

# **Master Construction Specifications**

## **Samples**

Specs for Division 8



## SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions for the Contract including Conditions and Division 1 General Requirements Sections, apply to this Section.

#### 1.2 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8-1998 (SDI-100), ANSI A151.1, and as specified. Submit test reports upon request.
- B. Acoustical qualities: Minimum sound transmission classification of 28 as tested under ASTM designation E490 and ASTM designation E413.
- C. Insulation properties: U factor .363 (R factor of 2.85) for honeycomb core, U factor for polystyrene core of .263 (R factor of 3.8), U factor for polyurethane core of 0.09 (R factor of 11.1).
- D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
  - 1. Investigate and test all labeled fire doors and frames in accordance with either UL-10(b), ASTM E-152, NFPA 252, ANSI A2.2, or UL-10(c), UBC 7-2-1997.
  - 2. Manufacture all labeled doors and frames under the UL factory inspection program and in strict compliance to UL procedures, and provides the degree of fire protection, heat transmission and panic-loading capability indicated by the opening class.
  - 3. Manufacture Warnock Hersey labeled doors and frames to meet the specific requirements of that labeling agency's current procedure for the tested hourly rating designated and subject to inspection by representatives of the labeling agency.
  - 4. Affix a physical label or approved marking to the fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency.
- E. Manufacturer: Company specializing in manufacture of products specified with a minimum of three years documented experience.
- F. All doors and frames shall be the product of one manufacturer.

#### 1.3 REGULATORY REQUIREMENTS

- A. Comply with California Code of Regulations, Title 24, Standards of Accessibility.
- B. Comply with Uniform Building Code Standards 7-2, 7-3, and 7-4.
- C. Fire Rated Openings: Comply with NFPA 80.
- D. Affix label to fire-rated doors and frames as evidence of compliance with procedures of labeling agency.

#### 1.4 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
- B. Storage of Doors:
  - 1. Store doors in an upright position under cover. Place the units on at least 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately. Provide a 1/4" (6.35 mm) space between the doors to promote air circulation.
- C. Storage of Frames:
  - 1. Store frames under cover on 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Store assembled frames in a vertical position, five units maximum in a stack. Provide a 1/4" (6.35 mm) space between frames to promote air circulation.

#### PART 2 - MATERIALS

##### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products of the following:
  - 1. Krieger Steel, [www.kriegersteel.com](http://www.kriegersteel.com)
  - 2. Door Components, Inc., [www.doorcomponents.com](http://www.doorcomponents.com)
  - 3. Steelcraft, [www.steelcraft.com](http://www.steelcraft.com)
  - 4. Ceco Door Products, [www.cecodoor.com](http://www.cecodoor.com)

##### 2.2 MATERIALS

- A. Manufacture frames and frame components from commercial quality carbon steel conforming to ASTM designation A568 and A569 or hot-dipped galvanized steel having an A60 zinc-iron alloy coating conforming to ASTM designation A653. Embossed CE-Series EmCraft doors: hot-dipped galvanized steel face sheets having an A40 zinc-iron alloy coating conforming to ASTM designation A653. Treat galvanized steel to insure proper paint adhesion. Steel component parts used in galvanized doors and/or frames: match galvanized specification. Stainless steel: fabricate from type 304 or 316 stainless steel polished to a number 4 matte finish. Steel component parts used in stainless doors and/or frames are to be stainless steel.
- B. Clean, phosphatized and finish all doors, frames and frame components with one coat of rust inhibiting prime paint in accordance with ANSI A250.10.
- C. Clean, phosphatized and finish all painted doors and frames with a rust-inhibiting paint in accordance with ANSI A250.3.

- D. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick steel sheet; galvanized steel or galvanized steel where used with galvanized steel frames.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, comply with ASTM A 153, Class C or D as applicable.

## 2.3 DOORS

- A. Steel Doors: Provide 1-3/4-inch- (44-mm-) thick doors of materials, grades, and models specified below, or as indicated on Drawings or schedules:
  - 1. Interior Doors: SDI Level 2, heavy-duty, Model 2 seamless, minimum 0.042-inch- (1.0 mm) thick cold-rolled steel sheet faces.
  - 2. Exterior Doors: SDI Level 3, extra heavy duty, Model 2 seamless design, minimum 0.053-inch (1.3 mm) thick galvanized sheet faces.
- B. Door Louvers: Provide louvers according to SDI 111C for doors where indicated, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick cold-rolled steel sheet set into minimum 0.032-inch- (0.8-mm-) thick steel frame.
  - 1. Sight-Proof Louvers: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.
  - 2. Louvers and frames shall be hot-dip galvanized or galvanized.

## 2.4 FRAME

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated.
  - 1. Fabricate interior frames of minimum 16 gage (1.3 mm) thick cold-rolled steel sheet.
  - 2. Form exterior frames from 14 gage (2.0mm) thick hot dipped galvanized steel sheet.
  - 3. Fabricate frames with mitered or coped and continuously welded corners.
- B. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.
- C. Plaster Guards: Provide minimum 0.016-inch- (0.40-mm-) thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings. Projection welds all hinges and strike reinforcements to the door frame.
- D. Grout: Use plaster or cement and sand mixture.

## 2.5 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify Work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

1. Internal Construction: As standard with manufacturer to meet ANSI A250.8 and SDI 100.
  2. Fabricate exposed faces of doors and panels from only cold-rolled steel sheet except galvanized for exterior doors.
  3. Close top of exterior doors with a steel channel over the entire top of the door. Provide galvanized cap to cover channel.
- B. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- C. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet. Weld hardware reinforcements in position.
1. Provide appropriate frame anchors at jambs and floors.
- D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- E. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
1. For concealed overhead door closers, if any, provide space, cutouts, reinforcing, and provisions for fastening in top rail of doors or head of frames, as applicable.
- F. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- G. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
- H. Glazing Stops: Minimum 0.032-inch- (0.8-mm-) thick steel.
1. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass and louvers.
  2. Provide screw-applied, removable, glazing beads on inside of glass and louvers.
- I. Where required by applicable codes at fire-rated assemblies, coordinate the factory-fitting of wood doors to steel frames.

## 2.6 FINISHES

- A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.
- B. Do not prime galvanized or galvanized face sheets or frames.

