



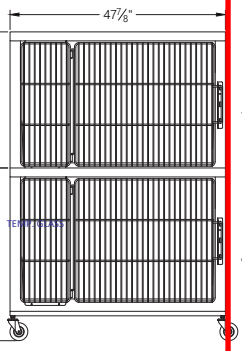
MODEL 3



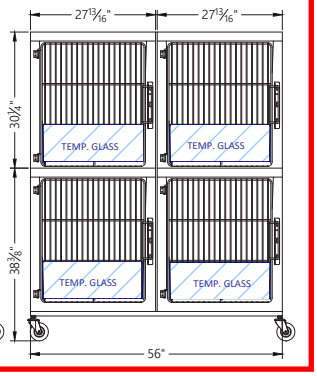
MODEL 4



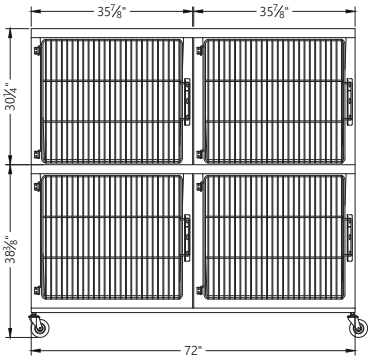
MODEL 5



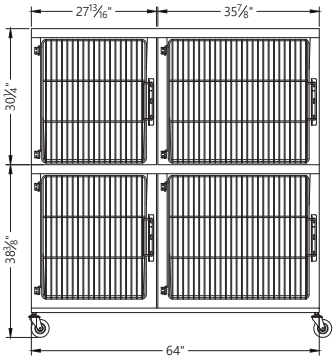
MODEL 6



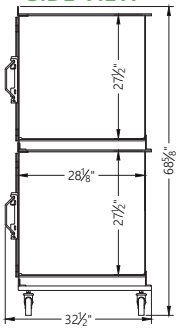
MODEL 7



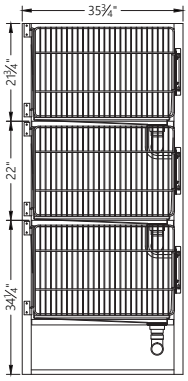
MODEL 8



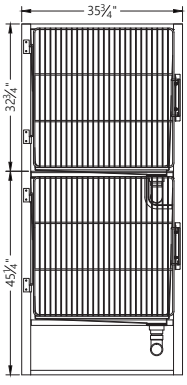
MODEL 1-8
SIDE VIEW



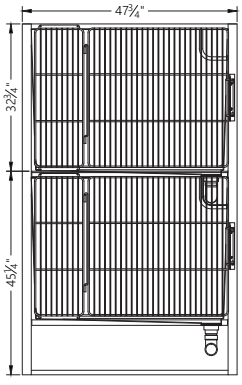
MODEL 9



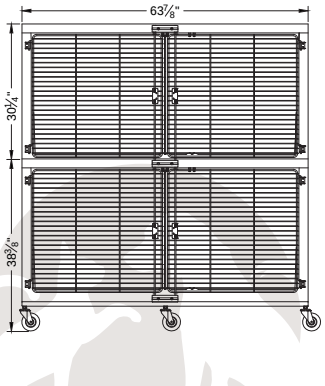
MODEL 10



MODEL 11



MODEL 12



NO. 332.03 CAGE, STANDARD, STAINLESS

Stainless Steel Cages

- All 20 Gauge 304 Stainless Steel Construction—23% thicker than industry average
- Heavy-duty reversible door
- One-piece stainless steel hinge plate—Multiple attachment points for stability—Prevents sagging
- 3/8" diameter frame
- 1/4" diameter crossmembers
- One-piece stainless steel corner/trim strips—Enhances strength and stability—Easier to clean
- 3/16" diameter vertical rods
- Full 1" radius corners
- Heavy-gauge latch—Padlock or door clip—Extremely quiet—Easily cleaned
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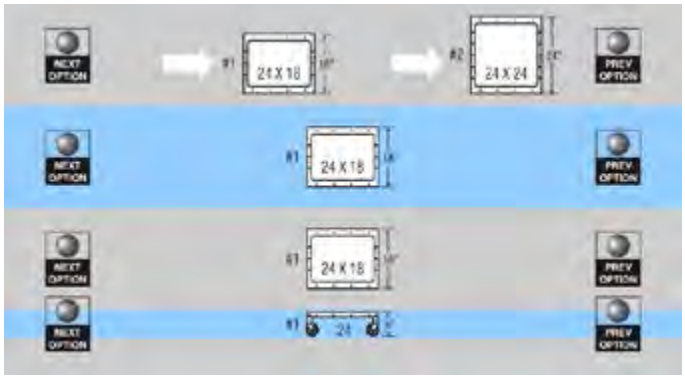

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160-2430-00	Single Door 24"w x 30"h x 28"d	$457.00
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160-3030-00	Single Door 30"w x 30"h x 28"d	$519.00
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160-4830-01	Double Door w/ Spring-loaded Latch 48"w x 30"h x 28"d	$787.00
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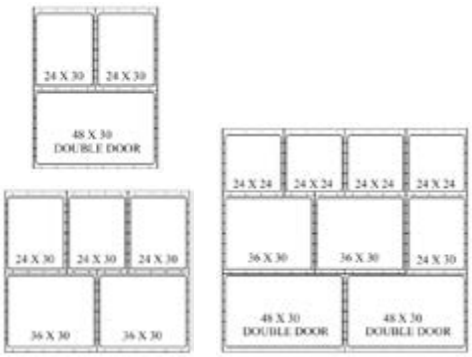

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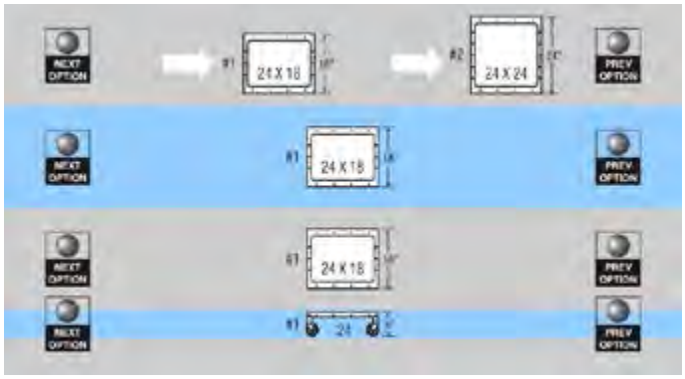
For questions on these formerly VSSI inc. products or for ordering information, please contact our Carthage customer service team at: 1-800-299-9525

Made in USA

NO. 332.04 CAGE, STANDARD, STAINLESS

Stainless Steel Cages

- All 20 Gauge 304 Stainless Steel Construction—23% thicker than industry average
- Heavy-duty reversible door
- One-piece stainless steel hinge plate—Multiple attachment points for stability—Prevents sagging
- 3/8" diameter frame
- 1/4" diameter crossmembers
- One-piece stainless steel corner/trim strips—Enhances strength and stability—Easier to clean
- 3/16" diameter vertical rods
- Full 1" radius corners
- Heavy-gauge latch—Padlock or door clip—Extremely quiet—Easily cleaned
- Formed Threading—Will not cross thread or strip out—Prevents self-Locking stainless steel screws from loosening with everyday use
- Easier to clean, less labor cost—Larger radius corners—Fluid retaining lip—Allows for a cleaner kennel environment
- Strong door latches and assemblies—Secure, yet easy to open and close



Configure Your Cage Bank Online

Select an assembly width and browse through the options to find the configuration that fits your needs.

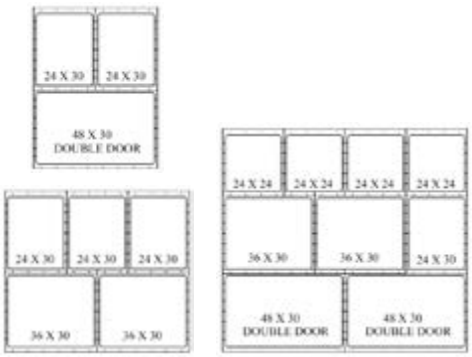
Single Doors

160-1824-00	Single Door 18"w x 24"h x 28"d	$375.00
160-2418-00	Single Door 24"w x 18"h x 28"d	$375.00
160-2424-00	Single Door 24"w x 24"h x 28"d	$386.00
160-2430-00	Single Door 24"w x 30"h x 28"d	$457.00
160-3024-00	Single Door 30"w x 24"h x 28"d	$457.00
160-3630-00	Single Door 36"w x 30"h x 28"d	$543.00

Double Doors

160-4830-00	Double Door 48"w x 30"h x 28"d	$787.00
160-4830-01	Double Door w/ Spring-loaded Latch 48"w x 30"h x 28"d	$787.00
160-4836-00	Double Door w/ Gravity Latch 48"w x 36"h x 28"d	$787.00

Popular Configurations:



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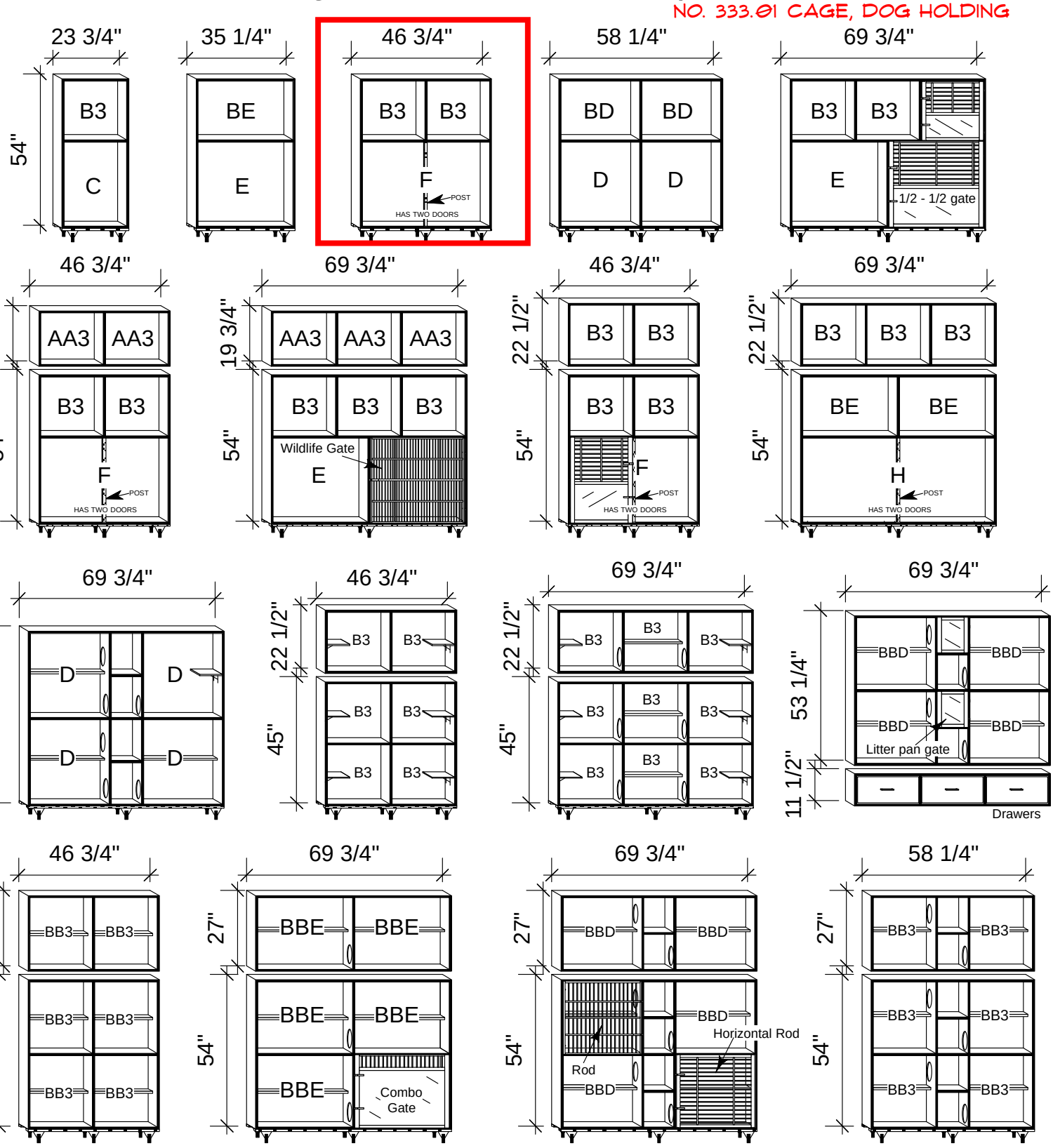
Made in USA

Cage Combination Examples

NO. 333.01 CAGE, DOG HOLDING



*Multi-tiered configurations over 54" tall by 58" wide are built as 2-tiered banks with stackable strips (exceptions can be made)

Flooring: FLOOR RACKS (Polypropylene)

#1 = 16"w x 25 3/4"

#2 = 18"w x 25 3/4"

#3 = 21 3/4"w x 25 3/4"

D = 27 3/4"w x 25 3/4"

E = 33 1/4"w x 25 3/4"

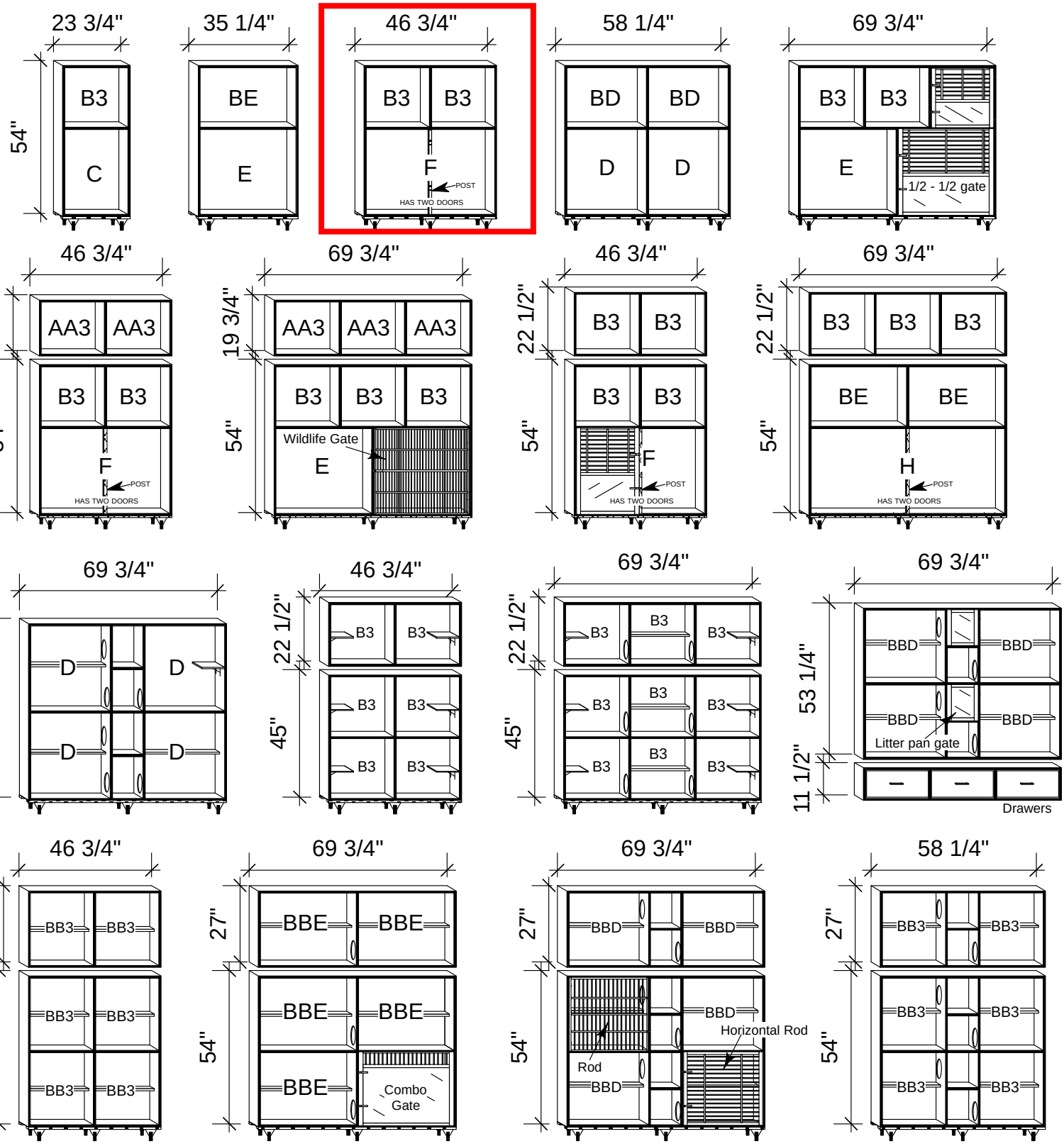
Legs (per rack) $11.00

Vinyl Mat: VINYL FLOOR MAT

Roll lengths of 33' (Widths of 24", 30", & 36")

Roll colors: 24" - Black, Blue, & Green
30" - Black
36" - Black, Blue, & Green

Cage Combination Examples



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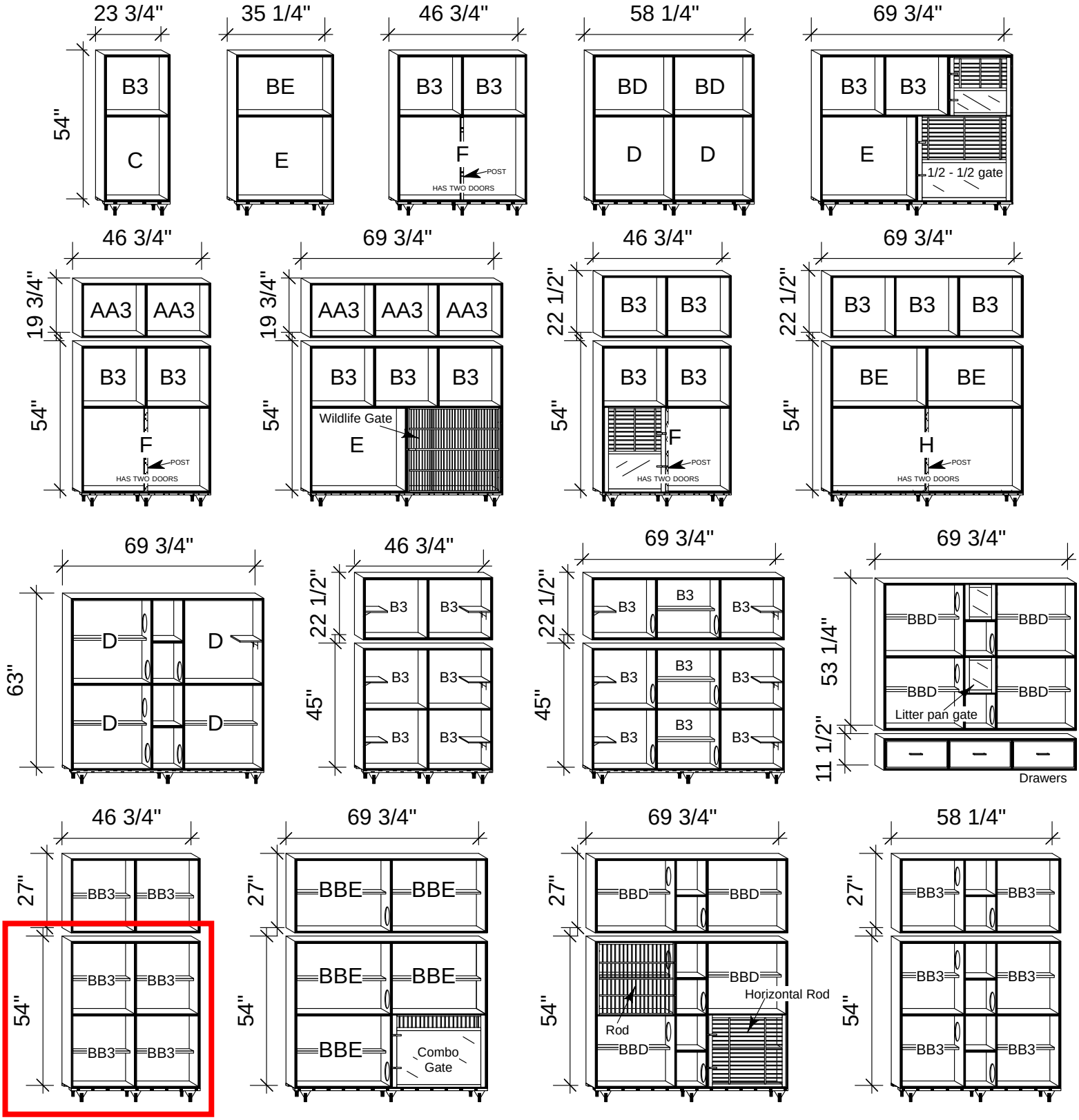

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Legs (per rack) $11.00

Vinyl Mat: VINYL FLOOR MAT

Roll lengths of 33' (Widths of 24", 30", & 36")

Roll colors: 24" - Black, Blue, & Green
30" - Black
36" - Black, Blue, & Green

NO. 334 CAGE, AVIAN

OPERATING MANUAL

BIRD VERTICAL DISPLAY SYSTEMS

Commercial Systems
MARINELAND®

IMPORTANT SAFEGUARDS

WARNING

To guard against injury, basic safety precautions should be observed, including the following:

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

DANGER

**To avoid possible electric shock, special care should be taken in the use of this equipment.
For each of the following situations, do not attempt repairs yourself;
contact an authorized service facility for service.**

1. **Do not operate appliance if it has a damaged cord or plug, or if it is malfunctioning or if it is dropped or damaged in any manner.**
2. **Close supervision is necessary when any appliance is used by or near children.**
3. **To avoid injury, do not contact moving parts or hot parts such as reflectors, lamp bulbs, etc.**
4. **Always turn off power at main disconnect when not in use, before putting on or taking off lamp bulbs. Never yank a cord to pull a plug. Grasp the plug and pull to disconnect.**

5 **Do not use an appliance for other than intended use. The use of attachments not recommended or sold by the appliance manufacturer may cause an unsafe condition.**

6. **Make sure appliance is installed properly before operating it.**
7. **Read and observe all the important notices on the appliance.**
6. **This appliance is to be installed with all appropriate codes and ordinances.**

SAVE THESE INSTRUCTIONS

The Vertical Display System for Birds. Easier Maintenance, Increased Sales!

This manual will provide you with the information you need to successfully operate and maintain your Bird Vertical Display System. Please read it carefully and keep it for future reference.

Congratulations on your new, "Plug and Play" Marineland Bird Merchandiser purchase!

Improve your sales, enhance viewing and use less energy!

All part of the Marineland Bird Cage Merchandiser.

Your fully integrated Marineland, 3-Tier Bird System provides easy-to-maintain enclosures with Slide-out removable cages for easier cleaning and better hygiene.

The birds will love it and you will appreciate all the extra features the Bird Display System has to offer.

FEATURES

1 ► REMOVABLE CAGES TO ACCESS LIGHT FIXTURES AND FOR EASIER CLEANING OF UNIT AND CAGES.