## 2.8 FLASHING

- A. Provide rubberized asphalt flashings, 60 mil thick at exterior opening perimeters.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories in accordance with ANSI/DHI A115.1G Installation Guide for Doors and Frames, Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 1. Place frames before construction of enclosing walls and ceilings.
  - 2. Provide at least 3 wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jambs. Anchor frames secure to floor.
    - a. Anchors: Appropriate to type of construction.
  - 3. Install fire-rated frames according to NFPA 80.
- C. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8.
  - 1. Fire-Rated Doors: Install with clearances specified in NFPA 80.
  - 2. Smoke-Control Doors: Comply with NFPA 105.
- D. Coordinate installation of glazing and door hardware.
- E. Install flashings as indicated for watertight construction. Lap rubberized-asphalts flashing 4 inches over wall membrane at jambs and sill, and 4 inches under wall membrane at head.

#### 3.2 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion (out of square): 1/16 inch measured with straight edge, corner to corner of each door opening.
- B. Maximum out of plane: 1/16 inch measured with a straight edge from corner to corner of each door opening.
- C. Minimize twist of door frame members to provide uniform margin all around door to allow hanging without springing hinges or loading the latch bolt.

#### 3.3 ADJUSTING AND CLEANING

- A. Prime Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
- B. Adjust door for smooth and balanced movement.

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's	Contractor is to acknowledge with initials each submittal included.
Initials	Attach a letter of explanation for each submittal not included.
_____	All submitted products are as specified.

B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- \_\_\_\_\_ 2. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
- \_\_\_\_\_ 3. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.
  - a. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- \_\_\_\_\_ 4. Samples of manufacturer's color finish showing match to Architect's selected color. Minimum size 4x4 inches.
- \_\_\_\_\_ 5. Manufacturer's installation instructions.

END OF SECTION 08 11 13



## SECTION 08 14 16 – FLUSH WOOD DOORS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions for the Contract including Conditions and Division 1 General Requirements Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Flush face solid core doors with plastic laminated faces, shop factory finished.

#### 1.3 RELATED SECTIONS

- A. Division 8 **Section 08 11 13** "Hollow Metal Doors and Frames" for steel frames.
- B. Division 8 **Section 08 70 00** "Hardware" for door hardware.
- C. Division 6 **Section 06 48 00** "Wood Frames" for wood door frames, for rehanging existing doors, and patching existing doors. *Section not provided.*
- D. Division 8 **Section 08 81 00** "Glass Glazing" for glass panels in flush wood doors and for fire-resistant glazing.

#### 1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with the following standard:
  - 1. Woodwork Institute Quality Standard: "Manual of Millwork" of the Woodwork Institute for grade of door, core, construction, finish, and other requirements.
    - a. Provide Woodwork Institute Certified Compliance Certificate indicating that doors meet requirements of grades specified.
    - b. Provide Woodwork Institute Certified Compliance Certificate for installation.
- B. Fire-Rated Wood Doors: Provide wood doors that comply with California Building Code Section 713.3 and NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per NFPA 252; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.
  - 1. Comply also with UBC Standards 7-2, 7-3, and 7-4.
  - 2. Provide fire door label of testing agency.
- C. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.



- D. Installer Qualifications: Use only skilled journeymen carpenters who are completely familiar with, and have a minimum of three years experience in, the installation of wood doors and the requirements of the Work.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

#### 1.6 PROJECT CONDITIONS

- A. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location.

#### 1.7 WARRANTY

- A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not conform to tolerance limitations of referenced quality standards.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
  - 2. Warranty shall be in effect during the following period of time after date of Final Completion.
    - a. Solid Core Interior Doors: Life of installation.

### PART 2 - MATERIALS

#### 2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide doors by one of the following, or approved equal:
  - 1. Algoma Hardwoods Inc., [www.algomahardwoods.com](http://www.algomahardwoods.com)
  - 2. Eggers Industries, Architectural Door Division, [www.eggersind.com](http://www.eggersind.com)
  - 3. Graham Manufacturing Corp., [www.grahamdoors.com](http://www.grahamdoors.com)
  - 4. Haley Brothers, Inc., [www.haleybros.com](http://www.haleybros.com)
  - 5. Mohawk Flush Doors, Inc., [www.mohawkdoors.com](http://www.mohawkdoors.com)

## 2.2 INTERIOR FLUSH WOOD DOORS

- A. Plastic laminated flush wood doors: Comply with the following requirements:
  - 1. Faces: PL-4 Nevamar ARP Plus, Siren Maple Textured #Wm-0005T.
  - 2. Construction: 5 ply, Type LD2 Particleboard core
  - 3. Edge banding at all four (4) door edges to match face.
  - 4. All prefinished doors to be individually plastic wrapped.
- B. Fire-Rated Solid Core Doors: Comply with the following requirements:
  - 1. Faces and Stiles: Match non-fire-rated doors.
  - 2. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
  - 3. Blocking: Provide composite blocking designed to maintain fire resistance of door but with improved screw-holding capability of same thickness as core and with minimum dimensions as follows:
    - a. 5-inch (125-mm) top rail blocking.
    - b. 5-inch (125-mm) bottom rail blocking.
    - c. 4-1/2 inch-by-10-inch (114-by-250-mm) lock blocks.
    - d. 5-inch (125-mm) midrail blocking, at doors having exit devices.
    - e. As necessary to eliminate need for through-bolting hardware.
  - 4. Edge Construction: Provide manufacturer's standard laminated-edge construction for improved screw-holding capability and split resistance at hinge stiles.
  - 5. Pairs (if applies): Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

## 2.3 LOUVERS AND LIGHT FRAMES

- A. Metal vision panels and louvers supplied primed and painted. Louver blades shall be vision-proof, inverted V or Y. Metal shall be extruded aluminum with powder coat finish as selected by Architect.
- B. Metal frames for light openings in Fire Doors. Manufacturer's standard frame formed of 0.0478 inch (1.2 mm) thick cold-rolled steel sheet, factory primed and approved for use in doors of fire-rating indicated with fire-resistant glazing.

## 2.4 ADHESIVES

- A. Interior Doors: WIC Type I

## 2.5 FABRICATION

- A. Comply with following requirements:

1. Factory machine doors for hardware that is not surface applied as required by applicable codes. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
  - a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
  - b. Metal Astragals (If Any): Premachine astragals and formed- steel edges for hardware for pairs of fire-rated doors.
- B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
  1. Factory install louvers and light frames.
  2. Factory glaze doors.
- C. Factory fit doors and fire-rated doors to suit frame-opening sizes indicated, with uniform clearances and levels. Comply with clearance requirements of WI, except comply with NFPA 80 for fire-rated doors.

## 2.6 SHOP FACTORY FINISH

- A. Doors for transparent finish: all exposed surfaces shall be shop finished to match Algoma RA-1050.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine installed door frames prior to hanging door:
  1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
  2. Reject frames or doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: For installation see Division 8 **Section 08 71 00** "Door Hardware."
- B. install doors in accordance with WIC "Manual of Millwork", Section 13; and WIC Technical Bulletin 420-R. Conform to WIC requirements for fit tolerances. Provide WIC certified compliance label for installation. Pay all WIC inspection fees compliance label.
- C. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
  1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.

- 2. Manufacturer's installation instructions shall be available on the Project site for all fire rated doors.
  - D. Factory-Fitted Wood-Veneer Doors and Fire Rated Doors: Align in frames for uniform clearance at each edge.
- 3.3 ADJUSTING AND PROTECTION
- A. Operation: Re-hang or replace doors that do not swing or operate freely.
  - B. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Completion.
  - C. Clean doors and glass 5 days prior to Completion.

SECTION CONTINUES ON NEXT PAGE

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## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's	Contractor is to acknowledge with initials each submittal included.
Initials	Attach a letter of explanation for each submittal not included.
_____	All submitted products are as specified.

- B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Product data for each type of door, louver, and glazing, including details of core and edge construction, and trim for openings.
- \_\_\_\_\_ 2. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, and other pertinent data.
  - a. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts.
  - b. Indicate testing approvals for fire-rated doors with fire-resistant glazing set in manufacturer's glazing stops and fire-rated door construction.
- \_\_\_\_\_ 3. Samples for selection of wood veneer, showing full range of colors available.
- \_\_\_\_\_ 4. Sample of corner section of wood veneer doors, 8 x 10 inches.

END OF SECTION 08 14 16

## SECTION 08 17 00 - AUTOMATIC DOOR EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SECTION INCLUDES

- A. Electric operated door equipment.
  - 1. Operator housing.
  - 2. A.C. electric motor.
  - 3. Operator assembly.
  - 4. Electronic control.

#### 1.3 RELATED SECTIONS

- A. **Section 08 11 13** – Hollow Metal Doors and Frames.
- B. **Section 08 40 00** – Entrances, Storefronts and Curtain Walls.
- C. **Section 08 70 00** - Hardware.

#### 1.4 SYSTEM DESCRIPTION

- A. Operation: Power Open - The automatic door operator shall be powered open by force transmitted by the electric motor to operate and through adjustable arm linkage to the door. At all times a constant opening pressure shall be maintained. Both opening and closing speed shall be individually adjustable.

The automatic door system shall function as manual door closer in the event of a power failure. Manual opening force shall be unaffected by opening speed adjustment. The automatic door system shall be a self-contained design requiring no remote pumps or compressors.

Spring Close: The automatic door operator shall be spring closed. The spring shall be non-handed and designed to counteract wind conditions and return the door to full close.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Automatic door equipment to accommodate heavy pedestrian traffic, and weight of doors.
- B. Design system to operate, hold open and close doors under design wind and suction loads calculated in accordance with applicable California building code.
- C. Operating Temperature Range: Minus 20 to plus 140 degrees F (minus 7 to plus 60 degrees C) ambient.

- D. Full adjustable operators for opening and closing speeds, checking speeds, hold open time, and cancellation on activation of fire alarm and smoke detection system.

#### 1.6 SUBMITTALS

- A. Required submittals are indicated at the end of this section.

#### 1.7 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01 77 00.
- B. Accurately record locations of concealed equipment, services, and conduit.

#### 1.8 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 77 00.
- B. Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.

#### 1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Installer: The swing door operator shall be installed by authorized and trained personnel. The work shall be done in strict compliance with manufacturer's recommendations.

#### 1.10 REGULATORY REQUIREMENTS

- A. Conform to applicable California building code and ANSI A117.1 for automatic release of control drive unit to permit manual opening of doors.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

#### 1.11 COORDINATION

- A. Coordinate work under provisions of Section 01 31 00.
- B. Coordinate with the work of Division 16 for electrical service.

#### 1.12 WARRANTY

- A. Provide five year warranty under provisions of Section 01 77 00.
- B. Warranty: Include coverage for operator and control unit.

#### 1.13 MAINTENANCE SERVICE



- A. Furnish service and maintenance of operating equipment for one year from Date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Dor-O-Matic or approved equal.
  - 1. Senior Swing, surface mounted swing door operator for handicapped applications.
- B. Substitutions: Under provisions of Section 01 25 00.

### 2.2 OPERATOR HOUSING

- A. The operator shall be completely contained in a 6" x 6" high extruded aluminum housing. All aluminum sections shall be of 6006-T6 alloy and shall be a minimum wall thickness of .156". All exposed surfaces shall be custom finish as specified herein. The operator housing shall provide a seal against dust, dirt, and moisture. The housing shall extend full width of pair of door openings. Automatic door operator manufacturer to provide false headers where indicated.

### 2.3 ELECTRIC MOTOR

- A. The electric motor shall be equipped standard with a built-in thermal overload protection and shall not exceed 5 amps current draw.

### 2.4 OPERATOR ASSEMBLY

- A. The Power Transmission servo shall have only one moving part, ensuring superior reliability and low overall maintenance. Operator shall be non-handed to insure maximum versatility in adapting to varying field conditions. Provide reveal mount extension where required.

### 2.5 ELECTRONIC CONTROL

- A. A self-contained, solid state integrated circuit shall control the operations and switching of the swing power operator. The electronic control shall provide low voltage power supply for all means of actuation. No external or auxiliary low voltage power source shall be allowed. The control shall include time delay (1 to 60 seconds) for normal cycle.

### 2.6 ACTIVATING DEVICES

- A. Actuation and safety devices shall be indicated on door schedule and specified herein. Controls shall cause door to open instantly when device(s) located at remote location on approach side of door is actuated; hold door in open position, and cause door to close - unless safety device or re-actuation of opening impulse overrides such operation.
- B. Activating devices shall be wall recessed press switches.