2 ► REMOVABLE SLIDE-OUT SUBSTRATE TRAYS AND GRATES

3 ► PERCHES AND FEEDING/WATER BOWLS FOR EACH CAGE

4 ► FLUORESCENT LIGHTING

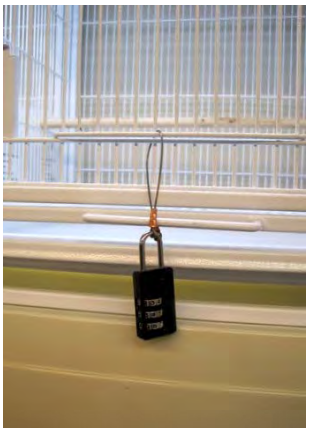
5 ► OPTIONAL MANUAL LOCKS FOR EACH CAGE

6 ► ALUMINUM CLADDING AND DURABLE ABS PANELS

1

2

5



6

SYSTEM SPECIFICATIONS – 3 TIER BIRD CAGE DISPLAY SYSTEM

MECHANICAL (approximate):
Size: $42^{1/4}$"L x $21^{3/4}$"W x 80"H
Locking System: Manual Locks (Optional)
ELECTRICAL:
Voltage: 120 VAC / 60Hz, 1 AMP
LIGHTING:
Lights: 3-each T8-25 watt Fluorescent
BUYER SUPPLIED CONNECTIONS:
Cord Connection: 120 VAC, 60 Hz, 15 AMP (plug and play)

INSTALLATION INSTRUCTIONS

Step 1: Position Bird Display System

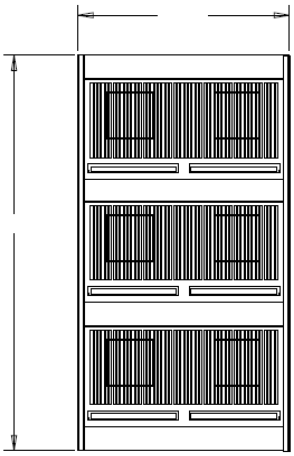
With the assistance of at least one other person, move the pallet/crate with Bird Display unit to the installation area.

NOTE: To ensure easier installation, do not remove the Bird Display unit from the pallet/crate, until you have moved the unit to the installation area.

Use a pallet jack if possible.

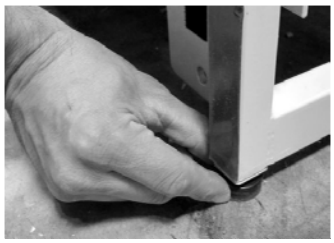
Step 2: Unwrap/Remove Bird Display

With assistance, unwrap and remove unit from pallet/crate.



Step 3: Level Assembled Rack

Place the unit where you want it to be and check horizontal and vertical levels. Adjust Leveling Legs as necessary.



Step 4: Plug in Bird Display System

Have the Lighting System connections plugged into the appropriate receptacle.

For system technical support call the MaRS Technical Support Division: **(800) 576-6277**

MAINTENANCE

Enclosure Maintenance (as needed)

After removing substrate , bowls and other décor within the enclosure, use a damp cloth to remove dirt , dust and bird waste (a mild soap can be used if necessary).

*A damp cloth can also be used to remove dirt , dust and bird waste from within the within the trays and on the grates within the unit.

*Use a mild soap if necessary, do not use abrasive pads or harsh chemicals to clean the cages or modular. DO NOT USE DAMP CLOTH ON ELECTRICAL COMPONENTS (lighting).

*For a more thorough cleaning, the cages can be removed away from the Bird Unit.

Safety note: if possible, it's recommended that assistance is used to remove the cages from the Bird Display. Carefully remove the cages to prevent cosmetic damage to the bird unit.

FLUORESCENT LAMP REPLACEMENT

To ensure maximum illumination and color reflection, we recommend that you replace with the same lamp type for proper operation. To replace them with "Cool White" or other lamps of lesser quality will greatly lessen lighting intensity and overall effect. The fluorescent lamp provides a pure white Full Spectrum illumination.

1. To replace the fluorescent lamp, simply unplug the light power.
   NEVER change lamps on fixture while it's on.

2. Remove the cage(s) within, (this procedure makes it easier to replace lamps).

3. Remove fluorescent lamp. Gently twist 90 degrees and push backward and out from mounted station slots. Discard (according to established environmental procedure).

4. Replace discarded lamps with new lamps. Gently insert ends into slots and push up and forward or up and back until lamp fits securely in place.

5. After replacing the lamp, plug in the Bird System light power cord. Make sure the new lamp works before replacing the cage.

To order Fluorescent lamps, please call Marineland at 800-576-6277.

MANAUL LOCK INSTRUCTIONS

Operating Instructions.

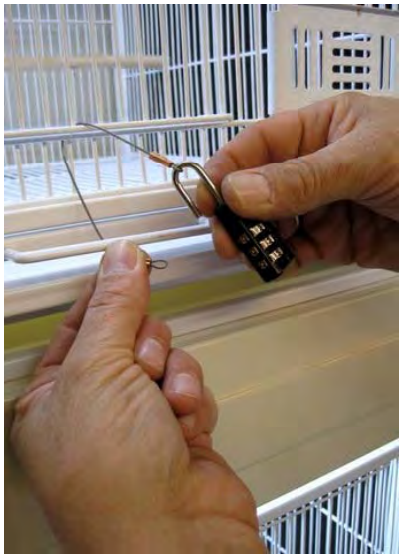
This lock is preset at the factory to open at 0-0-0.

To set own combination:

1. With dials at 0-0-0, pull out shackle.
2. Turn shackle counterclockwise 90° (1/4 turn) and press it down.
3. Continue pressing shackle and turn another 90° (1/4 turn).
4. Set the dials to your own combination.
5. Turn shackle clockwise back to the original 90° position. Lift and return shackle to closed position.

Cage Locking Instruction..

1. Loop small cable through Cage door and through bottom grate handle.
2. Once looped connect cable to lock and press close.



LIMITED WARRANTY

Marineland warrants their Bird Display systems for one year against defects in materials or workmanship. This warranty applies only to the system and does not cover water quality, live product, replacement parts or maintenance supplies.

If your system is found to be defective - and has not been modified, damaged or misused – call Marineland Commercial Aquariums (toll free) at (800) 576-6277 or fax us at (805) 517-7198. All calls received during regular business hours (8am - 5pm, Pacific Time) will be responded to within 24 hours. Please have your manual and the system serial number ready.

In most cases, the problem will be resolved by a simple maintenance procedure, recommendation or repair authorization. Upon authorization, and in instances where outside repair or replacement of parts is necessary, Marineland will absorb all appropriate costs.

Damage or injuries resulting from negligence, misuse or user modification are not covered by this warranty. Incidental or consequential damages are specifically excluded.

** This warranty gives you specific legal rights. You may also have other rights which vary from state to state.*

** Because some states do not allow the exclusion of incidental or consequential damages, this exclusion may not apply to you.*

CUSTOMER SERVICE

For emergency problems with this system, call the
MaRS Customer Service, Technical Support
at 800-576-6277
For non-emergency problems or questions please call the above number from 7a.m. – 5p.m. Monday – Friday.

CONSUMABLES ITEMS

SERVICING ITEMS

ADDITIONAL ITEMS

Z0-------- 8/12

All Fluorescent Lamps and Ultra Violet Lamps contain mercury.

Dispose of Properly.

MADE IN THE U S A

Commercial Systems MARINELAND®

UNITED PET GROUP, INC

A Division of The United Pet Group · Moorpark, CA 93021

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NO. 350.1 CONDO, FELINE, LITTER UNIT

Raintree™ Cat Condos

MATERIAL

3/4" thick melamine or PVC with a high pressure laminate coating

STANDARD FEATURES

- Wood-Grain Finish Condo Doors
- Coated Wire Grid Door Mesh
- Sealed Corners
- Two Built-In Feeding/ Watering/Resting Ledges
- Litter Area Privacy

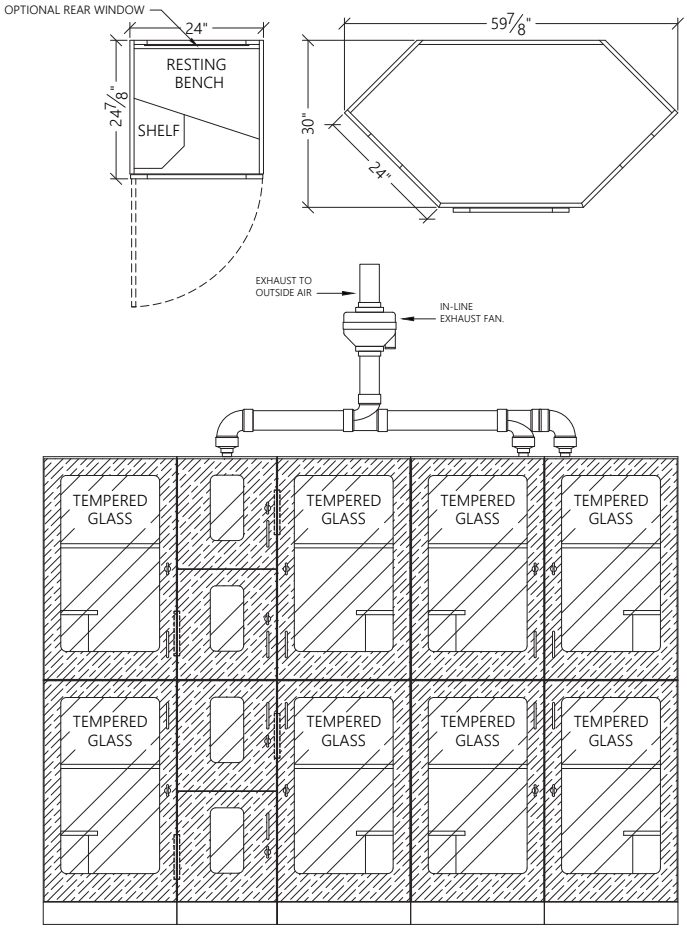
SIZE

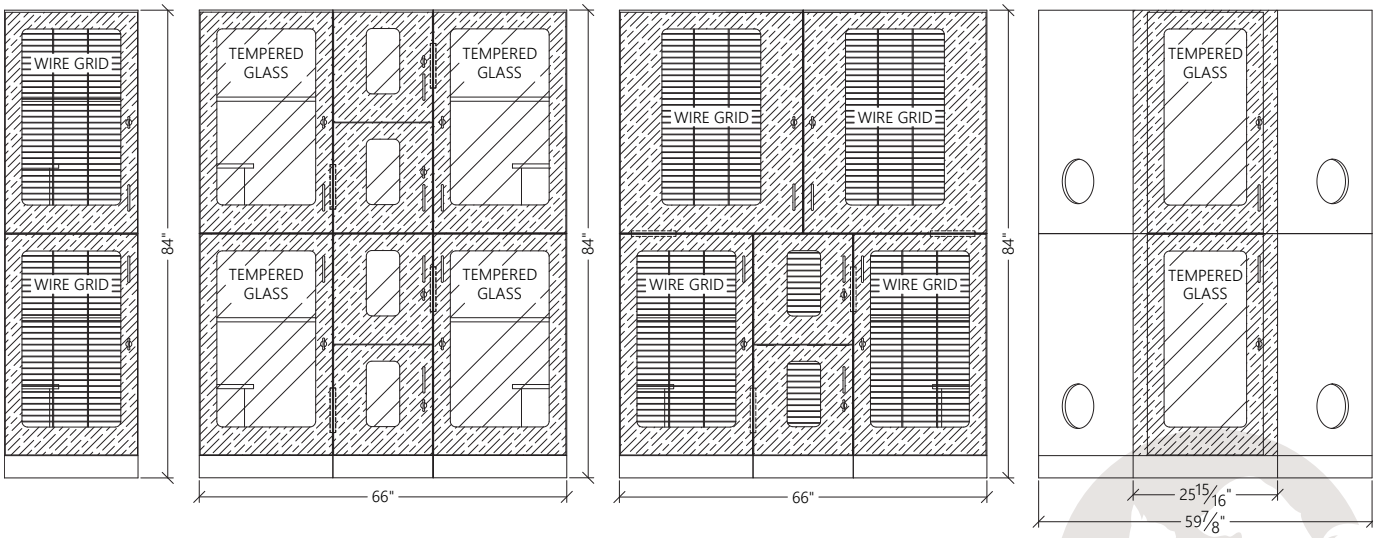
84" H X 24" W X 24 7/8" Deep

OPTIONAL FEATURES

- Tempered Glass Doors With Air Vents
- Integrated Ventilation Ductwork (Ready For Connection To External Exhaust System)
- Optional flexible hosing for vented units on casters
- Wood-Grain Finish Side/Back Panels
- Matching Storage Closet
- Corner Unit Trim Kit
- Luxury Play Top
- Litter Pan

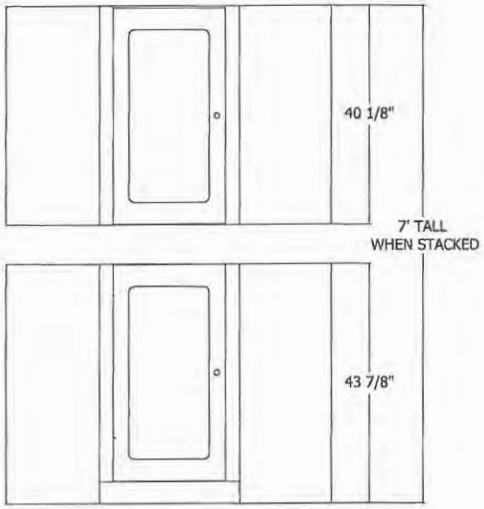
CORNER UNIT



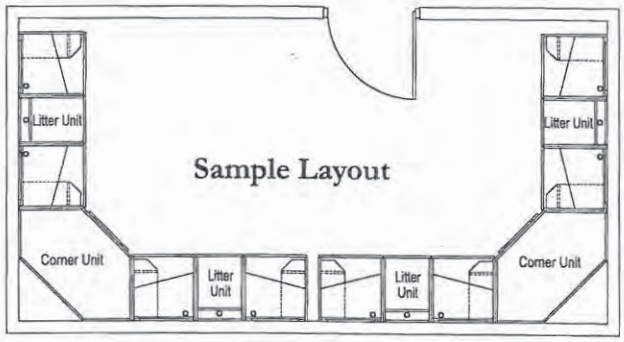


Double Stack Unit

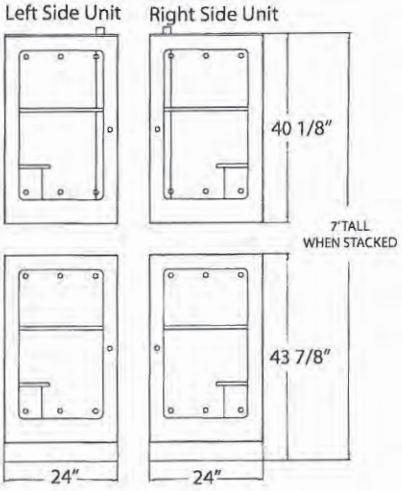
Corner Units



Front View with Doors

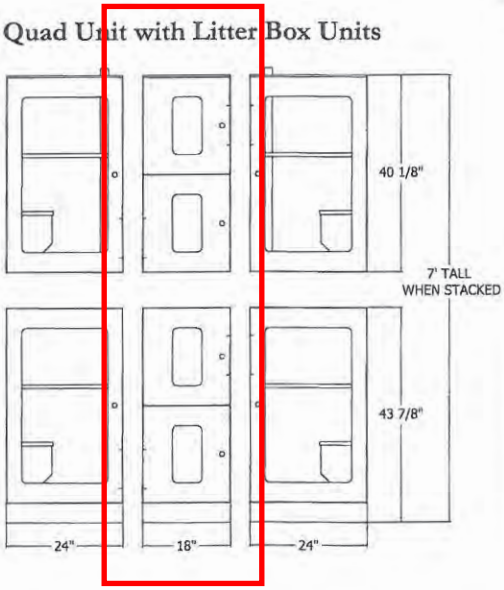


Quad Unit

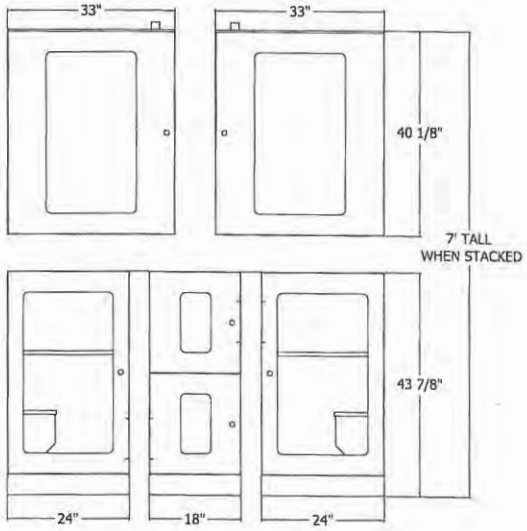


Front View with Doors

Quad Unit with Litter Box Units



Ultra Luxury Unit



NO. 350.2 CONDO, FELINE, LITTER UNIT, GRID FRONT

Raintree™ Cat Condos

MATERIAL

3/4" thick melamine or PVC with a high pressure laminate coating

STANDARD FEATURES

- Wood-Grain Finish Condo Doors
- Coated Wire Grid Door Mesh
- Sealed Corners
- Two Built-In Feeding/ Watering/Resting Ledges
- Litter Area Privacy

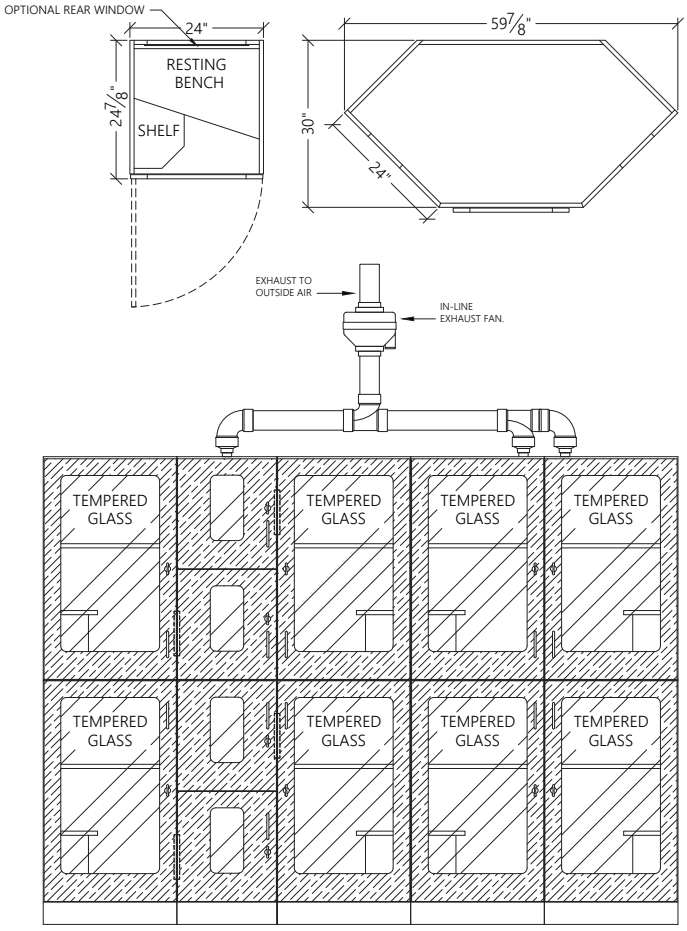
SIZE

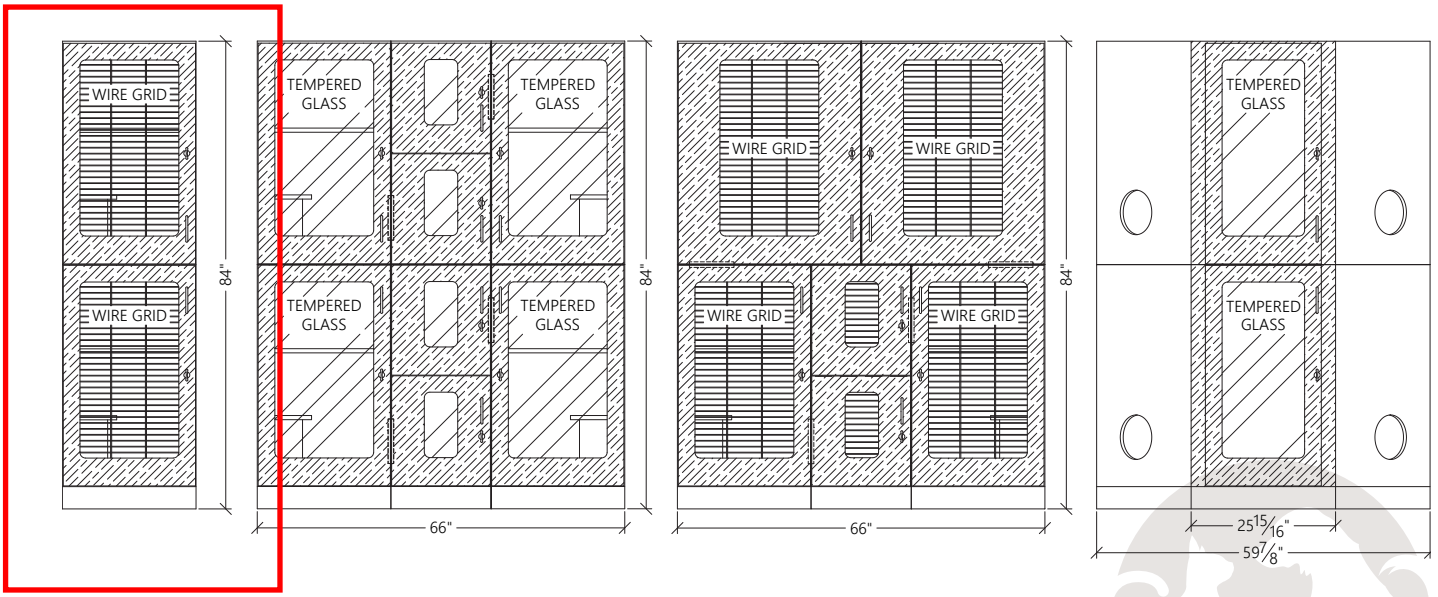
84" H X 24" W X 24 7/8" Deep

OPTIONAL FEATURES

- Tempered Glass Doors With Air Vents
- Integrated Ventilation Ductwork (Ready For Connection To External Exhaust System)
- Optional flexible hosing for vented units on casters
- Wood-Grain Finish Side/Back Panels
- Matching Storage Closet
- Corner Unit Trim Kit
- Luxury Play Top
- Litter Pan