## 2.7 PUSH PLATE CONTROL DEVICE

- A. Standard wall mounted, momentary contact type, as selected by architect.

- 1. Push plates shall meet all ADA Title 24 code standards.

## 2.8 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:

- 1. 110 volts, single phase, 60 Hz.
  - 2. 5 amperes maximum fuse size circuit breaker size. 15 amp minimum circuit capacity.

- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

- C. Disconnect Switch: Factory mount disconnect switch in control panel.

## 2.9 FINISHES

- A. Exposed Components shall have the same finish as aluminum storefront specified in Sections 08 40 00.

# **PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Verify that surfaces and openings and recesses are ready to receive work and dimensions are as indicated on shop drawings.

## 3.2 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

## 3.3 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.
- C. Provide for dimensional distortion of components during operation.
- D. Coordinate installation of components with related and adjacent work, level and plumb.

## 3.4 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.5 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

3.6 DEMONSTRATION

- A. Provide systems demonstration under provisions of Section 01 77 00.
- B. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

SECTION CONTINUES ON NEXT PAGE



## PART 4 - SUBMITTALS

### 4.1 REQUIRED SUBMITTALS

- A. Include this form with submittals of this specification section. Unless a substitute product is being proposed, then refer to SECTION 01 25 00 for SUBSTITUTION REQUEST.

General

Contractor's

Initials

General Contractor is to acknowledge with initials each submittal included.

Attach a letter of explanation for each submittal not included.

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All submitted products are as specified.

### B. SUBMITTALS

- \_\_\_\_\_ A. Submit under provisions of Section 01 33 00.
- \_\_\_\_\_ B. Shop Drawings: Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials and finishes, electrical characteristics and connection requirements.
- \_\_\_\_\_ C. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.
- \_\_\_\_\_ D. Product Data: Provide data on system components, sizes, features, and finishes.
- \_\_\_\_\_ E. Samples: Submit two (2) samples of exposed to view hardware, frame, and attachment hardware.
- \_\_\_\_\_ F. Submit product data on paint finish.
- \_\_\_\_\_ G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.

END OF SECTION 08 17 00

## SECTION 08 31 00 - ACCESS DOORS AND PANELS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

- 1. Test Method for Vertical Installations: ASTM E 152.
- 2. Test Method for Horizontal Installations: ASTM E 119.

- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

#### 1.3 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified under "Submittals" Article.

### PART 2 - MATERIALS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products of the following, or approved equal:

- 1. Bar-Co, Inc. Div., Alfab, Inc., [www.alfabinc.com](http://www.alfabinc.com)
- 2. Cesco Products, [www.cescoproducts.com](http://www.cescoproducts.com)
- 3. J.L. Industries, [www.jlindustries.com](http://www.jlindustries.com)
- 4. Karp Associates, Inc., [www.karpinc.com](http://www.karpinc.com)
- 5. Larsen's Manufacturing Co., [www.larsensmfg.com](http://www.larsensmfg.com)
- 6. Milcor, Inc., [www.milcorinc.com](http://www.milcorinc.com)
- 7. The Williams Bros. Corporation of America., [www.wbdoors.com](http://www.wbdoors.com)

#### 2.2 MATERIALS

- A. Steel Sheet: ASTM A 366/A 366M commercial-quality, cold-rolled steel sheet with baked-on, rust-inhibitive primer.

- B. Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Electrolytic zinc-coated steel sheet with Class C coating and phosphate treatment to prepare surface for painting.
- C. Stainless-Steel Sheet: ASTM A 167, Type 304 with No. 4 finish according to ASTM A 480/A 480M.

## 2.3 ACCESS DOORS

- A. Insulated, Fire-Rated Access Doors: Self-latching units consisting of frame, trim, door, insulation, and hardware, including automatic closer, interior latch release, and complying with the following requirements:
  - 1. Fire-Rated Locations:
    - a. Metal Frame: 0.0625-inch- (1.59-mm-) thick stainless-steel sheet in restrooms, and 0.0598-inch (1.52 mm) thick steel sheet in non-restroom locations.
    - b. Trim: 1-inch (25.4-mm) flange overlapping surfaces surrounding door frame.
  - 2. Door: 0.0359-inch- (0.91-mm-) thick steel sheet, welded pan type, except in restrooms provide 0.0375-inch- (0.95-mm-) thick stainless-steel sheet, welded pan type.
  - 3. Hinges: Continuous type.
  - 4. Latches: Bolt type, operated by a flush key device (keyed alike).
  - 5. Insulation: 2-inch- (50.8-mm-) thick mineral-fiber insulation.
  - 6. Fire-Protection Rating for Walls and Ceilings: 1-1/2 hour minimum.
- B. Non-Fire-Rated Locations: Provide flush access doors with exposed trim consisting of frame with exposed trim, door, hardware, and complying with the following requirements:
  - 1. Metal Frame: 0.0625-inch- (1.59-mm-) thick stainless-steel sheet in restrooms, 0.0598 inch (1.52 mm) thick steel sheet in non-restroom locations.
  - 2. Door: 0.0781-inch- (1.98-mm-) thick stainless-steel sheet, except 0.0747-inch (190 mm) thick steel sheet in non-restroom locations.
  - 3. Trim: Flange integral with frame, 3/4 inch (19 mm) wide, overlapping surrounding finished surface.
  - 4. Hinge: Continuous type.
  - 5. Locks: Key-operated cylinder lock, keyed alike with other access doors.
- C. Aluminum Doors for Suspended Ceiling:
  - 1. Milcor CF-2, 2'-6" x 3'-0", 1/4" extruded aluminum and 1/8" aluminum plate, downward swinging with automatic snap latch with removable handle.

## 2.4 ACCESS DOOR SIZES

- A. Unless indicated otherwise, required otherwise by applicable codes, or larger size is necessary for adequate access provide the following:
  - 1. Walls: 14 x 14 inch minimum.
  - 2. Ceilings: 18 x 18 inch minimum.

## 2.5 FABRICATION

- A. General: Manufacture each access door assembly as an integral unit ready for installation.
- B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
  - 1. Exposed Flange: Nominal 1 to 1-1/2 inches (25.4 to 38.1 mm) wide around perimeter of frame.
  - 2. For gypsum board assemblies or gypsum veneer plaster, furnish frames with edge trim for gypsum board or gypsum base.
  - 3. For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
- C. Locking Devices: Furnish number required to hold door in flush, smooth plane when closed.
  - 1. For cylinder lock, furnish 2 keys per lock and key all locks alike.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Advise Installers of other Work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other Work to avoid delay.

### 3.2 INSTALLATION

- A. Comply with manufacturer's instructions for installing access doors.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.

### 3.3 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

SECTION CONTINUES ON NEXT PAGE



## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's Initials      Contractor is to acknowledge with initials each submittal included.  
                                 Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

- B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Product data for each type of access door assembly specified, including details of construction relative to materials, individual components, profiles, finishes, and fire-protection ratings.
- a. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, latching or locking provisions, and other data pertinent to installation.

END OF SECTION 08 31 00

## SECTION 08 40 00 – ENTRANCES, STOREFRONTS AND CURTAIN WALLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SYSTEM REQUIREMENTS

##### A. Design Requirements:

1. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
2. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
3. Provide concealed fastening.
4. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
5. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
6. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
7. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.

##### B. Performance Requirements:

1. Air Infiltration: Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water Infiltration: No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 9 psf.
3. DSA Approval: System must be approved by the California Division of the State Architect.

##### C. Thermal Requirements:

1. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180° without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.
2. Ensure doors function normally within limits of specified temperature range.

D. Basic Wind Speed:

1. The minimum basic wind speed shall not be less than 70 mph (CBC Figure 16-1 minimum basic wind speed).
2. Wind Stagnation Pressure: 12.6 psf (CBC Table 16-F – wind stagnation pressure at standard height of 33 feet).
3. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" shall be limited to 1/175 of its clear span and for spans greater than 13'-6" deflection shall be limited to  $1/240 + \frac{1}{4}"$  of its clear span, except that maximum deflection of members supporting plaster surfaces shall not exceed 1/360 of its span.

E. Seismic Requirements:

1. Base on the requirements of the 2010 CALIFORNIA BUILDING CODE.

- \_ Zone 4     $Z = 0.4$
- \_ Importance  $I = 1.15$
- \_  $Ca = .44$      $Na = 1.3$
- \_  $Cv = .64$      $Nv = 1.6$
- \_ Soil Type: SD

*Executive Architect to verify*

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces as necessary to prevent damage.
- B. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
- C. Do not leave coating residue on any surfaces.
- D. Replace damaged units.

1.4 WARRANTY

- A. Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Contractor warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 1 year from date of Substantial Completion.

- B. Warranty shall cover the following:
  - 1. Complete watertight and airtight system installation within specified tolerances.
  - 2. System is structurally sound and free from distortion.
- C. Provide written warranty stating organic 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 1 year from date of Substantial Completion and agreeing to promptly correct defects.

## PART 2 - MATERIALS

### 2.1 MANUFACTURERS AND PRODUCTS

#### Glazed Aluminum Curtain Walls

- A. Acceptable Structural Glazed Curtainwall System: (basis of design)
  - 1. Kawneer 1600 Wall System<sup>2</sup> Structural Silicone Glazed. Outside glazed. Or approved equal.
- B. Acceptable Outside Glazed Curtainwall: (basis of design)
  - 1. Kawneer 1600 Wall System 1, integrated outside glazed, captures curtainwall.
- C. Acceptable Entrances System: (basis of design)

#### Aluminum-Framed Entrances and Storefronts

- 1. Kawneer Panic Guard Entrance with Trifab II Frame. Or approved equal.
- 2. Kawneer 500 Wide Stile Swing Door.

### 2.2 FRAMING MATERIALS AND ACCESSORIES

- A. Aluminum:
  - 1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
  - 2. Minimum thickness of 0.078 inch for main framing members.
- B. Internal Reinforcing:
  - 1. ASTM A 36 for carbon steel; or ASTM B308 for structural aluminum.
  - 2. Shapes and sizes to suit installation.

3. Steel components factory coated with alkyd type zinc chromate primer complying with FS TT-P-645.
- C. Anchorage Devices:
1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.
  2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 2.0 ounce minimum coating.
- D. Fasteners:
1. Aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with items being fastened.
  2. Provide concealed fasteners wherever possible.
  3. For exposed locations, provide Phillips flathead screws with finish matching item fastened.
  4. For concealed locations, provide manufacturer's standard fasteners.
- E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.
- F. Protective Coatings: Cold-applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.
- G. Touch-Up Primer for Galvanized Components: Zinc oxide conforming with FS TT-P-641.
- H. Glazing Gaskets:
1. Compression type design, replaceable, molded or extruded, of neoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
  2. Profile and hardness as required to maintain uniform pressure for watertight seal.
- I. Weatherstripping:
1. Wool pile conforming to AAMA 701.2.
  2. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.
- J. Internal Sealants and Baffles.
- K. 1600 SunShade™: An aluminum sunshade (consisting of outriggers, louvers, and fascia) that is anchored directly to the vertical curtain wall mullions. Outriggers shall be painted (Select from Kawneer's standard paints and colors.). Louvers and fascia shall be anodized.

## 2.3 GLASS AND GLAZING ACCESSORIES

- A. Refer to **Section 08 81 00** Glass Glazing.

## 2.4 FABRICATION

- A. Coordination of Fabrication:

1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
2. Fabricate units to withstand loads which will be applied when system is in place.

- B. General:

1. Conceal fasteners wherever possible.
2. Reinforce work as necessary for performance requirements, and for support to structure.
3. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators which will prevent contact and corrosion.
4. Comply with **Section 08 81 00** for glazing requirements.

- C. Aluminum Framing:

1. Provide members of size, shape, and profile indicated, designed to provide for glazing from exterior.
2. Fabricate frame assemblies with joints straight and tight fitting.
3. Reinforce internally with structural members as necessary to support design loads.
4. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
5. Seal horizontals and direct moisture accumulation to exterior.
6. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
7. Provide manufacturer's extrusions and accessories to accommodate expansion and contraction due to temperature changes without detriment to appearance or performance.
8. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer and FGMA Glazing Manual.