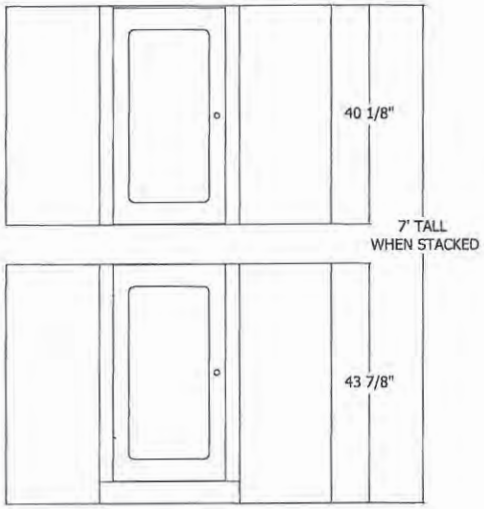
CORNER UNIT



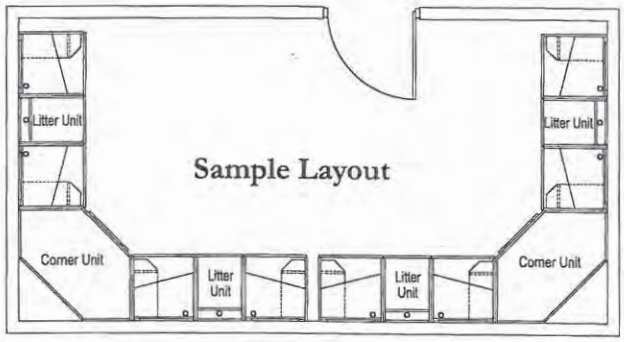


Double Stack Unit

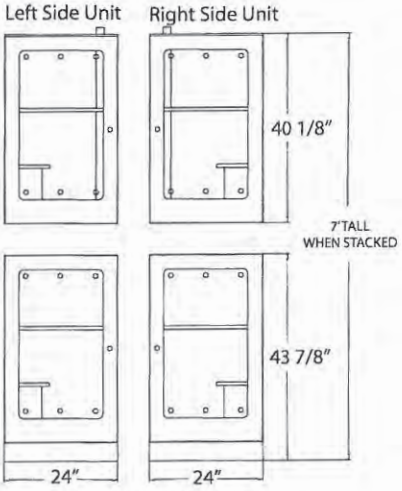
Corner Units



Front View with Doors

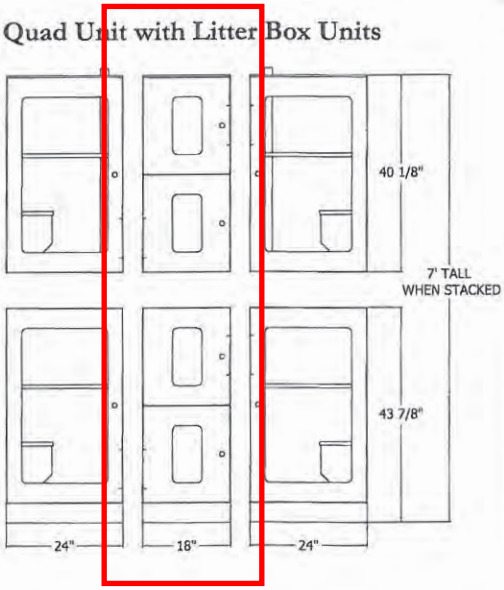


Quad Unit

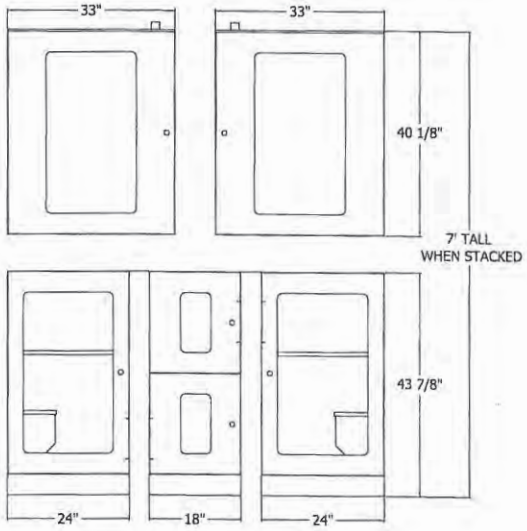


Front View with Doors

Quad Unit with Litter Box Units



Ultra Luxury Unit



NO. 350 CONDO, FELINE

Raintree™ Cat Condos

MATERIAL

3/4" thick melamine or PVC with a high pressure laminate coating

STANDARD FEATURES

- Wood-Grain Finish Condo Doors
- Coated Wire Grid Door Mesh
- Sealed Corners
- Two Built-In Feeding/ Watering/Resting Ledges
- Litter Area Privacy

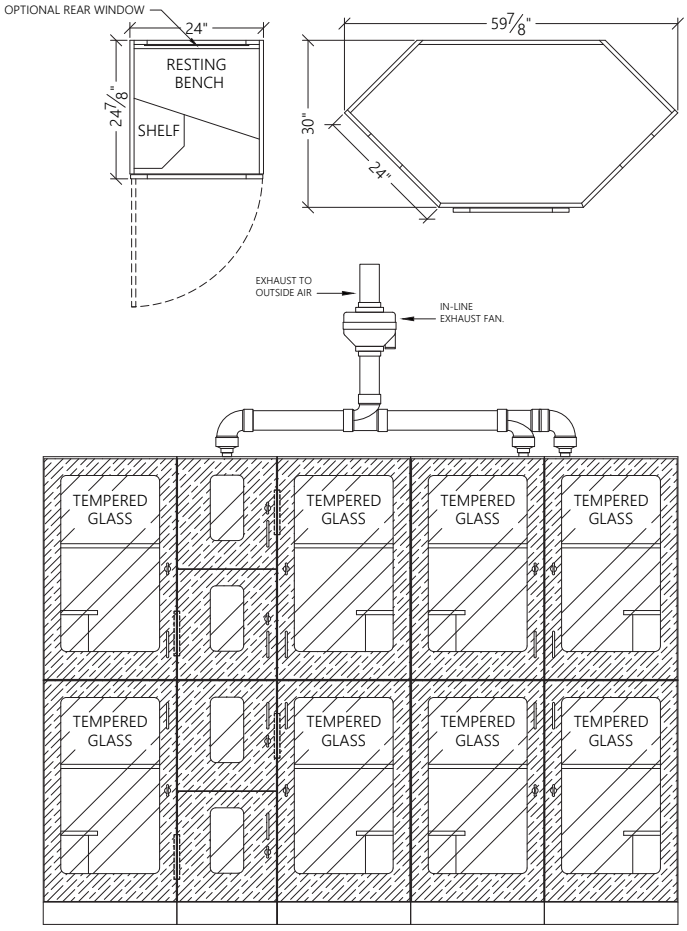
SIZE

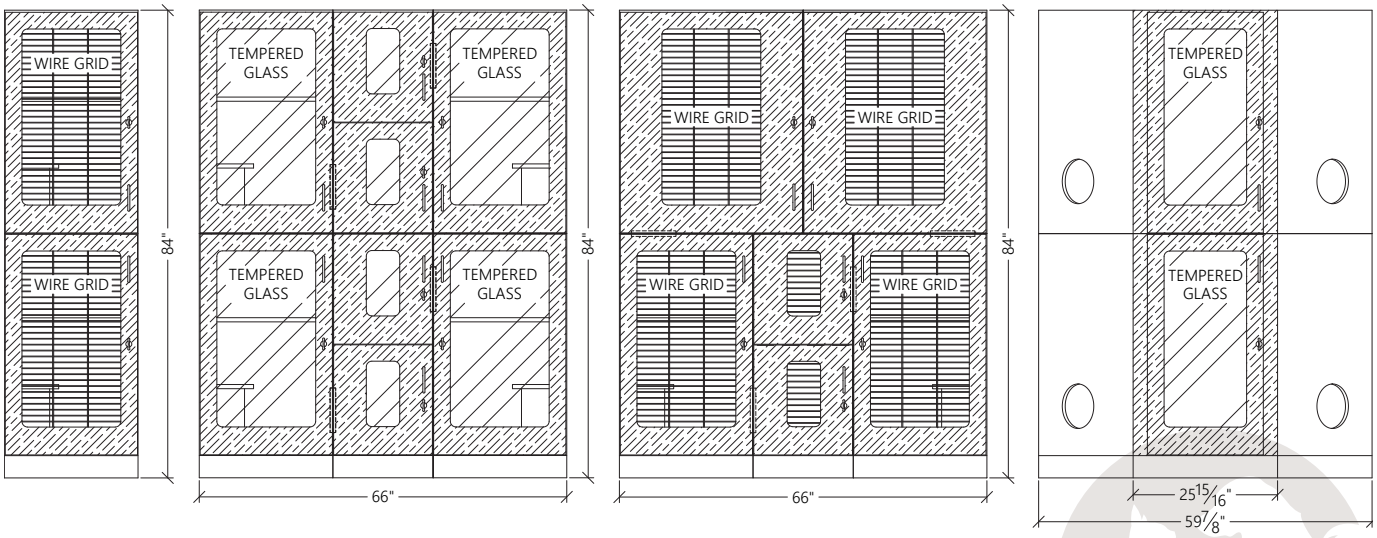
84" H X 24" W X 24 7/8" Deep

OPTIONAL FEATURES

- Tempered Glass Doors With Air Vents
- Integrated Ventilation Ductwork (Ready For Connection To External Exhaust System)
- Optional flexible hosing for vented units on casters
- Wood-Grain Finish Side/Back Panels
- Matching Storage Closet
- Corner Unit Trim Kit
- Luxury Play Top
- Litter Pan

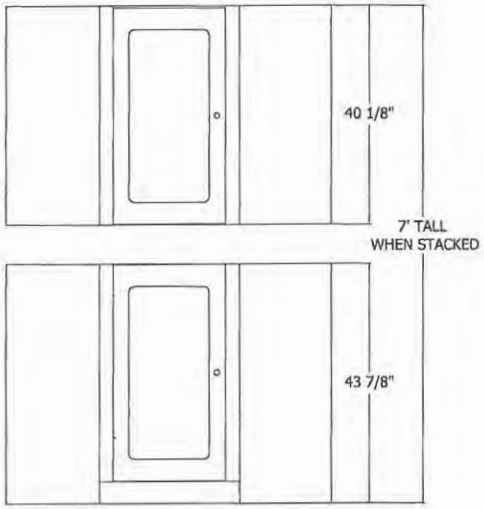
CORNER UNIT



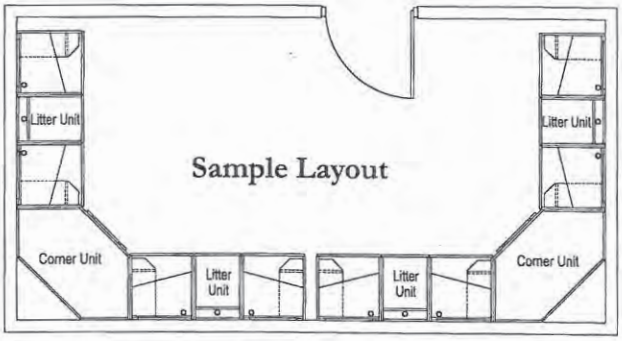


Double Stack Unit

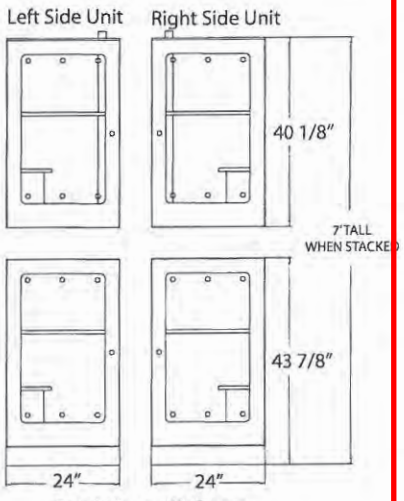
Corner Units



Front View with Doors

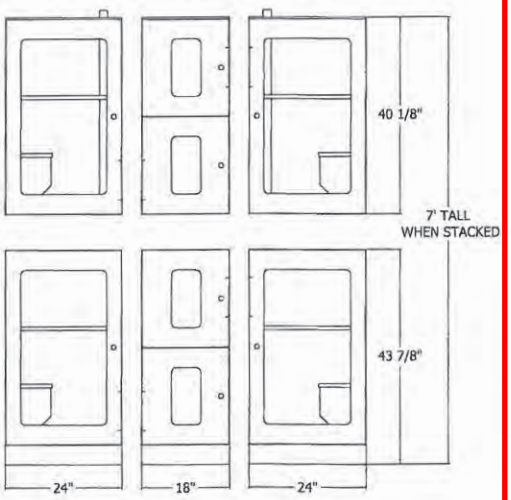


Quad Unit

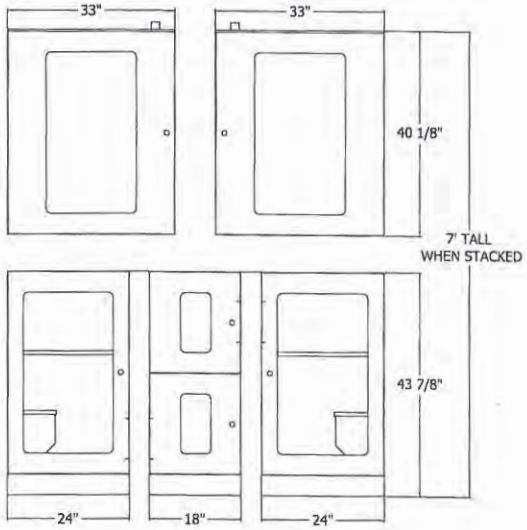


Front View with Doors

Quad Unit with Litter Box Units



Ultra Luxury Unit



OPERATING MANUAL

SMALL ANIMAL VERTICAL DISPLAY SYSTEMS

Commercial Systems
MARINELAND®

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IMPORTANT SAFEGUARDS

WARNING

To guard against injury, basic safety precautions should be observed, including the following:

READ AND FOLLOW ALL
SAFETY INSTRUCTIONS

DANGER

To avoid possible electric shock, special care should be taken in the use of this equipment.
For each of the following situations, do not attempt repairs yourself;
contact an authorized service facility for service.

1. A. **If an appliance falls into the water, DON'T reach for it! First turn off power at main disconnect and then retrieve it. If electrical components of the appliance get wet, turn off the appliance immediately.**
   B. **Carefully examine the appliance after installation. It should not be plugged in if there is water on parts not intended to be wet.**
   C. **Do not operate any appliance if it has a damaged cord or plug, or if it is malfunctioning or if it is dropped or damaged in any manner.**

2. **Close supervision is necessary when any appliance is used by or near children.**

3. **To avoid injury, do not contact moving parts or hot parts such as heaters, reflectors, lamp bulbs, etc.**

4. **Always turn off power at main disconnect when not in use, before putting on or taking off parts and before cleaning. Never yank a cord to pull a plug. Grasp the plug and pull to disconnect.**

5 **Do not use an appliance for other than intended use. The use of attachments not recommended or sold by the appliance manufacturer may cause an unsafe condition.**

6. **Do not install or store the appliance where it will be exposed to the weather or to temperatures below freezing.**

7. **Make sure appliance is securely installed before operating it.**

8. **Read and observe all the important notices on the appliance.**

9. **This appliance should be connected to a grounded, metallic, permanent wiring system, or an equipment-grounding conductor should be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the appliance.**

10. **This appliance is to be installed by a qualified electrician in accordance with all appropriate codes and ordinances.**

SAVE THESE INSTRUCTIONS

The High Capacity Vertical Display System for Healthier Small Animals, Easier Maintenance, Increased Sales!

This manual will provide you with the information you need to successfully operate and maintain your Small Animal Vertical Display System. Please read it carefully and keep it for future reference.

Your fully integrated Marineland Small Animal System provides easy-to-maintain enclosures with minimal corners for easier cleaning and better hygiene. Enclosures slide out like no other system for cleaning purposes, better viewing of species and alternate capture. Also included are removable dividers that allow you to use an entire tank for larger species or just to make a more spacious enclosure. These enclosures are ventilated with perforated, closing lids and vents for optimal use of Ventilation System that includes Odor Control Cartridges.

The Marineland Small Animal System enhances viewing, improves sales and uses less energy.

Congratulations on your new, "Plug and Play" Marineland Small Animal Merchandiser purchase!

SYSTEM Specifications

Integrated 3 Drawer / Habitat Rack System
Small Animal Vertical Display Modular System

MECHANICAL (approximate):

Size: 52“L x 25“W x 76"H

Shipping Weight: 640 lbs (approx.)

Locking System: Mechanical Key

(Key Fob Option)

ELECTRICAL:

Voltage: 120 VAC / 60Hz, 5 AMP

LIGHTING:

Lights: T8-32 watt Florescent

AIR CIRCULATION:

Blower: 150 CFM

Filter: 60 Square Inches

BUYER SUPPLIED CONNECTIONS:

Cord Connection: 120 VAC, 60 Hz, 15 AMP

APPROVALS:

Electrical Safety: ETL Listed

Seismic: California Seismic Code

MATERIALS OF CONSTRUCTION:

Frame: Powder Coated Steel

Drawer Glides: 150 lbs

Glass: 3/16” Tempered

Doors: Extruded Aluminum

Side Panels: Impact Resistant ABS

Installation Instructions

For system technical support call the

MaRS Technical Support Division: **(800) 576-6277**

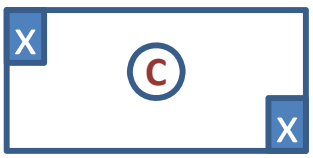
Your Small Animal system comes complete with these installation items:

- "Red Head" cement anchors with required nuts and washers
- Seismic braces and bolts
- Grade 5 "through" Bolts
- Extra leveling legs
- Roll of 1-inch, 2-sided mounting tape

In addition to those provided, you will need these items:

- Heavy-duty hammer drill with a 3/8-inch bit and drill gauge
- Tape measure
- ½-inch and a 9/16-inch open-end wrench
- Ratchet with a 9/16-inch socket
- Hammer
- Channel lock pliers
- Two levels: One large, one small

Note: A specially designed dolly is available for rent from Marineland for easier movement of the MaRS units.



FRONT OF REPTILE UNIT

Step 1: Position Small Animal System

Assistance of at least one other person is recommended to roll the Small Animal unit into the installation area.

Carefully place the Small Animal unit in an upright position. Make sure the unit is straight and in the correct place. Place the seismic brace and determine the proper drilling sites for the seismic brace anchor bolt holes. Make sure the hole on the unit is in the middle (*see picture A*)Use a black permanent marker to dot the area where you will drill into the floor (*see picture B*).

The Small Animal System will be anchored in 2-Corners (see drawing C).

Installation Instructions cont.

Step 2: Score and Drill

Remove the Small Animal system away from the marked area and use the drill to score the necessary holes. Drill the holes 3-inches deep at both corners.

NOTE: Take extra care to make sure the holes are drilled vertically.

Step 3: Install Anchor Bolts

Position each bolt in a drilled hole and hammer securely into place. Each anchor bolt should extend about 1 ½ - inches up from floor level.

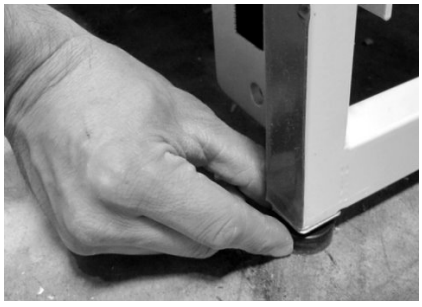
Step 4: Position Small Animal System

With the assistance of at least one other person, roll the small animal unit back into the installation area. Carefully tilt the Small Animal System to clear the anchor bolts and place the unit in an upright position.

NOTE: To ensure easier installation, remove front bottom (Kick) Panel. **Do not install provided end panels until the unit has been installed.**

Step 5: Level Assembled Rack

Check horizontal and vertical levels. Adjust Leveling Legs as necessary.



Step 6: Install Seismic Braces

Fit Seismic Braces to the cement Anchor Bolts. Attach Braces using washers and nuts provided.

Installation Instructions cont.

Step 7: Secure Assembled Rack

Insert front Through Bolts into the frame and Seismic Brackets (A). Secure all connections (B).

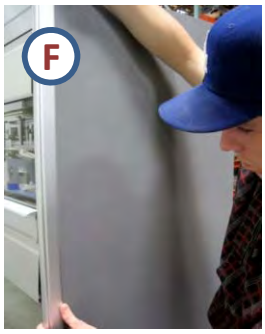
Before you begin Step 8 & 9, make sure you line up the End Panels and Vertical Extrusions correctly.

Step 8: Install System Side Panels

Strips of double-sided tape are included on the narrow surfaces of the end framework. Peel the tape (C) and press panels firmly into place (D). **Note:** Do not peel the front tape where the Vertical extrusion goes.

Step 9: Install System Vertical Extrusions

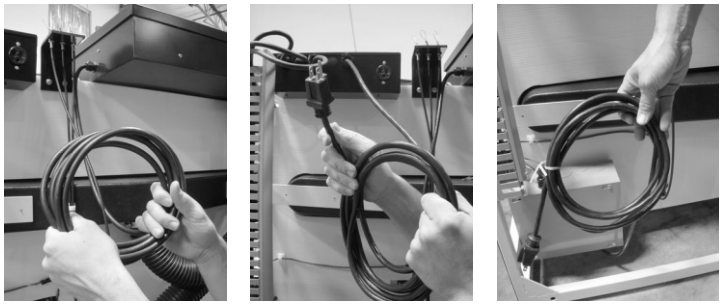
Peel the remaining double-sided tape included on the narrow surfaces of the end, front framework (E). Press Aluminum Vertical Extrusion firmly into place (F).



Step 10: Plug in Small Animal System

Have the Ventilation, Lighting and Door Locking System connections plugged into the appropriate receptacle.

Make sure that there are 3 electrical outlets available to plug the Ventilation, Lighting and Door Locking System.



(Left to Right) Ventilation, Lighting and Door Locking System connections

For system technical support call the

MaRS Technical Support Division: **(800) 576-6277**

OPERATION (SLIDE OUT DRAWERS)

Slide Out Drawer.

The Drawers on the Marineland Small Animal Vertical Display conveniently **Slide Out** for purposes such as cleaning and capture of small animals. The Drawers stabilizing feature include superior glides that improve strength and results in a smoother slide out of drawers.

To unlock a drawer, simply use the **key** (**see picture 1**), then pull open desired level. Or use the ***Key Fob** (**see picture 2**), then pull open desired level.

These actions allow you to open one tier at a time by holding the drawer in the middle (**see picture 3**) and gently pulling forward towards you.

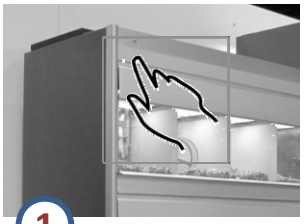
Note: Open the drawers gently and smooth so you do not disturb the small animals within the enclosures.

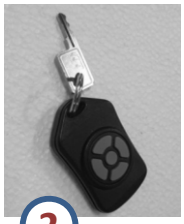
*If your purchase included a Key Fob (sold as an option), pressing the Key Fob for a second or two will allow you around 8 seconds to open one drawer.

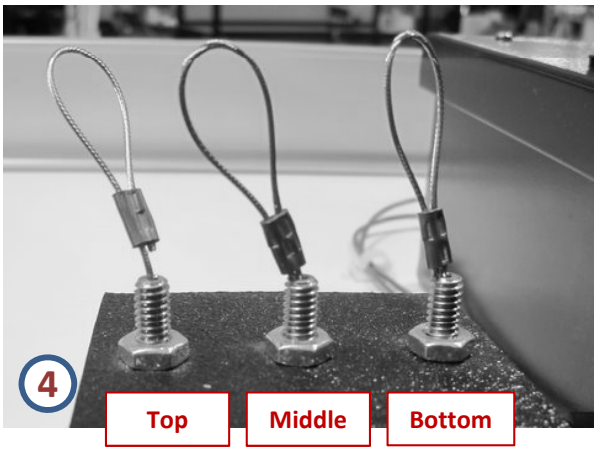
When ready to close the drawer, gently push the drawer away from you, smoothly and until you hear it lock.

Caution: Make sure that people are not near the drawer when closing **to prevent injury**. **To guard against injury, basic safety precautions should be observed.** Misuse of drawers may also cause damage to the Small Animal Vertical Display.