## D. Welding:

1. Comply with recommendations of the American Welding Society.
2. Use recommended electrodes and methods to avoid distortion and discoloration.
3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.

## E. Flashings: From sheet aluminum with same finish as extruded sections. Material thickness as required to suit condition without deflection or "oilcanning".

## 2.5 FINISHER FOR ALUMINUM CURTAINWALL FRAMES AND ENTRANCE DOORS AND FRAMES

- A. Kawneer Permanodic color to be determined on a per project basis by executive architect.

**PART 3 - EXECUTION**

## 3.1 EXAMINATION

- A. Examine conditions and proceed with work in accordance with Division 1, execution requirements.

## 3.2 INSTALLATION

## A. Erection Tolerances:

1. Limit variations from plumb and level:
  - a. 1/8 inch in 10'-0" vertically.
  - b. 1/8 inch in 20'-0" horizontally.
2. Limit variations from theoretical locations: 1/4 inch for any member at any location.
3. Limit offsets in theoretical end-to-end and edge-to-edge alignment: 1/16 inch from flush surfaces not more than 2 inches part or out-of-flush by more than 1/4 inch.

- B. Install doors and hardware in accordance with manufacturer's printed instructions.

- C. Set units plumb, level and true to line, without warp or rack of frame.

- D. Anchor securely in place, allowing for required movement, including expansion and contraction.

- E. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or preformed separators to prevent contact and corrosion.

- F. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.

- G. Coordinate installation of perimeter sealant and backing materials between assemblies and adjacent construction in accordance with requirements of **Section 07 92 00**.



- H. Glazing: Refer to requirements of **Section 08 81 00**.

### 3.3 ADJUSTING

- A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

### 3.4 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.
- B. Clean metal surfaces exercising care to avoid damage.

SECTION CONTINUES ON NEXT PAGE

COLLEGE of the CANYONS

**PART 4 - EXECUTION****4.1 SUBMITTALS SCHEDULE**

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's Contractor is to acknowledge with initials each submittal included.

Initials Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Submit approval of specified systems by the California Division of the State Architect (DSA).
- \_\_\_\_\_ 2. Submit manufacturer's descriptive literature and product specifications.
- \_\_\_\_\_ 3. Include information for factory finishes, hardware, accessories, and other required components.
- \_\_\_\_\_ 4. Include color charts for finish indicating manufacturer's standard colors available for selection.
- \_\_\_\_\_ 5. Submit shop drawings covering fabrication, installation and finish of specified systems.
  - a. Include the following:
    - 1) Fully dimensioned plans and elevations with detail coordination keys.
    - 2) Locations of exposed fasteners and joints.
  - b. Provide detailed drawings of:
    - 1) Composite members.
    - 2) Joint connections for framing systems and for entrance doors.
    - 3) Anchorage.
    - 4) System reinforcements.
    - 5) System expansion and contraction provisions.
    - 6) Glazing methods and accessories.
    - 7) Internal sealant requirements.
  - c. Schedule of finishes.
- \_\_\_\_\_ 6. Submit manufacturers' standard samples indicating quality of finish.
- \_\_\_\_\_ 7. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
- \_\_\_\_\_ 8. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.
- \_\_\_\_\_ 9. Qualification Data: Submit installer qualifications verifying years of experience.
- \_\_\_\_\_ 10. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

END OF SECTION 08 40 00

## SECTION 08 51 13 - ALUMINUM WINDOWS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SYSTEM DESCRIPTION

- A. The windows shall be Architectural Aluminum Fixed Windows in accordance with ANSI/AAMA 101 Voluntary Specifications for Aluminum and Poly Prime Windows and Glass Doors and AAMA 910, Voluntary "Life Cycle" Specifications and Test Methods for Architectural Grade Windows, Sliding Glass Doors for a Class and Grade F-HC100 and F-AW100.
- B. Test Units:
  - 1. All test unit sizes and configurations shall conform to the minimum size in accordance with ANSI/AAMA 101 and AAMA 90.
  - 2. Units submitted for laboratory testing shall be units of the manufacturer's standard construction, glazed and assembled in accordance with the manufacturer's specifications and ANSI/AAMA 101.
- C. Performance Requirements:
  - 1. Air Infiltration: The test specimen shall be tested in accordance with ASTM E283 at a minimum vent size of 6'x6' for F-HC100 and 5'x6' for F-AW100. The air infiltration rate shall not exceed 0.06 cfm/ft at a static air pressure differential of 6.24 psf.
  - 2. Water Resistance: The test specimen shall be tested in accordance with ASTM E547 and ASTM E331 at a minimum vent size of 6'x6' for F-HC100 and 5'x8' for F-AW100. There shall be no leakage as defined in the test method at a static air pressure differential of 12 psf.
  - 3. Uniform Load Deflection: A minimum static air pressure difference of 150 psf shall be applied in the positive and negative direction in accordance with E330. There shall be no deflection in excess of L/175 of the span of any framing member.
  - 4. Uniform Load Structural Test: A minimum static air pressure difference of 150 psf shall be applied in the positive and negative direction in accordance with ASTM E330. The unit shall be evaluated after each load.
  - 5. Component Testing: Window components shall be tested in accordance with procedures described in ANSI/AAMA 101.
  - 6. Life cycle testing for architectural grade windows when tested in accordance with AAMA 910, there shall be no damage to fasteners, and air infiltration and water resistance tests shall not exceed the primary performance specified herein.

### 1.3 QUALITY ASSURANCE

- A. The architectural aluminum supplier shall have a quality system registered to one of the ISO 9000 series of standards. The quality system shall be certified by a Registrar approved by the Accreditation Board (RAB) or another, international approval authority.
  - 1. The certificate shall be current and in good standing with the Registrar which issued it.
  - 2. The supplier shall furnish, upon request, a copy or copies of the current certificate.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Kawneer Company, Inc.
  - 1. Address: 555 Guthridge Court, Technology Park/Atlanta, Norcross, GA 30092. Telephone: 770-449-5555; Fax: 770-734-1560.
    - a. 8225TL Isolock, fixed with 1" venetian blind.

### 2.2 MATERIAL

- A. Aluminum for Windows and Components.
  - 1. Extruded aluminum profiles shall be 6063-T5 alloy and temper (ASTM B221 G.S. 10A-T5).
  - 2. The frame and ventilator depth shall be not less than -1/4" (57.2).
  - 3. All frame and ventilator depth shall have minimum wall thickness of 0.090" (2.3) and shall provide the structural strength sufficient to meet the specified performance requirements.
  - 4. All references to dimensions for wall thickness and other cross-sectional dimensions of window members are nominal and in compliance with ANSI H35.3-1990.
  - 5. All glass pockets shall be wept to provide positive drainage.

### 2.3 ACCESSORIES

- A. Fasteners: Where exposed, shall be 300 Series, Stainless Steel.
- B. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- C. Venetian Blinds: 1" aluminum venetian blinds with braided ladder cords. Finish shall be baked on polyester powder coat conforming to AAMA 2604. Provide tilt control knob with slip mechanism to prevent over-tilting.
- D. Dual Glazing: Extruded aluminum profiles, 6063-T5 alloy and temper, mitered and fastened joints.

## 2.4 GLASS AND GLAZING

- A. General: Glass thickness and type shall be in accordance with manufacturer's standard requirements.
  - 1. Glazing materials shall be compatible with aluminum and those sealants and sealing materials used in compliance which have direct contact with the gasket.
  - 2. Standard exterior and interior glazing shall be a dry glazed elastomer in accordance with ASTM C509-91.
  - 3. Glazing beads shall be extruded aluminum and shall be a minimum thickness of 0.062" (1.575mm).
- B. Glass Materials:
  - 1. Glass Type: Tinted or clear glass as indicated on drawings or schedules. Sealed insulated unit as indicated on drawings or schedule.
  - 2. Glass Thickness: ¼" or 1" nominal as indicated on drawings or schedules.
  - 3. Dual glazing shall consist of ¼" exterior glass and 3/16" interior access panel as indicated on drawings or schedules.

## 2.5 SEALANT MATERIALS

- A. Perimeter Sealant: Type Sika IA, polyurethane base.

## 2.6 FABRICATION

- A. Fabricate windows allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
- B. Rigidly fit, miter and reinforce joints and corners. Accurately fit and secure corners tight. Make corner joints flush, hairline, and weatherproof. Seal corner joints with sealant.
- C. Develop drainage holes with moisture pattern to exterior.
- D. Prepare components to receive anchor devices. Fabricate anchorage items.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Provide internal reinforcement in mullions members to maintain rigidity.

## 2.7 FINISH

- A. Finish shall be the same as specified in **Section 08 40 00 – Entrances, Storefronts and Curtain Walls**.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
- B. Beginning of installation means acceptance of existing conditions.

#### **3.2 INSTALLATION**

- A. Install window frames, glass and glazing and hardware in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely attach frame to structure.
- C. Align window frame plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.
- D. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.
- E. Install glass in accordance with Section 08 81 00.
- F. Install perimeter Type 1 sealant, backing materials, and installation requirements in accordance with Section 07 92 00. Apply sealant to ends of sill for watertight seal.
- G. Adjust operable hardware for smooth operation and tight fit of sash.

#### **3.3 CLEANING**

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, cleaning wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

SECTION CONTINUED ON NEXT PAGE.

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's	Contractor is to acknowledge with initials each submittal included.
Initials	Attach a letter of explanation for each submittal not included.
_____	All submitted products are as specified.

### B. SUBMITTALS

- \_\_\_\_\_ 1. Submit shop drawings and product data under provisions of **Section 01 33 00**.
- \_\_\_\_\_ 2. Include wall opening and component dimensions; wall opening tolerances required; anchorage and fasteners; affected related work; installation requirements; and head, jambs and sill conditions.
- \_\_\_\_\_ 3. Submit manufacturer's installation instructions under provisions of **Section 01 33 00**.
- \_\_\_\_\_ 4. Submit two samples 6x6 inches in size illustrating window frame sections.
- \_\_\_\_\_ 5. Submit product data on paint finish.
- \_\_\_\_\_ 6. Submit product data on sealant compound.

END OF SECTION 08 51 13



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## SECTION 08 70 00 - HARDWARE

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 REFERENCES

- A. Use date of standard in effect as of Bid date.
- B. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- C. ANSI A117.1 – Specifications for making buildings and facilities usable by physically handicapped people.
- D. ADA – Americans with Disabilities Act of 1990
- E. BHMA – Builders Hardware Manufacturers Association
- F. DHI – Door and Hardware Institute
- G. NFPA – National Fire Protection Association
  - 1. NFPA 80 – Fire Doors and Windows
  - 2. NFPA 101 – Life Safety Code
  - 3. NFPA 105 – Smoke and Draft Control Door Assemblies
  - 4. NFPA 252 – Fire Tests of Door Assemblies
- H. UL – Underwriters Laboratories
  - 1. UL10C – Fire Tests of Door Assemblies (Positive Pressure)
  - 2. UL 305 – Panic Hardware
- I. WHI – Warnock Hersey Incorporated
- J. State of California Building Code
- K. (Local applicable codes, e.g. municipal security codes, etc.)
- L. SDI – Steel Door Institute
- M. WDI – Wood Door Institute
- N. AWI – Architectural Woodwork Institute
- O. NAAM – National Association of Architectural Metal Manufacturers

### 1.3 QUALITY ASSURANCE

- A. Finish hardware shall be per College of the Canyons standard. Specification is at the end of this section. No substitutions.
- B. Qualifications:
  - 1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course Work for project hardware consultation to Owner, Architect and Contractor.
    - a. Responsible for detailing, scheduling and ordering of finish hardware.
- C. Hardware: New, free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- D. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- E. Fire-Rated Openings: In compliance with NFPA 80. Hardware UL10C/UBC-7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, plus resilient and required intumescent seals. Intumescent seals to be furnished by door mfg.
- F. Pre-Installation Meetings: Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Convene at least one week prior to commencement of related work.

### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
  - 1. Permanent keys and cores: secured delivery direct to Owner's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, etc...

### 1.5 PROJECT CONDITIONS

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical as the same operation and quality as type specified, subject to Architect's approval.

## 1.6 SEQUENCING AND COORDINATION

- A. Coordinate with concrete.
- B. Reinforce walls.
- C. Coordinate finish floor materials and floor-mounted hardware.
- D. Conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
- E. Furnish manufacturer templates to door and frame fabricators.
- F. Use hardware consultant to check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
  - 1. Confirm that door manufacturers furnish necessary UBC-7-2 compliant seal packages.