If needed and in case of an electrical issue where the Key Fob or Key will not open the drawers. A manual override is available on the system. The drawer manual override is located above the unit. Use an appropriate latter to reach the top (**see picture 4**). Each drawer is labeled, you must close the drawer in order to open another.





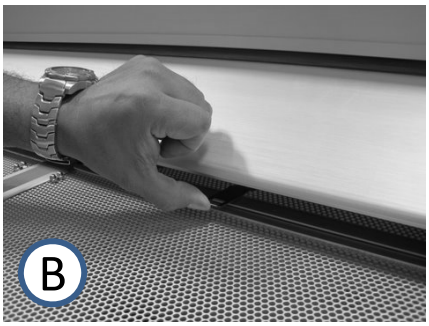


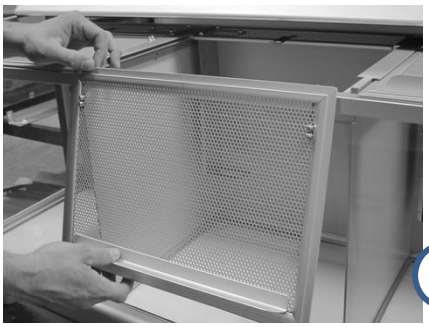
OPERATION (SLIDE OUT DRAWERS) cont.

Sliding Lid Enclosures

Vending made Easy.

1. Open Slide Out Drawer using the steps on page 7 (**picture A**).
2. Manually release the "Clip" to allow the front half of the lid to slide open (**picture B**).
3. Slide the front portion of the enclosure toward you to open for vending or cleaning purposes, (**picture C**).
   Note: The back portion of the slide out Lid is stationary to deter escape.
4. As you slide the lid toward you, use the 2 hooks on the bottom side of the lid to allow the lid to hang on the front of the tank, (**picture D**).
5. When done vending animals, remember to replace the "hanging" lid *before sliding in drawer*. Slide the lid in until the "clip" engages, (**picture E**).
6. Close Slide Out Drawer using the steps on page 7 (**picture F**).





OPERATION (SLIDE OUT DRAWERS) cont.

Removable Enclosures.

The enclosures are available with removable dividers to accommodate your merchandising needs.

Each Enclosure on the Small Animal Display System slide out and are removable for cleaning purposes.

After sliding out a drawer you can pick up the enclosure above the door I.D. Tag/Handle.

Gently pull the enclosure towards you and slide it until you can grab the enclosure securely with two hands for better support (see picture). Use assistance to remove or replace enclosure. When cleaning, the enclosures have minimal corners for easier maintenance and better hygiene. The enclosures are also vented on top and on the back for superior ventilation.

Remember to use the recommended substrate for the Small Animal within the enclosure. Add the appropriate amount per the tank dimensions. Most substrates have an amount recommendation on the product.

Note: It's recommended that enclosures containing a large amount of substrate, be cleaned within the small animal unit. If you decide to remove and carry the enclosure away from the Small Animal unit. Handle the enclosure securely to avoid an accident or damage. If available, use a service cart to move enclosures for cleaning purposes or feeding of species (see picture).

Service carts will help moving enclosures (example).

Enclosure Maintenance

After removing substrate , bowls and other décor within the enclosure, use a damp cloth to remove dirt and dust (a mild soap can be used if necessary). If needed a non toxic glass cleaner can be used for the front glass of the enclosure.

*By removing all enclosures from a drawer, a damp cloth can also be used to remove dirt and dust from within the drawer (use a mild soap if necessary, do not use abrasive pads or harsh chemicals to clean). DO NOT USE DAMP CLOTH ON ELECTRICAL COMPONENTS.

ODOR CONTROL CARTRIDGE REPLACEMENT

Ventilation System with Odor Control Cartridges

Each Small Animal Unit unit is equipped with a ventilation system that helps control odor. The well vented enclosures ensure superior ventilation within the Small Animal System.

Odor Control Cartridge Replacement Procedures

The cartridge should be replaced when 30 days are up. DO NOT exceed 30 days to replace the cartridge within the Ventilation System. Failure to replace the cartridge as recommended may result in unpleasant odor, temperature and ventilation issues.

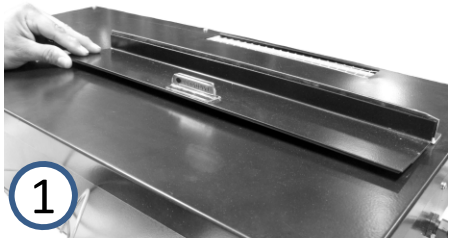
Step by step instructions:

1. ***Use an appropriate ladder to reach the Ventilation System above Small Animal Display System.***
2. ***Open access cover and "pull up" cartridge to remove (1, 2).***
3. ***Insert new Odor Control Cartridge and close access cover (3,4 and 5).***

To order Odor Control Cartridges, please call Marineland at 800-576-6277.

***Odor control cartridges (Ventilation Filter Cartridge) Part# MZ0412**

Note: The Ventilation unit within and around the cartridge compartment should be cleaned every 6 months. Simply use a damp cloth to remove dirt and dust. (Do not use soap or cleaning chemicals).



Helpful tip: Make sure that ventilation screens within the enclosures are not blocked off for proper Ventilation System operation.

FLUORESCENT LAMP REPLACEMENT

Fluorescent Lamp Replacement

To ensure maximum illumination and color reflection, we recommend that you replace with the same lamp type for proper operation. To replace them with “Cool White” or other lamps of lesser quality will greatly lessen lighting intensity and overall effect. The fluorescent lamp provides a pure white Full Spectrum illumination.

1. To replace the fluorescent lamp, simply shut off the light power.
   NEVER change lamps on fixture while it’s on.

2. Open Drawer and carefully remove enclosure (tank) within. This procedure makes it easier to replace lamps.

3. Remove fluorescent lamp. Gently twist 90 degrees and push backward and out from mounted station slots. Discard (according to established environmental procedure).

4. Replace discarded lamps with new lamps. Gently insert ends into slots and push up and forward or up and back until lamp fits securely in place.

5. After replacing the lamp, turn on the light power to the Small Animal System. Make sure the new lamp works before replacing the enclosure (tank).

To order Fluorescent lamps, please call Marineland at 800-576-6277.

Helpful tip: By simply shutting off the light power and removing enclosures . You are able to easily replace the old lamp on the Reptile Display System.

Water Bottle Replacement

Water Bottle Replacement

To remove water bottle from Holder, simply remove one side of the spring holder and replace water bottle with clean, freshwater.

Water bottle is not included on the Small Animal System. The Water Bottle Holder is made to hold a variety of water bottles.

Removable Divider Procedures

Removable Divider Procedures

To remove the divider, gently pull the divider up with both hands holding it on both sides. Then gently push the divider to one side to remove off the rail. Take to divider out of enclosure. *Reverse the procedure to replace.*

TROUBLESHOOTING GUIDELINES

For system technical support or to schedule a service, call the

MaRS Technical Support Division: **(800) 576-6277**

Drawer will not open?

Make sure all drawers were closed properly. Gently push in the drawers away from you and try opening the drawer using the key fob or key. If you continue to have issues contact Marineland Technical Support.

Need to open drawers during power outage?

If needed and in case of an electrical issue where the Key Fob or Key will not open the drawers. A manual override is available on the system (see page 7). This procedure will disengage the drawers allowing you to open one drawer at a time.

Slide-out Drawers are not sliding smoothly?

By removing all enclosures from a drawer, you can inspect the slide-out drawer for proper operation. If needed use a smooth brush to clean slide brackets. Also use a small portable vacuum to removed dust and debris.

Fluorescent Lamp not coming on?

To replace the fluorescent lamp shut off the light power by unplugging the unit. NEVER change lamps on fixture while it's on. Open Drawer and carefully remove enclosures within. This procedure makes it easier to replace lamps. *Please see page 11 for additional information*.

For ballast issues please contact Marineland Technical Support.

Noticeable unpleasant odor within Small Animal System?

Make sure enclosures are kept clean to ensure a healthy environment for the animal. A maintenance schedule is recommended.

If the Odor Control Cartridge needs replacement: The cartridge should be replaced when 30 days are up. DO NOT exceed 30 days to replace the cartridge within the Ventilation System. Failure to replace the cartridge as recommended may result in unpleasant odor, temperature and ventilation issues. *Please see page 10 for additional information*.

LIMITED WARRANTY

Marineland warrants their Reptile Display systems for one year against defects in materials or workmanship. This warranty applies only to the system and does not cover water quality, live product, replacement parts or maintenance supplies.

If your system is found to be defective - and has not been modified, damaged or misused – call Marineland Commercial Aquariums (toll free) at (800) 576-6277 or fax us at (805) 517-7198. All calls received during regular business hours (8am - 5pm, Pacific Time) will be responded to within 24 hours. Please have your manual and the system serial number ready.

In most cases, the problem will be resolved by a simple maintenance procedure, recommendation or repair authorization. Upon authorization, and in instances where outside repair or replacement of parts is necessary, Marineland will absorb all appropriate costs.

Damage or injuries resulting from negligence, misuse or user modification are not covered by this warranty. Incidental or consequential damages are specifically excluded.

** This warranty gives you specific legal rights. You may also have other rights which vary from state to state.*

** Because some states do not allow the exclusion of incidental or consequential damages, this exclusion may not apply to you.*

CUSTOMER SERVICE

For emergency problems with this system, call the
MaRS Customer Service, Technical Support
at 800-576-6277
For non-emergency problems or questions please call the above number from 7a.m. – 5p.m. Monday – Friday.

CONSUMABLES ITEMS	
1- VENTILATION FILTER CARTRIDGE(6 PACK)	MZ0412

SERVICING ITEMS	

ADDITIONAL ITEMS	

Z090618 6/11

All Fluorescent Lamps and Ultra Violet Lamps contain mercury.

Dispose of Properly.

MADE IN THE U S A

Commercial Systems MARINELAND

UNITED PET GROUP, INC

A Division of The United Pet Group · Moorpark, CA 93021

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NO. 370 AQUARIUM

OPERATING MANUAL

BIO-WHEEL® VERTICAL MODULAR DISPLAY SYSTEMS

MaRS™

Marineland Retailer Systems

IMPORTANT SAFEGUARDS

WARNING – To guard against injury, basic safety precautions should be observed, including the following:

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

DANGER – To avoid possible electric shock, special care should be taken in the use of aquarium equipment. For each of the following situations, do not attempt repairs yourself; contact an authorized service facility for service.

1. **A. If an appliance falls into the water, DON'T reach for it! First turn off power at main disconnect and then retrieve it. If electrical components of the appliance get wet, turn off the appliance immediately.**
   B. If the appliance shows any sign of abnormal water leakage, immediately turn off power at main disconnect.
   C. Carefully examine the appliance after installation. It should not be plugged in if there is water on parts not intended to be wet.
   D. Do not operate any appliance if it has a damaged cord or plug, or if it is malfunctioning or if it is dropped or damaged in any manner.
2. **Close supervision is necessary when any appliance is used by or near children.**
3. **To avoid injury, do not contact moving parts or hot parts such as heaters, reflectors, lamp bulbs, etc.**
4. **Always turn off power at main disconnect when not in use, before putting on or taking off parts and before cleaning. Never yank a cord to pull a plug. Grasp the plug and pull to disconnect.**
5. **Do not use an appliance for other than intended use. The use of attachments not recommended or sold by the appliance manufacturer may cause an unsafe condition.**
6. **Do not install or store the appliance where it will be exposed to the weather or to temperatures below freezing.**
7. **Make sure appliance is securely installed before operating it.**
8. **Read and observe all the important notices on the appliance.**
9. **This appliance should be connected to a grounded, metallic, permanent wiring system, or an equipment-grounding conductor should be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the appliance.**
10. **This appliance is to be installed by a qualified electrician in accordance with all appropriate codes and ordinances.**

SAVE THESE INSTRUCTIONS

The High Capacity Modular System for Healthier Fish, Easier Maintenance, Increased Sales!

This manual will provide you with the information you need to successfully operate and maintain your BIO-Wheel Vertical Modular Display System. Please read it carefully and keep it for future reference.

Your fully integrated MaRS System provides easy-to-maintain filtration for multiple tanks. Its high performance mechanical, chemical and commercial BIO-Wheel wet/dry biological filtration ensure optimum water quality at all times.

The system's compact design allows for convenient self-contained installation. It also provides the option of maintaining isolated filtration "zones", each showcasing a different aquatic environment. Every modular unit is equipped to provide ideal system conditions warm or cold, freshwater or marine. Front access panels ensure fast, trouble free maintenance and service.

While all units function in essentially the same manner, the marine systems come equipped with a Protein Skimmer to remove organic matter from the water and a second BIO-Wheel Module to provide additional 3-stage filtration.

Inside the System...

Water is automatically introduced to the Sump at a preset rate. As "new" water enters the system, "old" water is simultaneously removed. This continuous water cycle ensures constant water level, efficient nitrate removal and constant pH.

The system pump directs filtered water to the display tanks, the UltraViolet (UV) Disinfection Unit, the Protein Skimmer (Marine only) and the Heating or Refrigeration Unit.

The **UV Disinfection Unit** helps stop the spread of bacteria and disease throughout the system. Water enters the UV Housing, surrounding the lamp where it is exposed to UV light. This exposure destroys the DNA of free swimming bacteria, viruses and algae, preventing them from reproducing.

The thermostatically controlled **Heating or Refrigeration Unit** can be preset to the temperature (within a range of 70°- 80°F) required by your individual system. A thermometer strip is provided for every section module.

The **Protein Skimmer** (Marine System only) employs heavy aeration to remove organic matter from the tank in the form of foam. The foam is flushed from the system and deposited into the drain. Foam level can be easily and effectively regulated by means of the Air Adjustment Valve attached to the Venturi Air Inlet.

Water uniformly flows into each display tank, exiting via the Bi-Level Skimmer. The skimmer draws water and floating debris from both the bottom and surface levels to ensure uniform water circulation. It's easily removable for cleaning.

Water is directed from the tanks to the BIO-Wheel Filtration Module. Solid waste is mechanically trapped by the polyfiber Prefilter Pad and filter sleeve of the heavy duty Carbon Filter Pack contained in two "stacked" Filter Media Trays. The Carbon Filter Pack also contains a full pound of Black Diamond Premium Activated Carbon for chemical filtration...efficiently adsorbing dissolved organic compounds such as phenols and tannin.

Passing through the Filter Media Trays, water flows onto the BIO-Wheel Wet/Dry Biological Filter mounted below. Because system flow causes it to rotate, the BIO-Wheel is constantly exposed to both water *and* air, thus developing a thriving culture of aerobic nitrifying bacteria. This bioculture efficiently oxidizes all ammonia and nitrite on contact.

NOTE: Precultured BIO-Wheels are shipped to you ready to go. They provide full load biological filtration capacity immediately upon installation.

SPECIAL FEATURES

Service Panels

Latched panels provide easy access to filtration media, heating or refrigeration unit and electrical system components. All are equipped with locks for maximum safety.

Tilt Door Access System

Polyurethane doors allow easy tank access.

Fish Feeding Timer

Allows you to shut down the system pump for feeding (preset for 5 minutes) and then automatically restores the system to full operation after a preselected time has elapsed.

Fish Jumper Guards

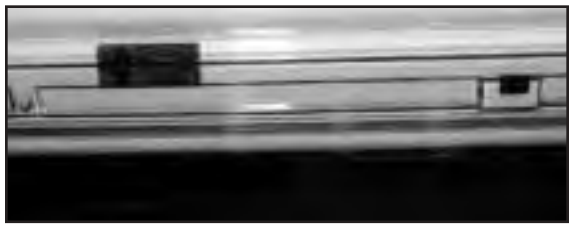
Each two-tank "zone" is equipped with a Fish Jumper Guard on each side and one in back. The bottom-notched side guards slot into the top side edge of each tank and press into place beneath the lamp cover. The back guard removes easily for cleaning.

Sump Replenishment Valve

This valve adds water to the Sump when Sump water level drops below ideal operational levels. During heavy sales, the Sump can be easily refilled using this simple spring-loaded manual attachment.

Lighting

The 5000K daylight fluorescent lamps are protected by a molded plastic lamp cover. To ensure maximum safety, the power cord is routed inside the system framework to connect to a central junction box. A single power cord exits the junction box for direct plug-in to any standard GFCI wall socket.



Backup Thermostat (refrigerated units only)

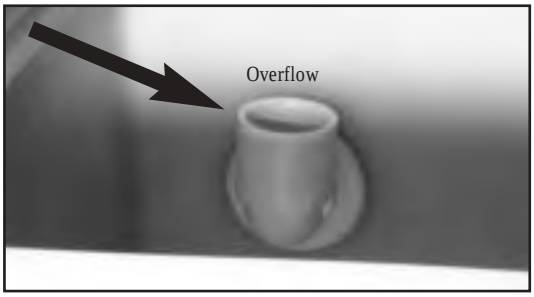
If water temperature drops below 40º, a second thermostat activates, stopping refrigeration unit output and preventing freezing of the heat exchanger.

OPERATION

Startup

Five simple steps are required to get your system up and running prior to the addition of filtration media. Consult Exploded Views (pgs. 24-37) for clarification.

1. Remove Sump Service Panel (lift panel up and off) and manually fill Sump to level of Overflow.



2. Open Display Tank Access Doors and fill display tanks to desired levels with sediment-free dechlorinated water.

3. **FOR FRESHWATER SYSTEMS ONLY:** Open New Water Supply Valve (A). Check Drip Emitter (B) for slow trickle of new water into Sump.

A

B

4. Unlock and remove Electrical Service Panel. Activate Master Switch. After system has operated for five minutes, fill Sump to level of Overflow.

   NOTE: Never activate Master Switch without water in tanks and Sump. Heater must be fully submerged or system damage may occur.

A Refrigerated System

B Heated System

5. Allow system to operate with mechanical and chemical filtration media (blue polyfiber Prefilter Pad and Carbon Filter Pack) for a period of 24 hours.

   NOTE: See Adding Filtration Media, steps 4-5 (pg. 8) for installation. Be sure to remove BIO-Wheel for first 24 hours of operation.

   Inspect areas near pump, UV and other components for leaks.

6. Adjust "IN" Water Nozzles in display tanks to ensure optimum circulation.

   NOTE: Water flow should just break the surface.

Adding Filtration Media

Follow the few easy steps outlined below to install filtration media. Refer to the Exploded Views for additional clarification.

1. Remove Service Panel.

2. Fit Bottom BIO-Wheel Housing securely over raised Housing Locator (left) in bottom of Sump.

3. Place cultured BIO-Wheel in Bottom Housing (A). Tray guides will ensure correct positioning. Place Top BIO-Wheel Housing over BIO-Wheel (B) and on top of Bottom BIO-Wheel Housing (notches on Bottom Housing match up with holes in Top Housing).

A

B

4. Install Lower Filter Media Tray (A) and place Carbon Filter Pack inside (B).

   NOTE: Before installing, be sure to rinse Carbon Filter thoroughly in cold water (at sink) until water runs clear (C).

A

B

C

5. Install Upper Filter Media Tray (A) and place blue polyfiber Prefilter Pad inside (B). Replace clear BIO-Wheel Assembly Cover (C).

A

B

NOTE: In Marine systems, follow steps 1-5 for additional installation of second BIO-Wheel Filtration Module over raised Housing Locator on right side of Sump.

C

MAINTENANCE

To ensure optimum operational efficiency, routine maintenance must be performed. The procedures listed below are neither difficult nor time consuming. They will keep your system clean, your fish healthy. Failure to follow these simple maintenance steps will adversely affect system performance and could lead to premature failure of some components. We recommend setting up a maintenance log to track procedure completion. *NOTE: For easier system maintenance, we recommend the MaRS Maintenance Kit. To order call 800-322-1266.*

Daily

Clean or replace Prefilter Pad

Clogged filter pads overflow and will not collect waste. Uncollected waste is returned to the display tanks and can severely reduce system efficiency.

To replace Prefilter Pad:

1. Remove clear BIO-Wheel Filtration Module Cover.
2. Remove used pad.
3. Rinse or replace with new pad.
   NOTE: Pads may be rinsed more than once. Replace when they become damaged or misshapen from repeated use.
4. Replace Cover.

Check Bi-Level Skimmers

Remove any debris or blockage.

Clean Gravel

Gently stir gravel in each tank and allow debris to be pulled through the Bi-Level Skimmer. This will eliminate the need to vacuum gravel on a regular basis. For more intensive spot cleaning or excessively dirty tanks, use the H.O.T. Magnum Canister Filter and Power Kleen Gravel Washer included in your MaRS Maintenance Kit.

Check Sump Water Level

Correct water level is designated by the "FILL TO THIS LINE" label located on the side of the BIO-Wheel Module. If necessary, add water to the sumps via the Sump Replenishment Valve (located at top rim of Sump) or other treated water supply.

Check Temperature

Refrigerated Systems: 68-70ºF Heated Systems: 78-80ºF.

Weekly

Replace Carbon Filter Packs

Keeping the Prefilter Pad and Carbon Filter Pack clean and unrestricted is critical to the successful operation of the BIO-Wheels. They must receive clean, filtered water to keep bacteria healthy and thriving.

1. Remove clear BIO-Wheel Filtration Module Cover.
2. Lift out Upper Filter Media Tray with Prefilter Pad.
   NOTE: Have bucket or large plastic pan ready to catch water spillage from Upper and Lower Tray.
3. Set Upper Filter Media Tray aside. Lift out Lower Filter Media Tray.
4. Replace Carbon Filter Pack (#MZ0175) and rinse out Filter Tray before replacing.
   NOTE: Before installing, be sure to rinse Carbon Filter Pack thoroughly in cold water until water runs clear.

Check Water Pump and BIO-Wheel Operation

Observe flow of water to the BIO-Wheel Assembly. Make sure that water flow to the BIO-Wheel is unhindered. The BIO-Wheel should rotate freely and remain wet at all times. Speed of rotation is not important. If a BIO-Wheel is turning - regardless of the rate - it is working.

If flow interruption is evident, check Pump Intake Strainer (in Sump) for obstructions. If clogged, shut off system, remove Strainer and clean. If flow interruption is still evident and no obstructions are found, consult Troubleshooting Guidelines section in this manual.

NOTE: A properly cultured BIO-Wheel is brown or discolored. There is no reason to clean a BIO-Wheel or replace it - unless it is damaged. If removed from the system for any reason, it should be kept moist and exposed to air until you reinstall it. If a BIO-Wheel is allowed to dry out or is inadvertently exposed to a contaminant, the bioculture may be destroyed. A precultured replacement can be purchased directly from Marineland (see back page).

Check Drip Emitter

It's the job of the Drip Emitter (see pg. 6 and below) to regulate the amount of new water introduced to your MaRS system. Because the Drip Emitters are vital to optimum operation, it is necessary to check them each week to ensure their proper function. Emitter water flow should be slow and steady. Reduced flow indicates that the Drip Emitter should be cleaned or replaced.

CAUTION: *NEVER operate the system with the Drip Emitter removed. This results in too much water passing through the system, which can cause water temperature fluctuations. It can also diminish chlorine removal effectiveness of the Carbon Pack.*

Inspect Tanks For Algae Growth

Algae spores enter the system naturally via tank inhabitants and light allows them to grow. Although your system's UV Sterilizer eliminates the majority of algae spores, the more light you have, the greater the potential for some algae growth. To remove algae, simply wipe inside tank surface with a cloth, algae scraper or blue filter pad. NEVER use soap or metal scouring pads. Maintain a separate cloth only for the tanks. It should be kept clean and isolated from other departments so that it does not get contaminated by multiple task use.

Clean Bi-Level Skimmer and Area Behind

1. **Remove Bi-Level Skimmer.**
   Grasp Skimmer Cover on either side. Gently pull up and away from tank back and bottom slot.
2. **Wipe Areas Clean** with designated tank cloth.
3. **Replace Bi-Level Skimmer.**
   Insert bottom of Back Plate into lower slot on tank and push Skimmer gently into place.

Check UV "Lamp Out" Indicator Light

The "Lamp Out" Indicator Light is located on the UV Cover. When lit, it indicates the UV Lamp is operating. See Service section for replacement instructions.

A. REFRIGERATED SYSTEM

B. HEATED SYSTEM

Wipe Down All Exterior Casing Surfaces

Never use chemicals, soaps, detergents or harsh abrasives on any part of the system. Do not use cleaners inside or near the tanks at any time.

WARNING: *Never spray insecticides within 20 feet of your tank system. The resulting contamination could kill your fish and destroy your biological filter. If you must use insecticides, be careful to turn off the system and cover all open water until the odor has cleared from the area completely. And don't forget to turn the system back on.*

Clean Fish Jumper Guards

1. **Remove Side Jumper Guards:**
   Grasp top and gently pull toward you to free Guard from frame. Lift bottom of Guard up and away from tank rim.

2. **Remove Back Jumper Guard:**
   Using brackets, lift top up and out from system frame.

3. **Wipe down with a damp cloth.**
   If necessary, use tank scrubber pad for any calcium buildup.

4. **Remount Back Jumper Guard:**
   Slot bottom notch onto top rim of tank. Press into position.

5. **Replace Side Jumper Guards:**
   Slot bottom notch onto top rim of tank. Press into position beneath Locator Bumps in Lamp Cover.

   NOTE: Center Jumper guards may be wiped clean without having to be removed. Be sure to use ***only*** *a clean, damp cloth.*

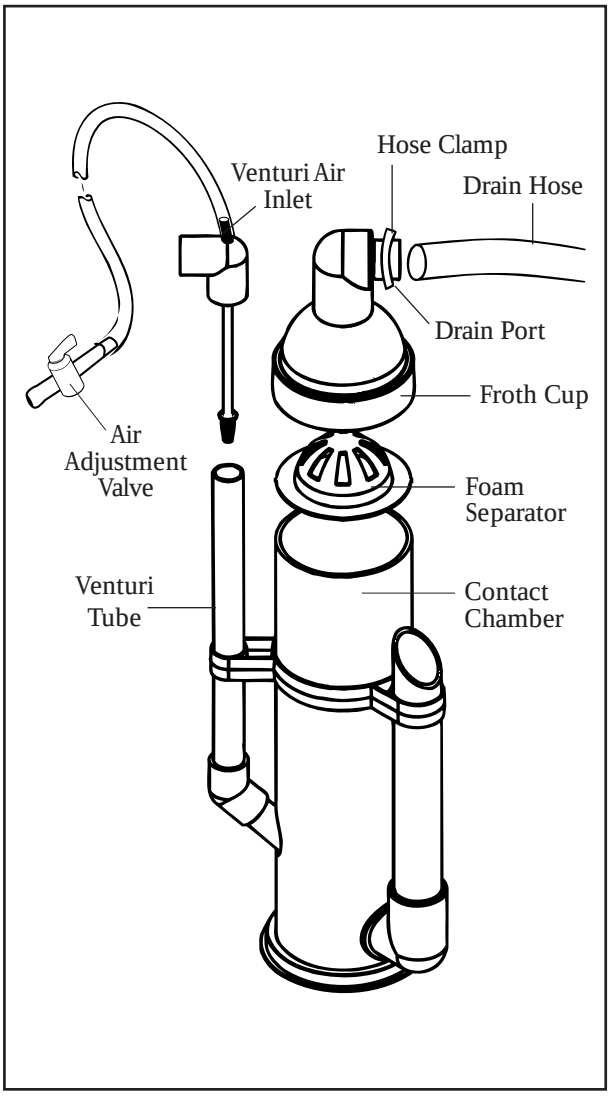
Clean Protein Skimmer Froth Cup/Foam Separator

(Marine System Only)

To ensure proper operation, Froth Cup and Foam Separator should be cleaned every week with warm water.

To remove Froth Cup and Foam Separator:

1. Shut down system.
2. Remove Sump Access Panel.
3. Remove Hose Clamp from Drain Hose.
4. Remove Drain Hose from Drain Port.
5. Remove (lift up) Froth Cup from Contact Chamber.
6. Clean Cup and Separator.
7. Return Cup and Separator to position atop Contact Chamber.
   NOTE: Make sure that good seal forms around Cup and Chamber.
8. Reconnect Drain Hose and Clamp.
   NOTE: Make sure Clamp is fastened securely around base of Hose.
9. Turn on system. Inspect Skimmer for leaks.
10. Replace Sump Access Panel



Protein Skimmer - Exploded View

Clean Protein Skimmer Venturi Air Inlet

Using pipe cleaner or squirt bottle, make sure Inlet orifice is clear and drawing air into Venturi Tube.

Monthly

Clean Heat Exchanger Screen *(refrigerated units only)*

1. Remove Service Panel and shut down system.
2. With handled brush (provided) reach through rack and brush accumulated dust and debris from rear screen.
3. Restart system. Replace Service Panel.

Clean Water Pump

Keep exterior surfaces clean and dust free. Wipe the dust from the electrical service area. All pumps require a clean environment in which to operate. It is important to see that no debris is "ingested" into the pump impeller. It is equally important to keep dust and debris away from the built-in cooling fans that keep the motor from overheating during operation.

Yearly

Clean Titanium Heater Housing *(heated unit only)*

1. Shut down system.
2. Clean outer housing with handled brush or non-abrasive scrubber pad.
   NOTE: Allow Heating Unit to cool (5-10 minutes) prior to cleaning. It is not necessary to remove Heating Unit. Reach through access port adjacent to housing when cleaning.
3. Turn on system.

As Needed

Change Fluorescent Lamps

To ensure maximum illumination and color reflection, the unit comes equipped with 5000K fluorescent lamps. We recommend that they be replaced with the same lamp type. To replace them with "Cool White" or other lamps of lesser quality will greatly lessen lighting intensity and overall effect.

1. Remove Side Fish Jumper Guards.
2. Using a dime or screwdriver, unscrew placement bolts (3) in Lamp Cover.
   NOTE: Placement Bolts are attached to Lamp Cover and will not fall out.

3. Carefully remove Lamp Cover.

4. Switch "Off." **NEVER** change fixtures while switch is "On."

5. Remove front fluorescent lamp. Gently twist 90° and pull forward and out from mounted station slots. Discard (according to established environmental procedure).

6. Remove rear fluorescent lamp. Gently twist 90° and push backward and out from mounted station slots. Discard.

WARNING: DO NOT attempt to remove white Access Housing from mounting. To do so may cause electric shock and severe injury.

7. Replace discarded lamps with new 5000K lamps. Gently insert ends into slots and push up and forward or up and back until lamp fits securely in place.

8. Switch "On".

9. Replace Lamp Cover. Line up cord notch (to the rear of Cover on one side) with power cord and screw in Placement Bolts.

   NOTE: Lamp Cover is specifically formed on one side to fit over the On/Off Switch. Be sure to match switch with molded protrusion before replacing Placement Bolts.

10. Replace Fish Jumper Guards.

Weekly Maintenance Procedures for Marine Modules

Water Change

Change 25% per week. Water should be mixed in a container used only for that purpose (recommended: 30 gallon refuse container on a dolly) with appropriate amount of salt (recommended: use a standard measuring cup for exact amount). Water should be added and a new batch mixed on the same day to ensure that supply is always available.

MODEL	SYSTEM CAPACITY	25% CHANGE
MV4	98 GALLONS	25 GALLONS
MV8	192 GALLONS	48 GALLONS

Gravel Cleaning

Siphon Kleen gravel thoroughly.

Brown Algae Removal

Scrub inside of glass lightly with blue filter pad or algae scrubber.

Salt “Creep” Removal

Wipe outer aquarium surface with a clean, damp cloth.

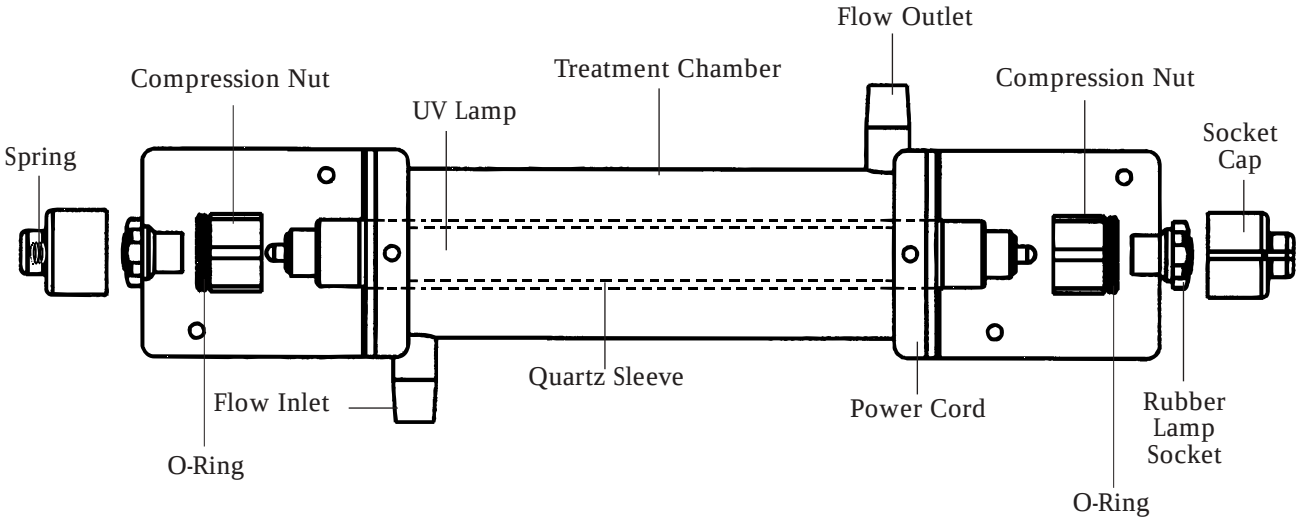
SERVICE

We strongly recommend that all servicing for your system be performed by a qualified technician or trained associate. For a service referral, call ***800-322-1266.***

Aquafine UV Disinfection Unit

IMPORTANT NOTE: To prolong the life of the AQUAFINE UV Disinfection Unit and avoid leaving fingerprints on the UV Lamp, we strongly recommend that you wear cotton gloves at all times during servicing of UV Sterilizer Unit.

For convenient Quartz Sleeve servicing, we recommend the MaRS UV Sterilizer Servicing Kit (MZ0017). Specifically assembled for this purpose, each kit contains a pair of cotton gloves, silicon lubricant and detailed instructions. UV Lamps are also available (MZ0190). To order call (800) 322-1266.



WARNING:

Never look directly into UV Lamp while in operation…eye injury may occur.

Never restore power while UV Lamp is separated from Treatment Chamber. Skin damage and/or injury may result.

Always make sure hands are absolutely dry before servicing equipment.

Every Six Months

UV Disinfection Unit Quartz Sleeve

The Quartz Sleeve will develop a layer of scum on its surface. This can reduce UV Lamp effectiveness. Scum should be cleaned off at least once every six months. Exercise care when cleaning.

To clean Quartz Sleeve:

1. Turn off Master Switch. Allow UV Unit to drain (3-5 minutes).

IMPORTANT: With the 4' Refrigerated Systems (MV4FR & MV4MR), it is necessary to remove the entire UV Disinfection Unit from the system before servicing.

To remove UV Unit:

A. Unclip UV Discharge Hose from back of Sump.

B. Carefully slide UV Housing out and away from the Hanger Bracket.

C. Gently remove the UV from the rack assembly and set aside.

2. Remove Cover.
3. Unscrew both threaded Socket Caps from Treatment Chamber ends. Gently disconnect UV Lamp from Rubber Lamp Sockets and carefully remove UV Lamp from treatment Chamber, sliding it through from one end to the other. Carefully set aside.
4. Unscrew and remove both threaded Compression Nuts. Grasp one end of Quartz Sleeve and gently draw it from Treatment Chamber. **Caution:** Quartz Sleeves are very fragile. Handle with care to prevent breaking or chipping.

If Quartz Sleeve breaks during service and a replacement is not readily available, close the UV Inlet Valve (Marine System: Close Inlet and Outlet Valve). Unplug UV. Do not replace UV Lamp until new Sleeve is acquired. Turn on Master Switch (system will operate without UV Lamp). When new Quartz Sleeve is acquired, follow installation procedure. Be sure to open UV Inlet and Outlet Valves…and plug UV Power Cord into proper receptacle.

5. Wash Quartz Sleeve with mild soap and hot water. Rinse thoroughly with hot water.
   NOTE: For heavier deposits, we recommend cleaning with CLR™. Gently wipe sleeve with clean cloth before reinstalling.
6. Working from one end of Treatment Chamber, carefully insert clean Quartz Sleeve through stainless steel nipple and into Treatment Chamber. Sleeve should protrude an equal distance from each end.
7. Before installing Compression Nuts, remove and clean O-Rings. Then lubricate each with a very thin coating of silicon lubricant. Reinstall O-Rings.
   NOTE: O-Rings should be replaced each year.
8. Install Compression Nut at one end. Finger tighten while holding opposite end of Quartz Sleeve.
9. Install remaining Compression Nut. Hand tighten (firmly) both Compression Nuts.
   CAUTION: *Do not* ***over*** *tighten Compression Nuts. This can fracture ends of Quartz Sleeve. After hand tightening Compression Nut, release it one half turn to avoid fracture.*
10. Carefully reinsert UV Lamp into open Quartz Sleeve and push it about 2-3 inches out beyond the opposite Compression Nut.
11. Insert lamp base into spring equipped Rubber Lamp Socket (see diagram), sliding "boot" portion over end of lamp. Push until you feel a firm, "bottomed out" connection. *NOTE: Make sure "boot" does not fold under.*
12. Connect opposite lamp base to remaining Rubber Lamp Socket.
13. Once Rubber Lamp Sockets are attached to UV Lamp at both ends, position Rubber Lamp Sockets inside Socket Caps. Making sure that Rubber Lamp Sockets are seated securely, join Socket Caps to threaded ends of Compression Nuts and finger tighten.

For refrigerated models (MV4FR & MV4MR), carefully replace UV on Hanger Bracket, making sure Service Panel will not touch end of UV housing. Reclip UV Discharge Hose into position at back of Sump.

14. Replace Cover.
15. Turn on Master Switch. Inspect Discharge Hose for leaks. Replace Service Panel.

Every Six Months (or as dictated by "Lamp Out" Indicator Light)

UV Disinfection Unit Lamp (Exploded diagram, pg.17)

The UV Lamp has a useful service life of about 6 months. After this time - whether it continues to appear functional or not - it loses intensity and must be replaced. When changing UV Lamp, *always* clean Quartz Sleeve.

To replace UV Lamp:

1. Turn off Master Switch. Allow UV unit to drain (3-5) minutes.

With the MV4FR and MV4MR systems, it is necessary to remove the entire UV Disinfection Unit from the system before servicing (consult page 18).

2. Remove Cover (unscrew outer nuts).
3. Unscrew both threaded Socket Caps from Treatment Chamber ends. Gently disconnect UV Lamp from Rubber Lamp Sockets and carefully remove UV Lamp from Treatment Chamber, sliding it through from one end to the other. Discard.
4. Remove Quartz Sleeve. Clean and reinstall (as directed in previous instructions).
5. Carefully insert new UV Lamp into open Quartz Sleeve and push it about 2-3 inches out beyond the opposite Compression Nut.
6. Insert lamp base into spring equipped Rubber Lamp Socket (see diagram), sliding "boot" portion over end of UV Lamp. Push until you feel a firm, "bottomed out" connection.

   NOTE: Make sure "boot" does not fold under.
7. Connect opposite lamp base to remaining Rubber Lamp Socket.
8. Once Rubber Lamp Sockets are attached to UV Lamp at both ends, position Rubber Lamp Sockets inside Socket Caps. Making sure that Rubber Lamp Sockets are seated securely, join Socket Caps to threaded ends of Compression Nuts and finger tighten.
9. Replace Cover.

WITH MV4FR and MF4MR systems, carefully replace UV on Hanger Bracket, making sure Service Panel will not touch end of UV Housing. Reclip UV Discharge Hose into position at back of Sump (see photo, pg.19)

10. Turn on Master Switch. Inspect unit for leaks. Replace Service Panel.

Yearly

UV Disinfection Unit O-Ring

The O-Rings should be replaced each year. Always clean and lubricate O-Ring with a very thin coating of silicone lubricant before inserting into section of threaded Compression Nut.

TROUBLESHOOTING GUIDELINES

CAUTION: Many of the corrective procedures recommended below require removal of the outer Service Panel. Only those familiar with basic filtration unit design should attempt to do so.

For a service referral,
call the MaRS 24-Hour Hotline:
(800) 576-MaRS (6277).

If entire system abruptly shuts down...

- *Make sure* Feeding Timer Switch has not been activated.
- *Reset* circuit breaker in main electrical panel.
- *Make sure* Master Switch is turned on.
- *Check* Pump Intake Strainer in Sump for obstructions.

If water turns yellow or odors develop...

- *Replace* Carbon Filter Pack(s).

If a BIO-Wheel fails to rotate...

- *Inspect* Prefilter Pad and Carbon Filter Pack for clogging. Clean or change as needed.
- *See* if BIO-Wheel is obstructed. Clean bearings, check for unimpeded rotation and reinstall.
- *Ensure* that Sump is not overfilled. Check Return Tube for obstruction.
- *Check* Pump Intake Strainer in Sump for obstructions.

If water flow to BIO-Wheels or display tanks stops or flow is sluggish…

- *Inspect* Pump Inlet Strainer in Sump. Clean and/or remove any debris or obstructions.
- *Remove* Electrical Service Panel and make sure System Pump is plugged in, motor fan is turning and all valves are open (parallel to direction of flow pipe).
- *Call* for service if problem persists.

If water level in a single tank is low or significantly lower than that in adjacent tanks…

- *Check* "IN" Water Nozzles for obstructions. Clean inside of nozzle with small brush or pipe cleaner. If necessary, remove nozzle from bulkhead (using open end wrench), clean and replace.
- *Call* for service if problem persists.

If UV "Lamp Out" Indicator Light goes out...

- *Replace* UV Lamp (see instructions, pg. 20). If problem persists after lamp is replaced, call for Service.

If water temperature is too low or too high...

- *Check* Thermostat setting.

  NOTE: Thermostat reading may differ from measured Display Tank temperature... adjust thermostat as required and monitor Display Tank temperature with thermometer, allowing 3-4 hours for temperature to stabilize before checking again.
- *Make sure* power cord to Refrigeration or Heating Unit is plugged into proper outlet.
- *Call* for service if Thermostat, Refrigeration Unit or Heating Unit is malfunctioning.

If large amounts of air bubbles are evident in display tanks...

- *Check* water level in Sump. If below standpipe, add water via Replenishment Valve and check frequently.
- *Inspect* "new" water entry into Sump. If water is not trickling into Sump, make sure Hose Bibs are open, and Drip Emitters are functioning properly.
- *Make sure* Pump Intake Strainer is fitted firmly in place.
- *Call* for service if problem persists.

If Drip Emitter or Replacement Value flow is greatly reduced or stopped...

- *Clean* Drip Emitter (twist top 90º and pull out to remove for cleaning).
- *Check* water level in Sump. If below standpipe, add water via Replenishment Valve until water level is at or near normal operating level.

If fluorescent lamps will not light...

- *Make* sure lights are plugged into wall receptacle.
- *Check* wall mounted GFCI's. Reset if necessary. If GFCI's trip repeatedly, call for service.
- *Make sure* lamps are inserted into the fixture properly.
- *Call* for service if problem persists.

If water leaks from rear of rack...

- *Remove* Sump Service Panel and Electrical Service Panels and check all hose connections. Tighten if necessary.
- *Remove* Back Jumper Guards and check all hose connections. Tighten if necessary.
- *Call* for service if problem persists.

If Protein Skimmer does not operate (no air bubbles)...

- *Use* Fish Feeding Timer to shut down and restart system. After restart, check Protein Skimmer operation.
- *Shut* down system and check aeration tube for blockage.
- *Call* for service if problem persists.

If water level in Protein Skimmer Drops...

- *Close* Venturi Air Adjustment Valve (partially or completely) to decrease oxygen intake.
- *Call* for service is problem persists.

SYSTEM Specifications

Integrated Rack System MV4FH
4 Foot Heated, Fresh Water System

MECHANICAL:

Size: 20”D x 51½”L x 94”H (shipping height: 85”)

Tilt: 20½” D x 51½” L x 86½”H

Weight: 490 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 98 gallons

ELECTRIC:

ETl listed for permanent installation

Voltage: 115 vac, 60 Hz

Current: Filtration/Circulation: 10.5 AMP

Lighting: 2.2 AMP

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7½” x 14”

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 1 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

“NEW” WATER FROM TREATED WATER SUPPLY:

Flow Rate: 1 gallon per hour

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-40RLT-115; 750 GPH; UL recognized

Display tank turns per hour (TPH): 5 TPH minimum

HEATER:

1,000 w. titanium heater; UL Listed

Thermostat Controller: UL listed; Temperature Range: 50°-130° F; GFCI Protected

LIGHTING:

UL listed light fixtures with polycarbonate lamp covers

Lamps: 6 each 40 W., 48”, T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

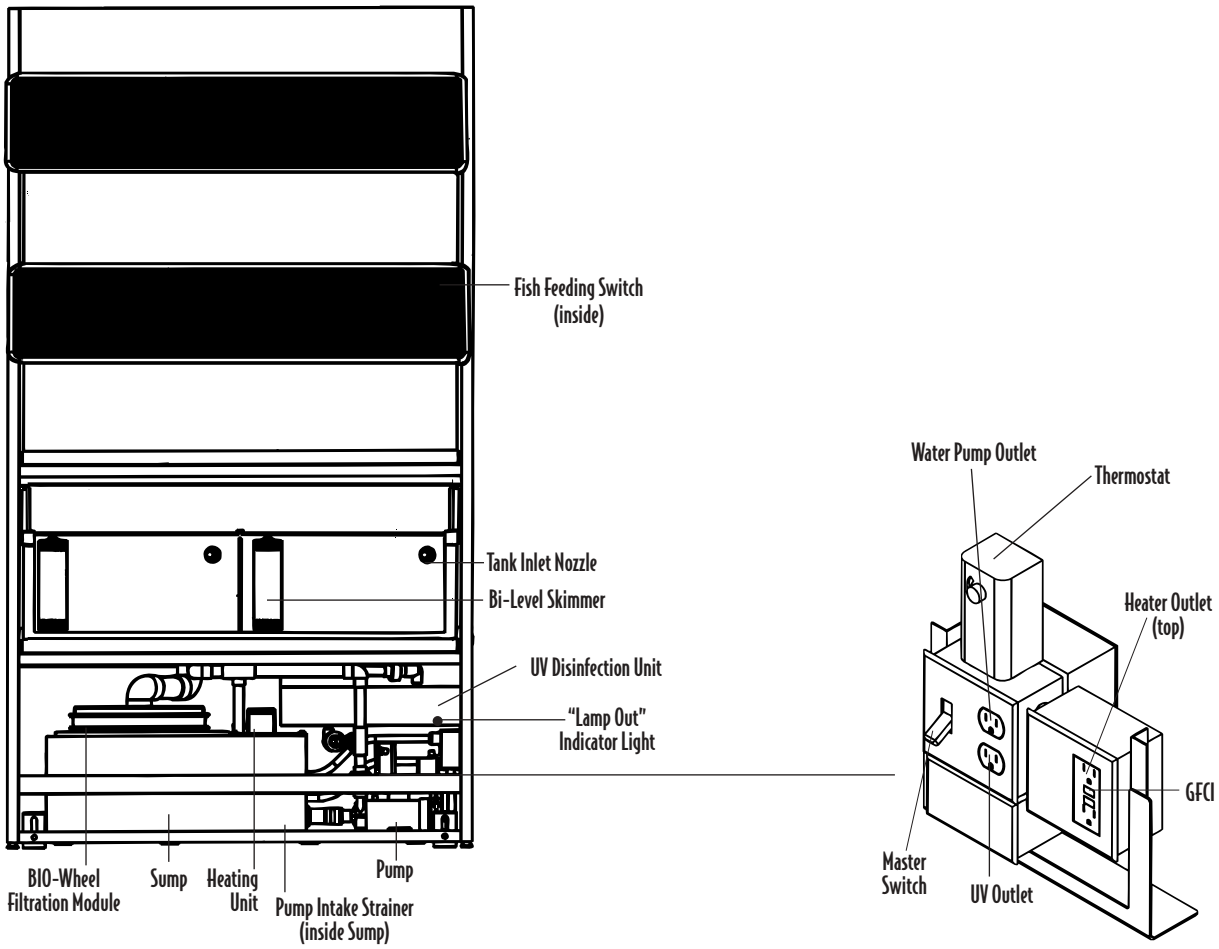
Main circuit: Hard wired J-Box, 115 VAC, 60 Hz, 15 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

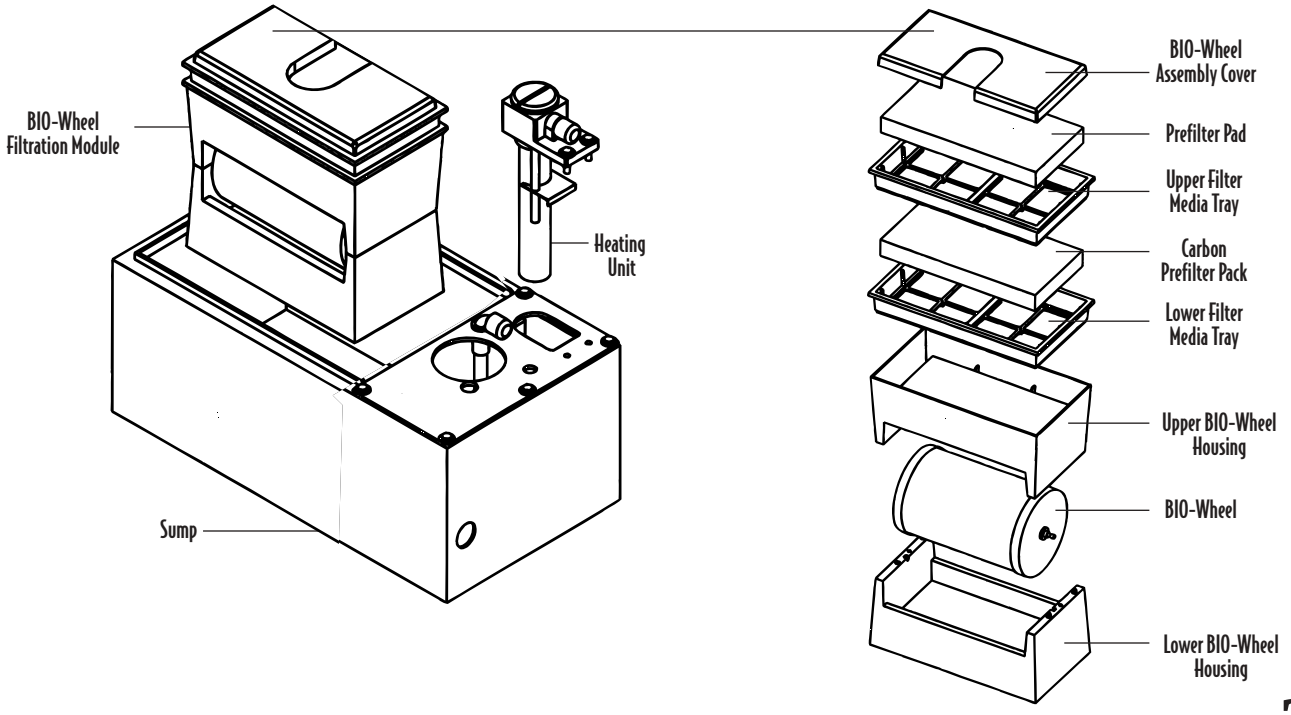
Treated Water Supply: 1 GPH, regulated to 25 PSIG

Drain: At or below grade, 30’ Run

Exploded View w/ Electrical Assembly Pullout



Sump w/ BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV8FH
8 Foot Heated, Fresh Water System

MECHANICAL:

Size: 20"D x 103"L x 94"H (shipping height: 85")

Tilt: 20 1/2" D x 103" x 86 1/2"

Weight: 860 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 192 gallons

ELECTRIC:

ETl listed for permanent installation

Voltage: 115 vac, 60 Hz

Current: Filtration/Circulation/Heater: 12.5 AMP

Lighting: 2.2 AMP for each 4 foot section, 4.4 AMP total

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 1/2" x 14"

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 1 ea. CBW-1

UV treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

"NEW" WATER FROM TREATED WATER SUPPLY:

Flow Rate: 1 gallon per hour

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-70RLT-115; 1200 GPH; UL recognized

Display tank turns per hour (TPH): 5 TPH minimum

HEATER:

1,000 w. titanium heater; UL listed Thermostat

Controller, UL Listed; Temperature Range: 50-130° F

GFCI Protected

LIGHTING:

UL listed light fixtures with polycarbonate lamp covers

Lamps: 12 each 40 W., 48", T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Polycarbonate, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

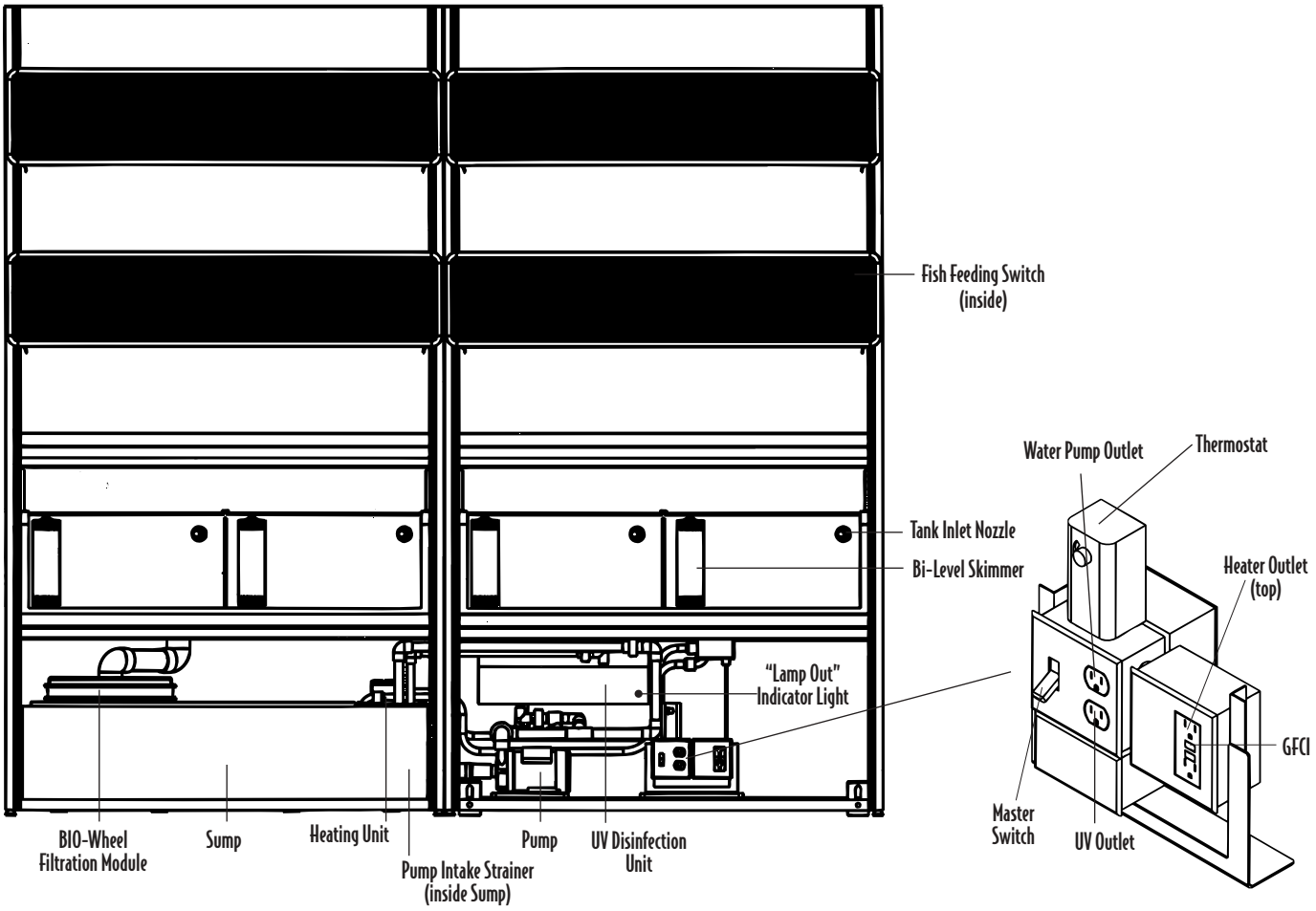
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 20 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI Protected

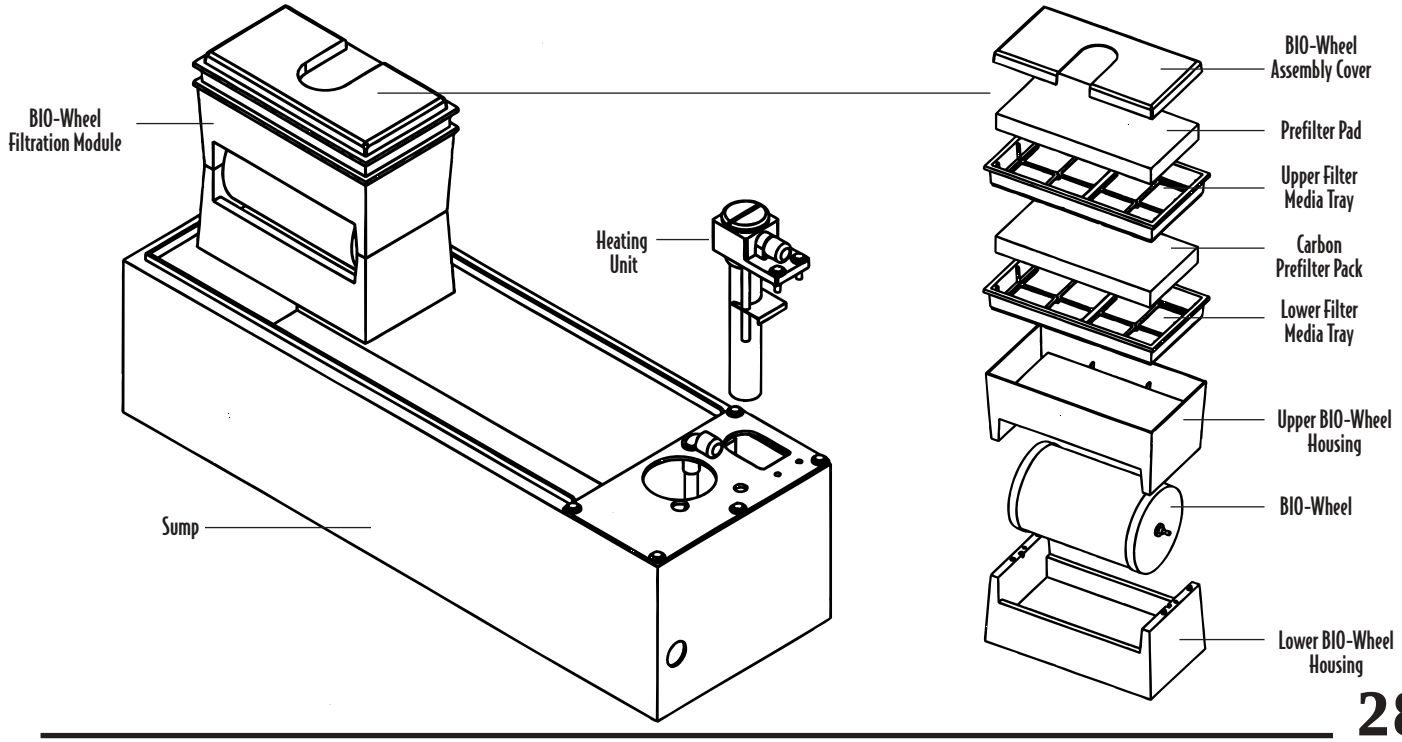
Treated Water Supply: 1 GPH, regulated to 25 PSIG

Drain: At or below grade, 30' run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV12FH
12 Foot Heated, Fresh Water System

Mechanical:

Size: 20"D x 154½" L x 94" H (shipping height: 85")
Tilt: 20½" D x 154½" x 86½"

Weight: 1260 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 292 gallons

Electric:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation/Heater: 12.9 AMP

Lighting: 2.2 AMP for each 4 foot section, 6.6 AMP total

Filtration:

Mechanical Filter: 2 ea. Polyester Pad, 7½" x 14"

Chemical Filter: 2 lb. Black Diamond Activated Carbon in Carbon Filter Packs

Biological Filter: 2 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

"NEW" WATER FROM TREATED WATER SUPPLY:

Flow Rate: 2 gallons per hour

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-100RLT-115; UL recognized

Display tank turns per hour (TPH): 5 TPH minimum

HEATER:

1,000 W. Titanium Heater; UL Listed

Thermostat Controller, UL listed;

Temperature Range: 50-130° F

GFCI Protected

Lighting:

UL listed light fixtures with polycarbonate lamp covers

Lamps: 18 each 40 W., 48", T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Polycarbonate, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric supply:

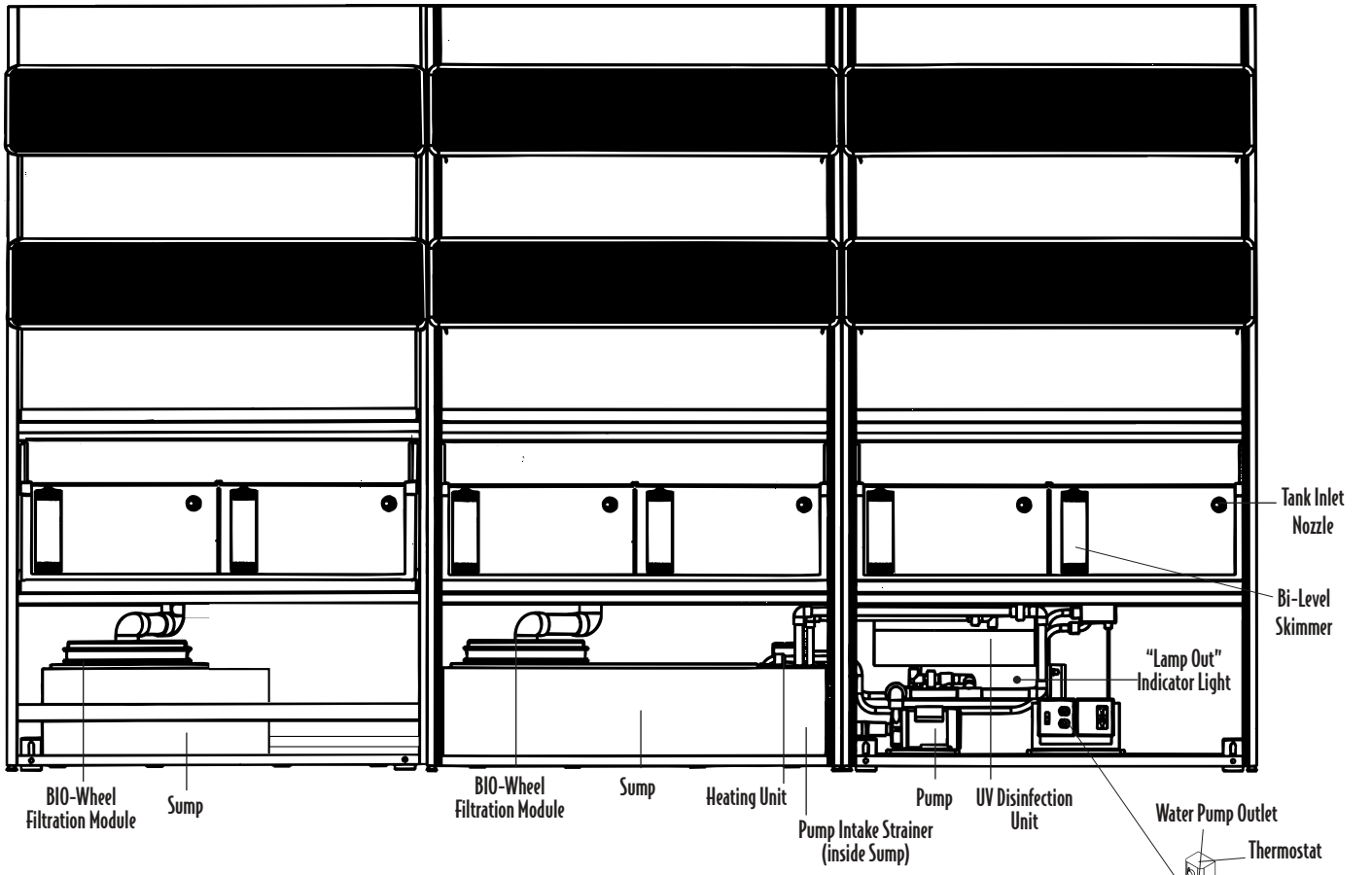
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 20 AMP

Lighting: Plug connected, 3 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

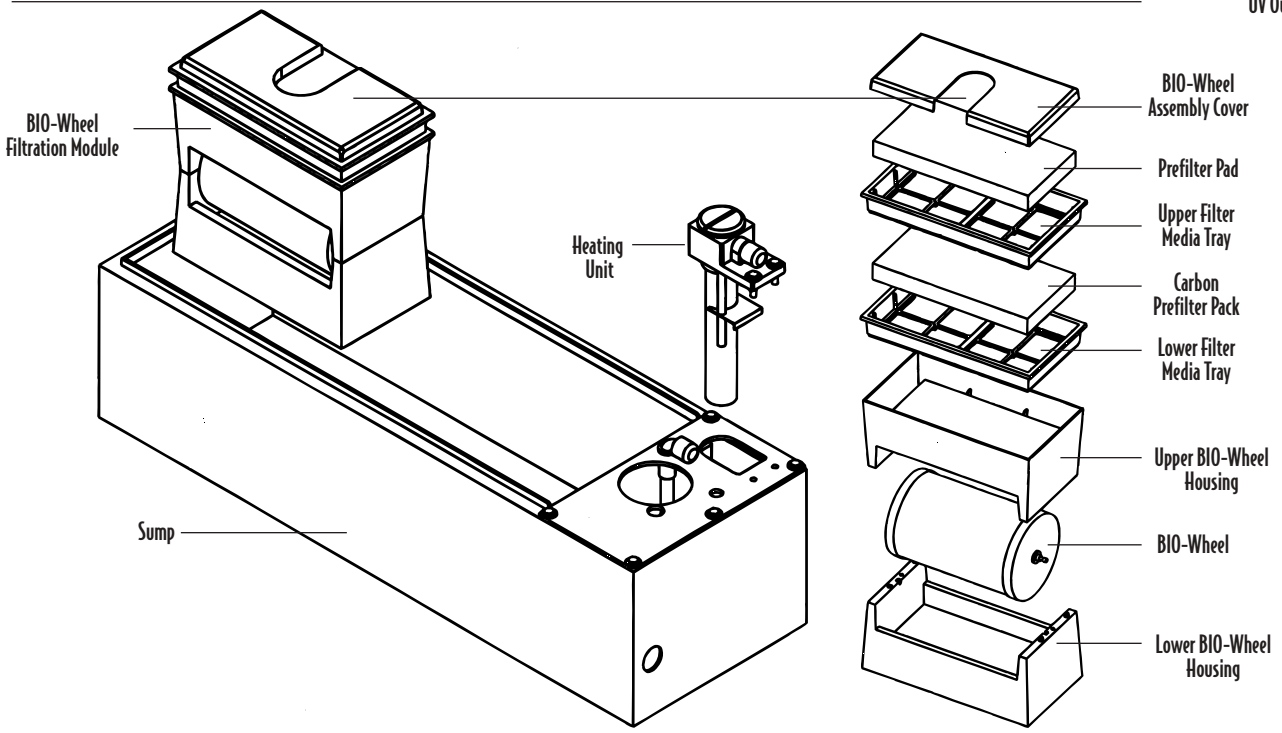
Treated Water Supply: 2 GPH, regulated to 25 PSIG

Drain: At or below grade, 30' run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV4FR
4 Foot Refrigerated, Fresh Water System

MECHANICAL:

Size: 20" D x 51½" L x 94" H (shipping height: 85")

Tilt: 20" D x 51 1/2" L x 86 1/2" H

Weight: 490 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 98 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 10.5 AMP
Lighting: 2.2 AMP

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 1/2" x 14"

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 1 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

"NEW" WATER FROM TREATED WATER SUPPLY:

Flow Rate: 1 gallon per hour

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-40RLT-115; 750 GPH; UL recognized

Display tank turns per hour (TPH): 5 TPH minimum

REFRIGERATION:

1/3 HP, R134A with Helical Heat Exchanger

Thermostat Controller, UL Listed; temperature range: 50-130° F. GFCI Protected

LIGHTING:

UL Listed light fixtures with polycarbonate lamp covers

Lamps: 6 each 40 W., 48", T12, Rapid Start, Fluorescent; 5,000K, 85 CRI, 20,000 Hr. Life; 2820 Lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

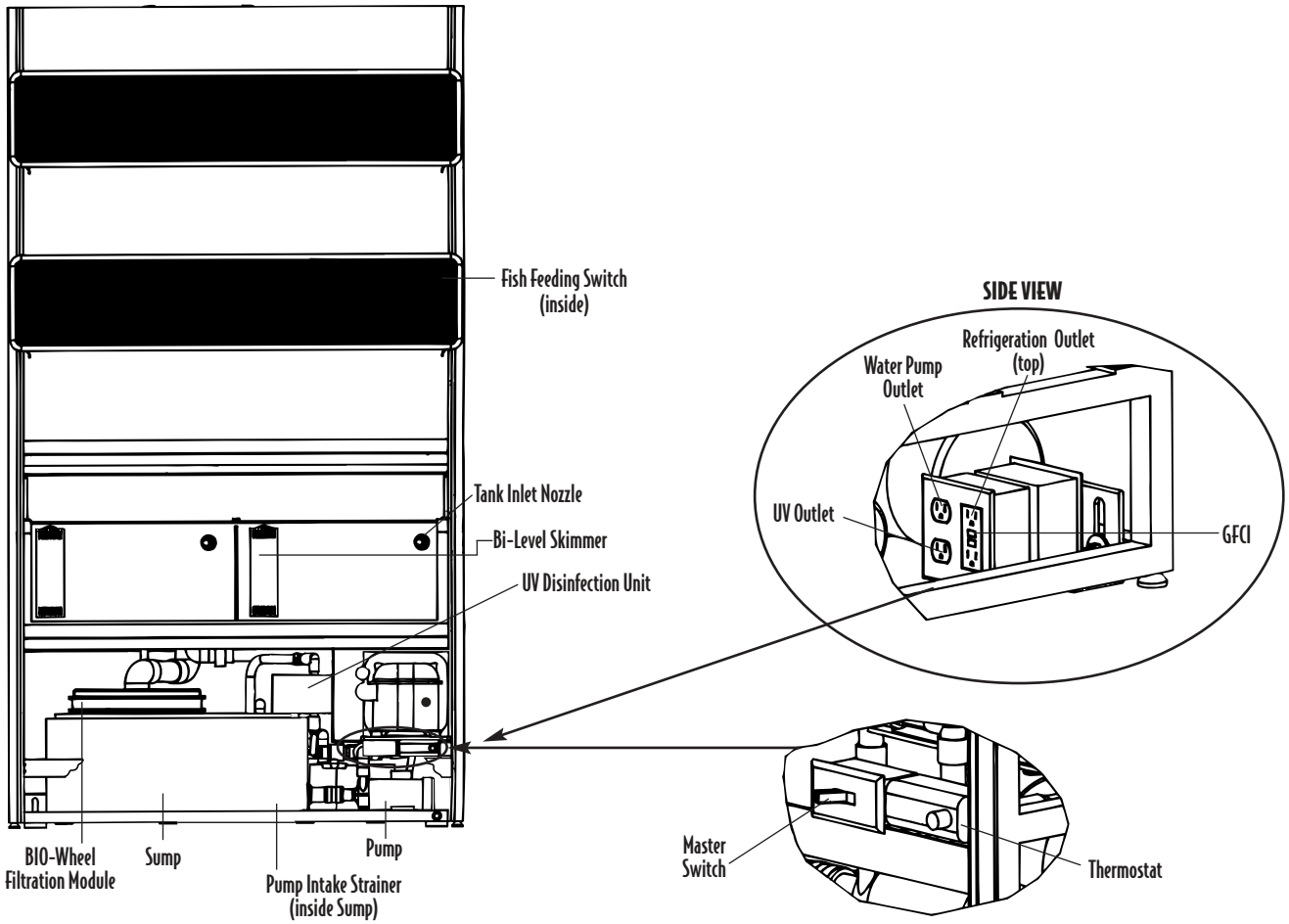
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 15 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

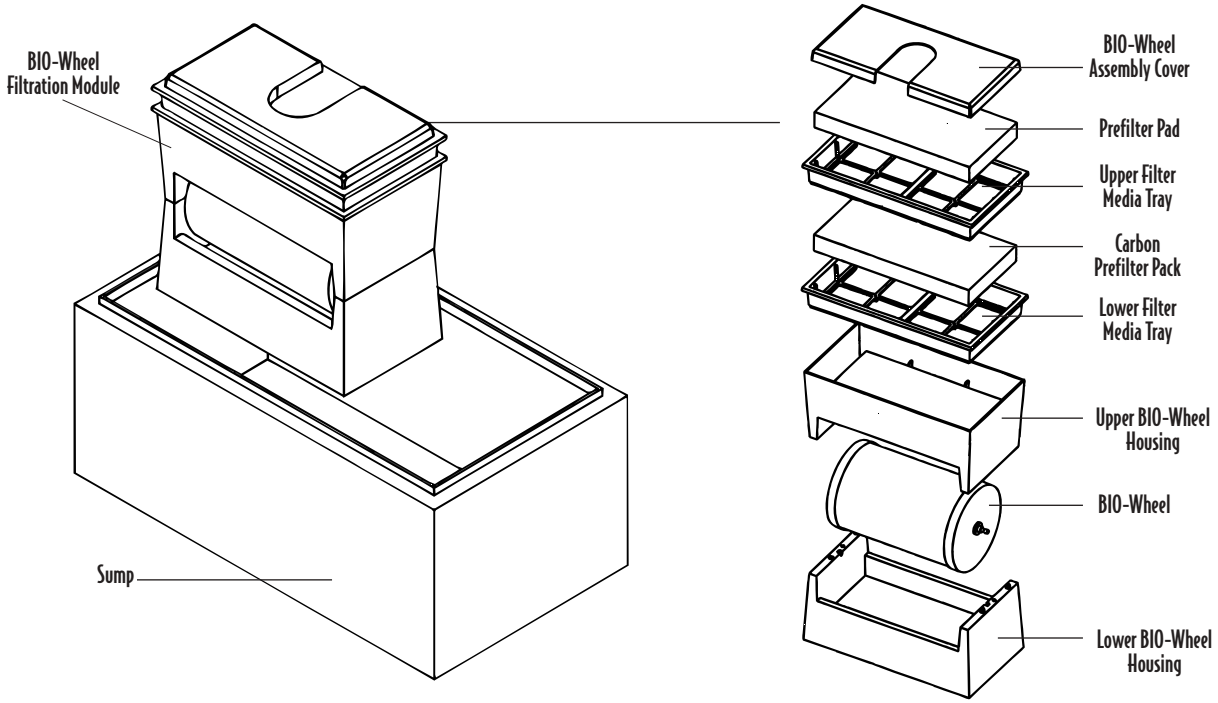
Treated Water Supply: 1 GPH, Regulated to 25 PSIG

DRAIN: At or Below Grade, 30' Run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV8FR
8 Foot Refrigerated, Fresh Water System

MECHANICAL:

Size: 20"D x 103" L x 94" H (shipping height: 85")

Tilt: 20 1/2" D x 103" L x 85 1/2" H

Weight: 875 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 192 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 12.5 AMP

Lighting: 2.2 AMP for each 4 foot section, 4.4 AMP total

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 1/2" x 14"

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 1 ea. CBW-1 (2 ea. CBW-1 w/Feeder System)

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

"NEW" WATER FROM TREATED WATER SUPPLY:

Flow Rate: 2 gallons per hour

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-70RLT-115; 1200 GPH; UL recognized

Display tank turns per hour (TPH): 5 TPH minimum

REFRIGERATION:

1/2 HP, R134A with Helical Heat Exchanger

Thermostat Controller, UL listed; Temperature Range: 50-130° F. GFCI protected

LIGHTING:

UL Listed light fixtures with polycarbonate lamp covers

Lamps: 12 each 40 W., 48", T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

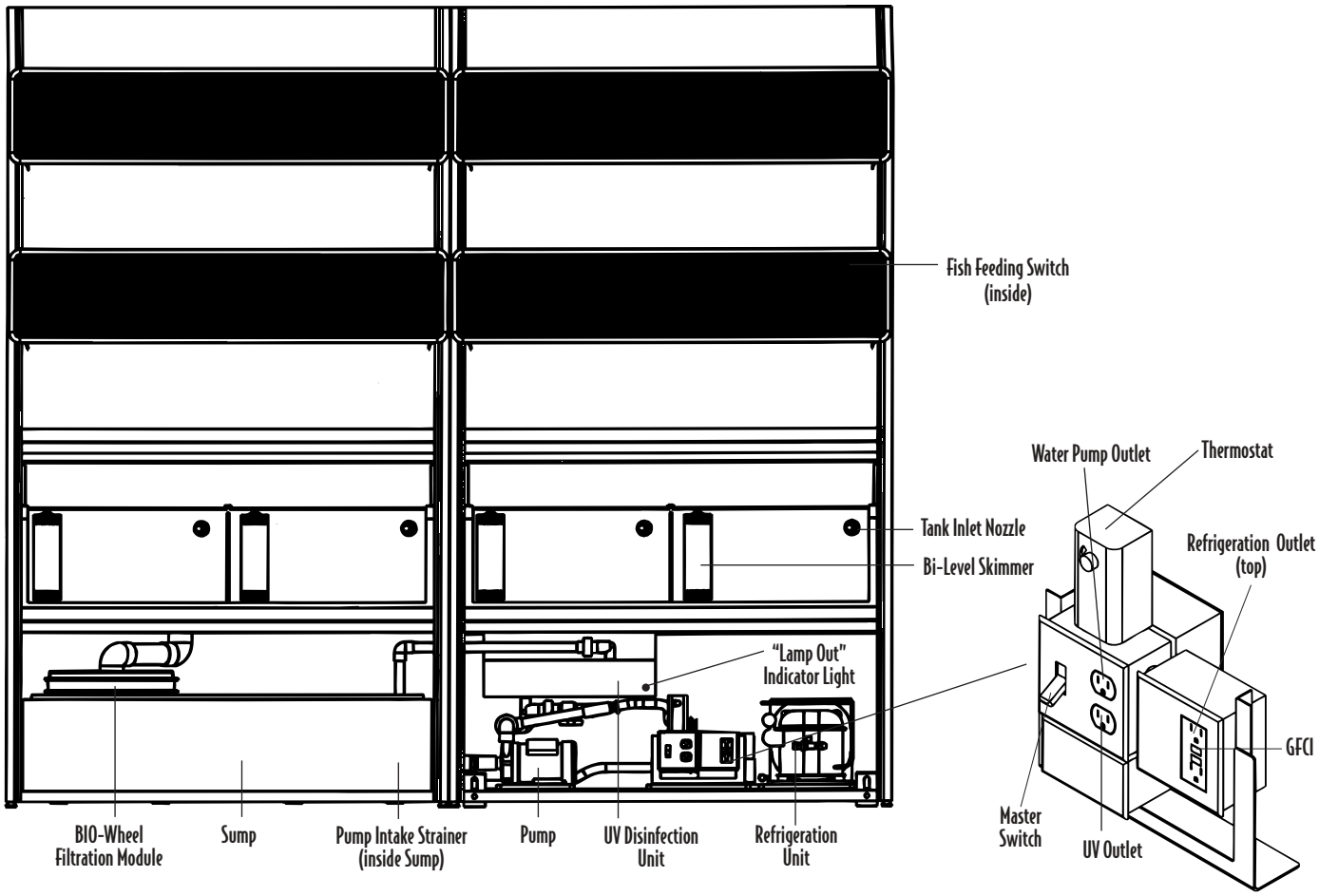
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 20 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

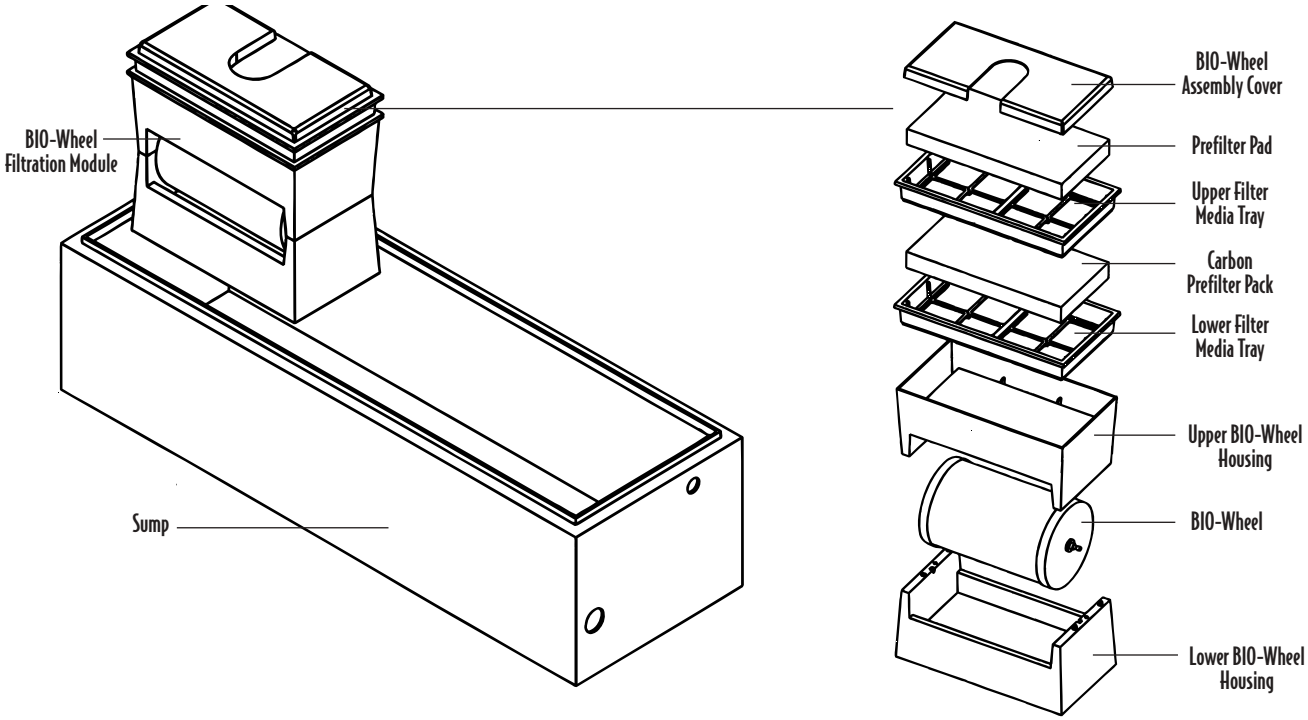
Treated Water Supply: 2 GPH, regulated to 25 PSIG

Drain: At or below grade, 30' run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV4MH
4 Foot Heated, Marine Water System

MECHANICAL:

Size: 20”D x 51½”L x 94”H (shipping height: 85”)

Tilt: 20½” D x 103” L x 86½” H

Weight: 490 Lb. (Est.)

Floor-attached for seismic loads
System Gallon Capacity: 98 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 12.5 AMP

Lighting: 2.2 AMP

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 ½” x 14”

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Packs

Biological Filter: 1 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

Protein Skimmer: Marineland Commercial Foam Fractionator

“NEW” WATER FROM TREATED WATER SUPPLY:

None: Buyer supplies salt water as needed.

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-70RLT-115; 1200 GPH; UL recognized

Display tank turns per hour (TPH): 8 TPH normal

HEATER:

1,000 W. heater; UL listed, Thermostat Controller,

UL Listed; Temperature Range: 50-130° F.

GFCI protected

LIGHTING:

UL Listed light fixtures with polycarbonate lamp covers

Lamps: 6 each 40 W., 48”, T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 Hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

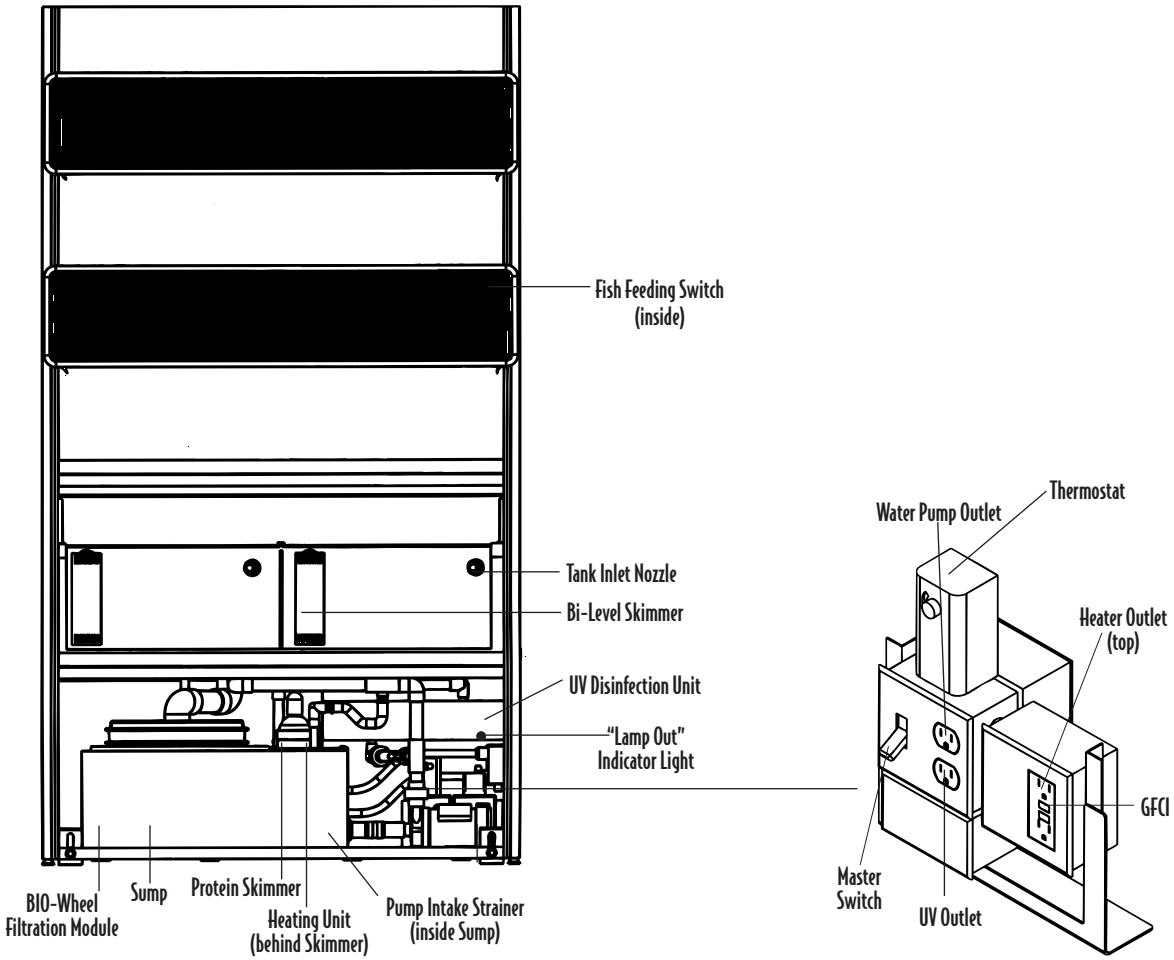
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 15 AMP

Lighting: Plug connected, 1 place; 115 VAC, 60 Hz, 2.2 AMPs, GFCI protected

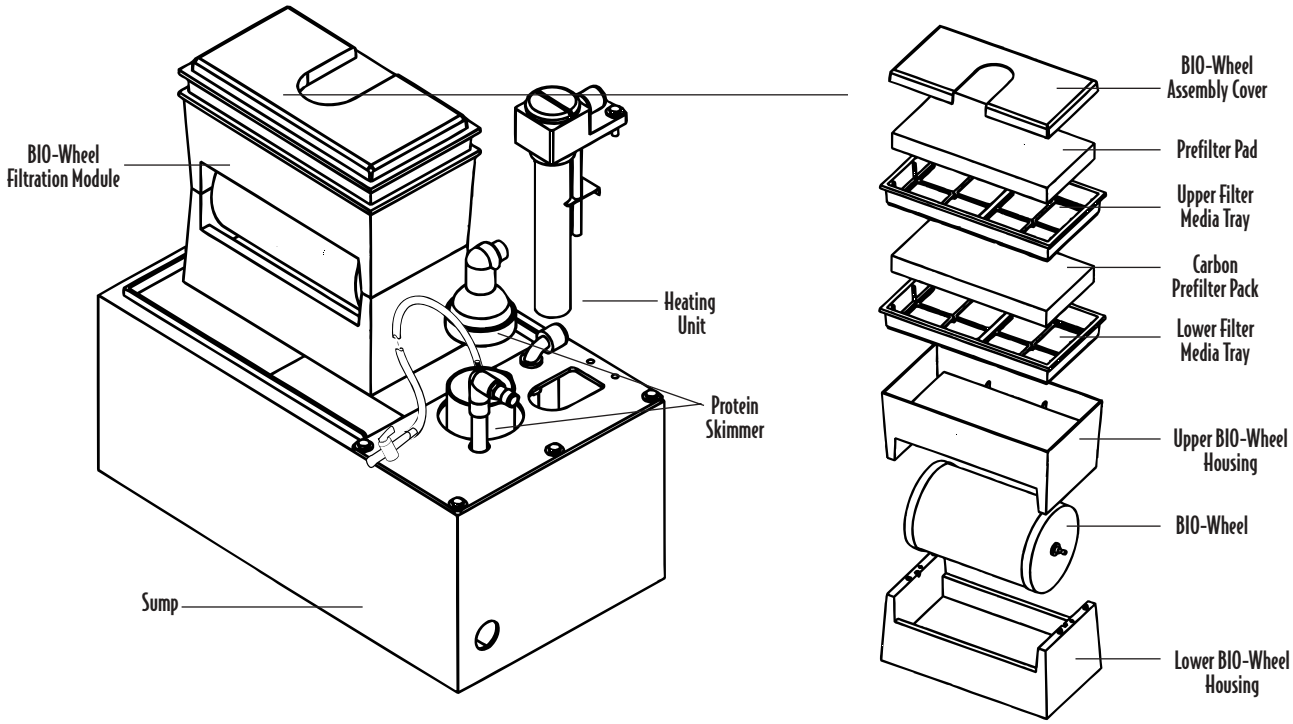
Treated Water Supply: None

Drain: At or below grade, 30’ run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV8MH
8 Foot Heated, Marine Water System

MECHANICAL:

Size: 20"D x 103" L x 94" H (shipping height: 85")
Tilt: 20 ½" D x 103" L x 86 ½" H

Weight: 860 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 192 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 12.9 AMP

Lighting: 2.2 AMP for each 4 foot section, 4.4 AMP total

FILTRATION:

Mechanical Filter: 2 ea. Polyester Pad, 7 ½" x 14"

Chemical Filter: 2-1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 2 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

Protein skimmer: Marineland Commercial Aquarium Foam Fractionator

"NEW" WATER FROM TREATED WATER SUPPLY:

None: Buyer supplies salt water as needed

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-100RLT-115; 1700 GPH; UL recognized

Display tank turns per hour (TPH): 8 TPH nominal

HEATER:

1,000 W. Titanium Heater, UL listed Thermostat

Controller, UL listed; Temperature range: 50-130° F.

GFCI Protected

LIGHTING:

UL listed light fixtures with polycarbonate lamp covers

LAMPS: 12 each 40 W., 48", T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 Lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

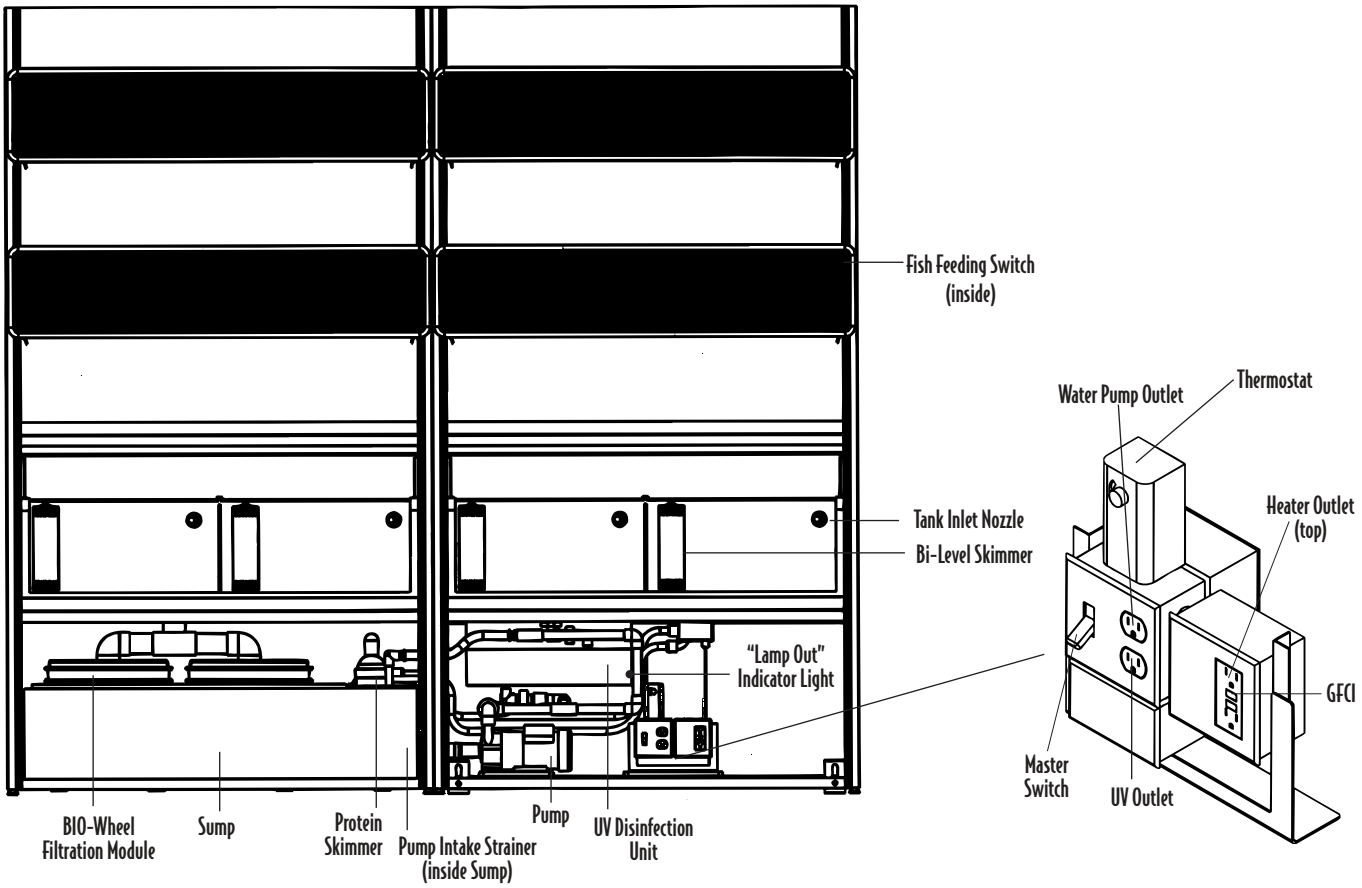
Main Circuit: Hard wired J-Box, 115 VAC, 60 Hz, 20 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs Each, GFCI protected

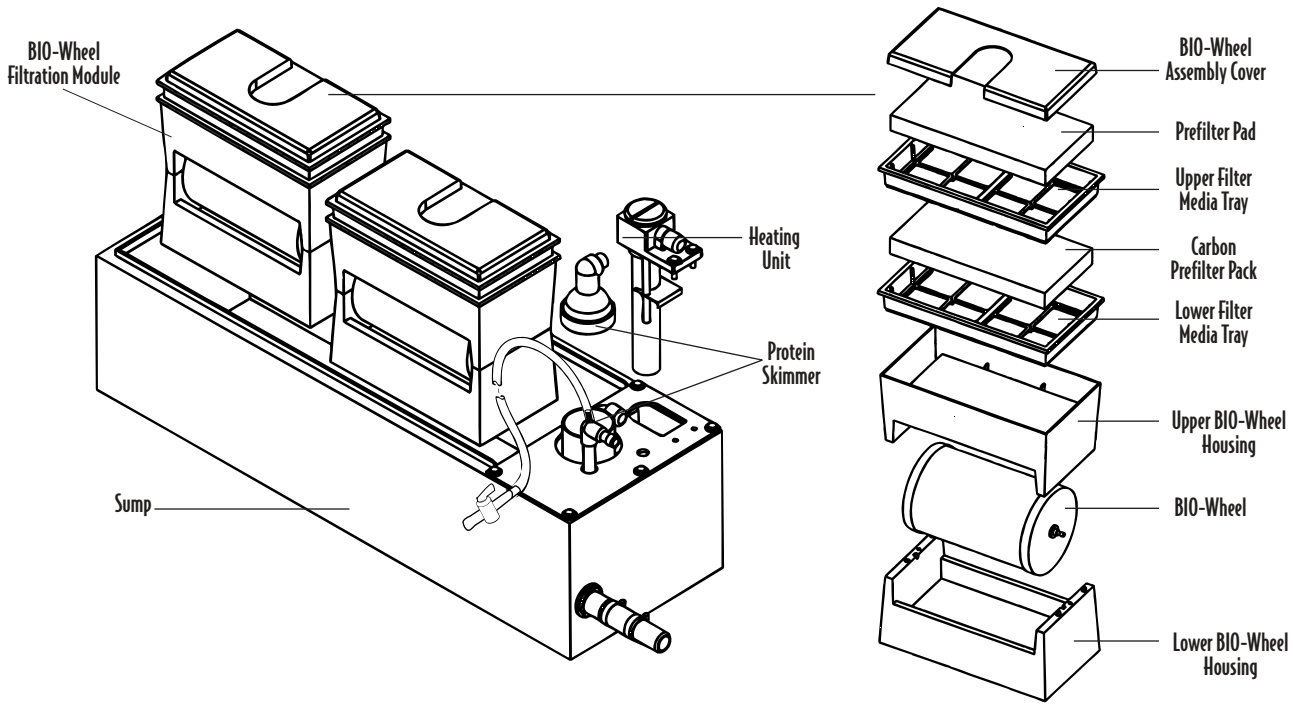
Treated Water Supply: None

Drain: At or below grade, 30' run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV4MR
4 Foot Refrigerated, Marine Water System

MECHANICAL:

Size: 20”D x 51½” L x 94” H (shipping height: 85”)

Tilt: 20½” D x 51½” L x 86½” H

Weight: 490 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 98 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 12.5 AMP

Lighting: 2.2 AMP

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 ½” x 14”

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 1 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

“NEW” WATER FROM TREATED WATER SUPPLY:

NoNE: Buyer supplies salt water as needed.

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-70RLT-115; 1200 GPH; UL recognized

Display tank turns per hour (TPH): 8 TPH minimum

REFRIGERATION:

1/3 HP, R134A with Helical Heat Exchanger

Thermostat Controller, UL Listed. Temperature Range 50-130˚F. GFCI Protected

LIGHTING:

UL Listed light fixtures with polycarbonate lamp covers.

Lamps: 6 each 40 W., 48”, T12, Rapid Start, Fluorescent; 5,000K, 85 CRI, 20,000 Hr. Life; 2820 Lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

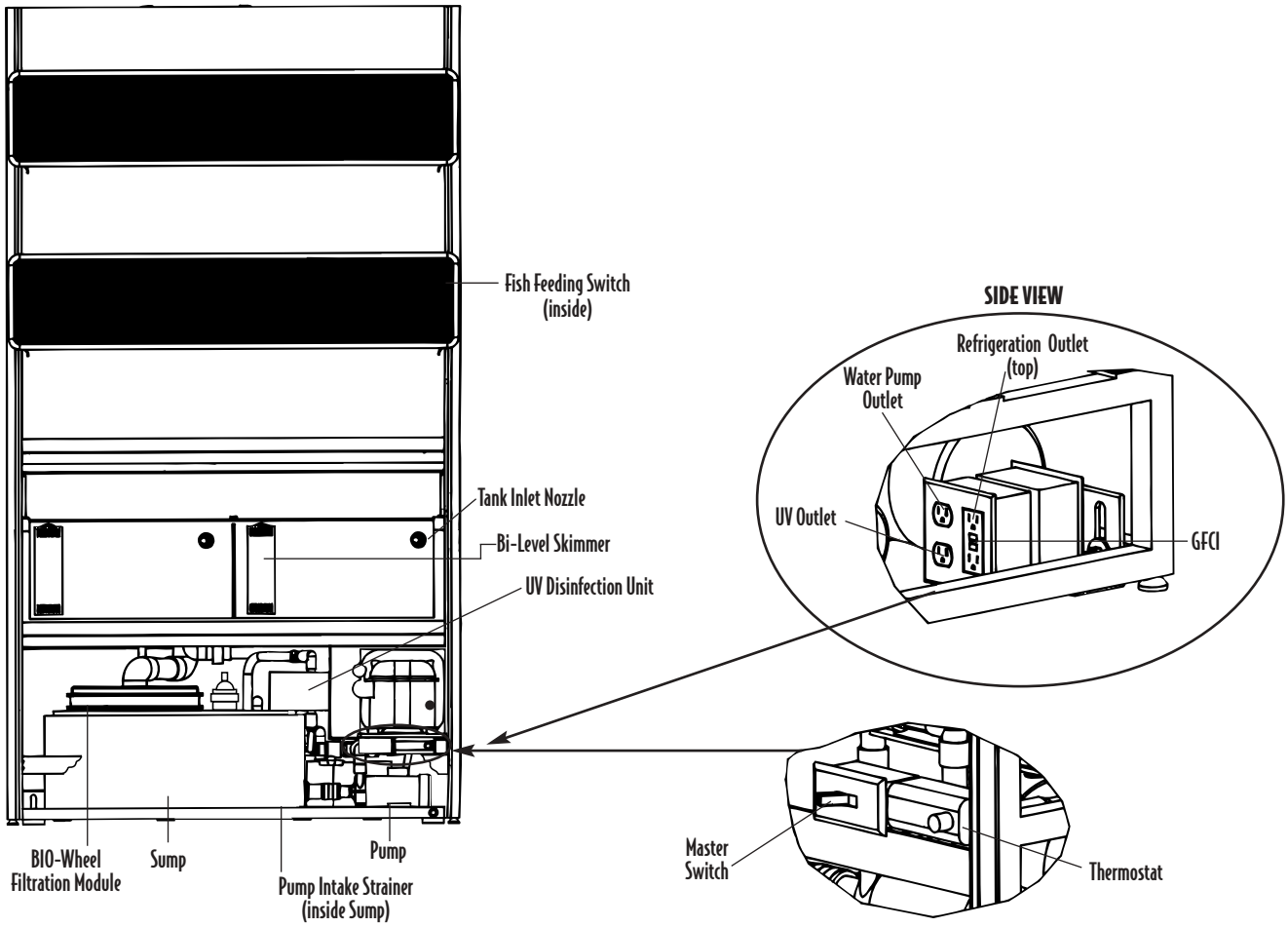
Main circuit: Hard wired J-Box, 115 VAC, 60 Hz, 15 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

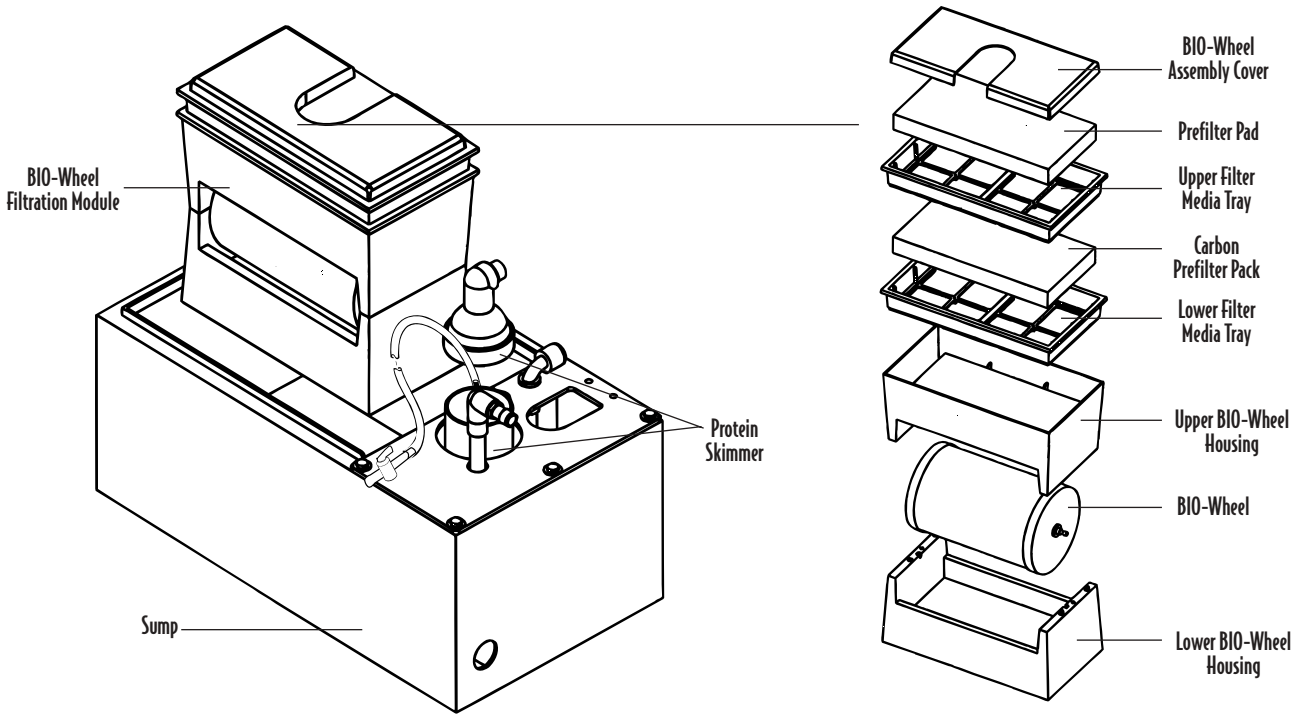
Treated Water Supply: None

Drain: At or Below Grade, 30’ Run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



SYSTEM Specifications

Integrated Rack System MV8MR
8 Foot Refrigerated, Marine Water System

Mechanical:

Size: 20"D x 103" L x 94" H (shipping height: 85")

Tilt: 20 1/2" D x 103" L x 85 1/2" H

Weight: 875 Lb. (Est.)

Floor-attached for seismic loads

System Gallon Capacity: 192 gallons

ELECTRIC:

ETL listed for permanent installation

Voltage: 115 VAC, 60 Hz

Current: Filtration/Circulation: 12.9 AMP

Lighting: 2.2 AMP for each 4 foot section, 4.4 AMP total

FILTRATION:

Mechanical Filter: 1 ea. Polyester Pad, 7 1/2" x 14"

Chemical Filter: 1 lb. Black Diamond Activated Carbon in Carbon Filter Pack

Biological Filter: 2 ea. CBW-1

UV Treatment: Aquafine DW-300; 50,000 uWs/cm^2, @ 4,000 hrs.

"NEW" WATER FROM TREATED WATER SUPPLY:

None: Buyer supplies salt water as needed

CIRCULATION/FILTRATION PUMP:

Pump: IWAKI MD-100RLT-115; UL recognized

Display tank turns per hour (TPH): 8 TPH normal

REFRIGERATION:

1/2 HP, R134A with Helical Heat Exchanger

Thermostat Controller, UL Listed; Temperature Range: 50-130° F. GFCI protected

LIGHTING:

UL listed light fixtures with polycarbonate lamp covers

Lamps: 12 each 40 W., 48", T12, rapid start, fluorescent; 5,000K, 85 CRI, 20,000 hr. life; 2820 lumens (mean); GE SPX50 or Philips Ultralume 50

MATERIALS OF CONSTRUCTION:

Frame: Mild steel tubular welded construction, epoxy powder coated

Doors: Polyurethane

Misc. Panels & Covers: Expanded PVC, ABS, Formica

BUYER SUPPLIED CONNECTIONS FOR INSTALLATION:

Electric Supply:

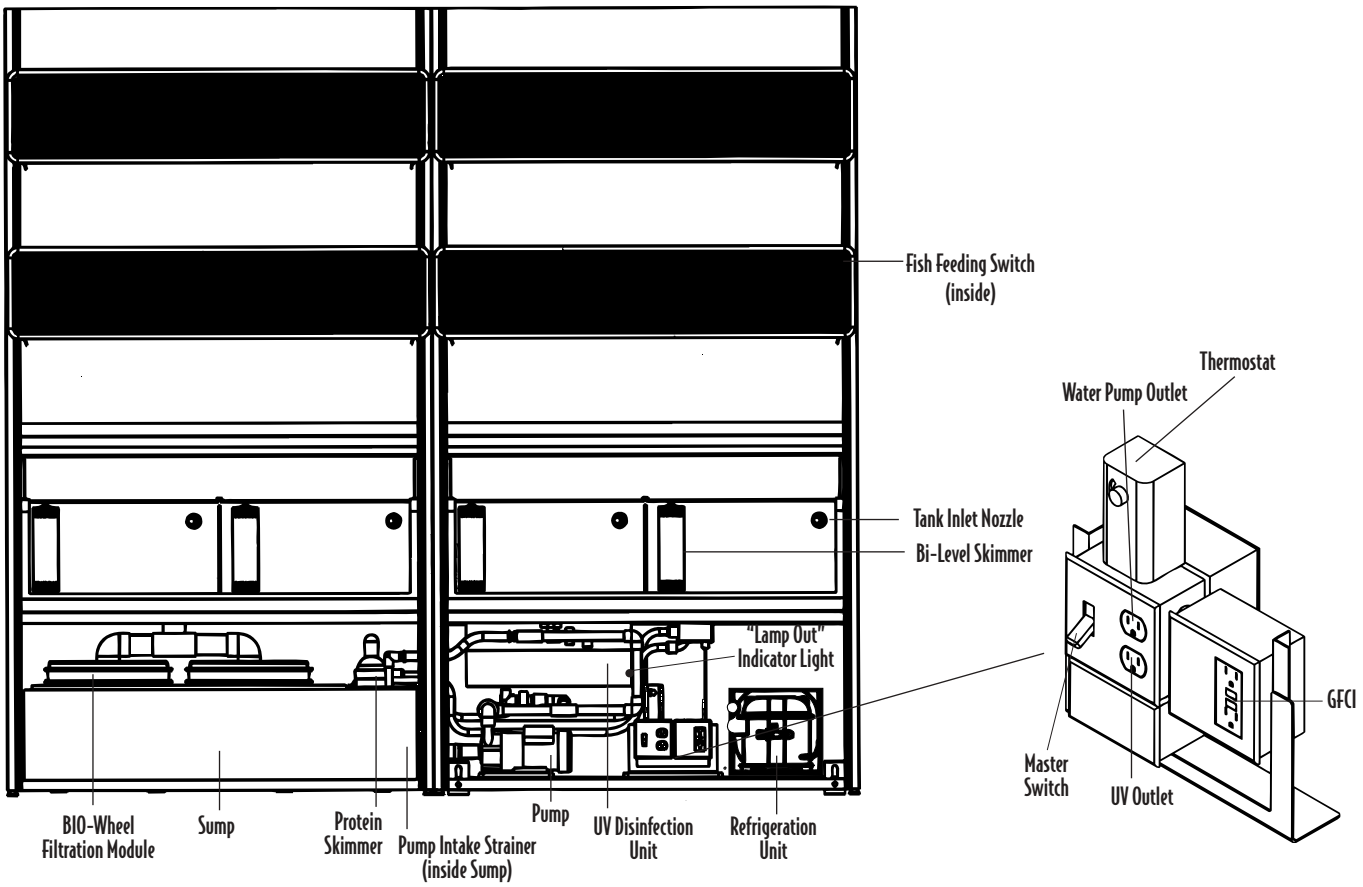
Main circuit: Hard wired J-Box, 115 VAC, 60 Hz, 20 AMP

Lighting: Plug connected, 2 places; 115 VAC, 60 Hz, 2.2 AMPs each, GFCI protected

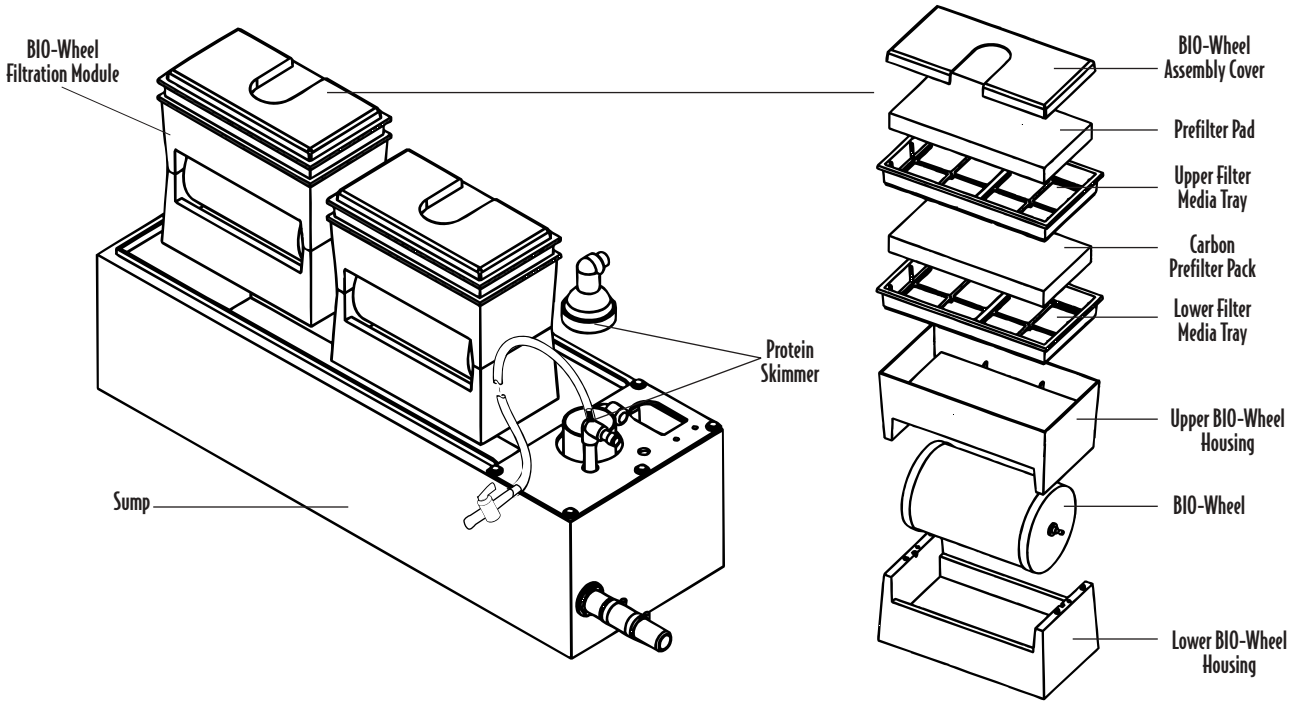
Treated Water Supply: None

Drain: At or below grade, 30' run

Exploded View w/Electrical Assembly Pullout



Sump w/BIO-Wheel Filtration Module Exploded View



CUSTOMER SERVICE

Should you experience problems with your system, call the 24-Hour MaRS Hotline at (800) 576-MaRS (6277).

To order any of the items listed below, call (800) 322-1266.

WEEKLY USE ITEMS:	
1. Prefilter Pads – Blue	MZ0180
2. Prefilter Pads – Coarse White	MZ0181
3. Carbon Filter Packs	MZ0175
SERVICING ITEMS:	
1. Maintenance Kit	MZ0012
2. KX Carbon/Micron Repl. Kit	MZ0040
3. UV Sterilizer Servicing Kit	MZ0017
4. UV Lamp	MZ0061
5. Replacement O-Rings	MZ0041
6. Maintenance Log (25-week supply)	074258

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