## 1.7 WARRANTY

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' warranties:
  - 1. Closers: Ten years mechanical, two years electrical.
  - 2. Exit Devices: Three years.
  - 3. Hinges: Life of Building.
  - 4. Other Hardware: Two years.

## 1.8 COMMISSIONING

- A. Test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
- B. Test electrical, electronic hardware systems for satisfactory operation.
- C. Test hardware interfaced with fire/life-safety system for proper operation and release.

## PART 2 - MATERIALS

### 2.1 MANUFACTURERS

- A. Provide hardware items required to complete the work in accordance with College of the Canyons finish hardware standard specification listed at the end of this section and manufacturers' instructions.
  - 1. Include items inadvertently omitted from this specification. Note these items in submittal for review.

2. Where scheduled item is now obsolete, bid and furnish manufacturers updated item at no additional cost to the project.

## 2.2 HANGING MEANS

- A. Conventional Hinges: Hinge open widths minimum, but, of sufficient throw to permit maximum door swing. Steel or stainless steel pins and concealed bearings.
  1. Three hinges per leaf to 7 foot, 6 inch height. Add one for each additional 30 inches in height, or any fraction thereof.
  2. Extra heavy weight hinges on doors over 3 foot, 5 inches in width, and doors with exit devices.
  3. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins.
  4. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.
  5. Provide shims and shimming instructions for proper door adjustment.
- B. Pivots: high-strength forged bronze or stainless steel, tilt-on precision bearing and bearing pin.
  1. Bottom and intermediate pivots: adjustability of minus 1/16 inch, plus 1/8 inch.

## 2.3 OTHER HARDWARE

- A. Seals:
  1. Intumescent seals to be furnished by door mfg.
- B. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.
- C. Thresholds: As scheduled and per details. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
  1. Exteriors: Set in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous ¼ inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
  2. Sound control openings: Set in bed of mastic sealant.
- D. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

- E. Silencers: Interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

## 2.4 FINISH

- A. Generally BHMA 626 Satin Chromium .
  - 1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

## PART 3 - EXECUTION

### 3.1 ACCEPTABLE INSTALLERS

- A. Factory trained, certified, and carries a factory-issued card certifying that person as a "Certified Installer". Alternative: can demonstrate suitably equivalent competence and experience.

### 3.2 PREPARATION

- A. Ensure that walls and frames are square and plumb before hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  - 1. Notify Architect of any code conflicts before ordering material.

### 3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation.
  - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
- B. Locate floor stops not more than 4 inches from the wall.
- C. Drill pilot holes for fasteners in wood doors and/or frames.

### 3.4 ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.
  - B. Inspection: Use hardware supplier. Include suppliers with closeout documents.
  - C. Follow-up inspection: Installer to provide letter of agreement to Owner that approximately 6 months after substantial completion, installer will visit Project with representatives of the manufacturers of the locking devices and door closers to accomplish following:
    1. Re-adjust hardware.
    2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.
    3. Identify items that have deteriorated or failed.
    4. Submit written report identifying problems and likely future problems.
- 3.5 DEMONSTRATION
- A. Demonstrate electrical, electronic hardware systems, including adjustment and maintenance procedures.
- 3.6 PROTECTION/CLEANING
- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/ barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
  - B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.
- 3.7 SCHEDULE OF FINISH HARDWARE
- A. Architect/Contractor to provide.

SECTION CONTINUES ON NEXT PAGE

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's Initials      Contractor is to acknowledge with initials each submittal included.  
                                 Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Submit six copies of schedule per Division 1. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
- a. Type, style, function, size, quantity and finish of hardware items. Use BHMA Finish codes per ANSI A156.18.
  - b. Name, part number and manufacturer of each item.
  - c. Fastenings and other pertinent information.
  - d. Location of hardware set coordinated with floor plans and door schedule.
  - e. Explanation of abbreviations, symbols, and codes contained in schedule.
  - f. Mounting locations for hardware.
  - g. Door and frame sizes, materials and degrees of swing.
  - h. List of manufacturers used and their nearest representative with address and phone number.
  - i. Catalog cuts.
  - j. Manufacturer's technical data and installation instructions.
- \_\_\_\_\_ 2. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.

END OF SECTION 08 70 00



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COLLEGE of the CANYONS

**Santa Clarita Community College District**  
**College of the Canyons Valencia Campus**  
**Finish Hardware Standard Specification**

**Attention: Architects, Design Professionals, Hardware Specifiers, Contractors, Project Managers and other concerned parties:**

SCCCD College of the Canyons Valencia Campus has standardized on the following door and hardware products. Please adhere to the following when specifying hardware for Specification Section 08710 in new construction, in renovation and tenant improvement work:

Key System	Corbin Russwin Interchangeable Core L3 key way. Cylinders to be keyed to district's master key system by a factory authorize security center. Consult with locksmith, Rey Briones for additional instructions and information prior to doing any work.
Locksets	Mortise: Schlage L9000L-17A-626 Series.
Electronic Access Control	Verify locations with owner. Typically at all exterior main entrances, labs, offices, and rooms with equipment. (Computers, etc.), storage rooms with equipment. Schlage Mortise: Use Schlage FSIC Cylinders CO200 MS_70_PR_SPA_JD_626_4AA. Specify Handing. Locks are field reversible Schlage Trim for Von Duprin Exits Rim Devices and Conceal Vertical Rods. Use Schlage FSIC Cylinders CO200_993R_70_PR_SPA_JD_626_4AA. Specify Handing. Locks are field reversible Schlage Trim for Von Duprin Exits Surface Vertical Rods. Use Schlage FSIC Cylinders CO200_993S_70_PR_SPA_JD_626_4AA. Specify Handing. Locks are field reversible
Cylinders	Corbin Russwin Interchangeable Core L3 key way. For all non access control locks. Consult with locksmith, Rey Briones for more details.
Padlocks	Schlage Portable Padlocks. FSIC Prep. Schlage JD only.
Cabinet Locks	Consult with Locksmith, Rey Briones
Exit Devices	Von Duprin CD98 Series. Use keyed center mullions plus rim device at pairs of doors.
Electrified Exit Devices	Do not specify.
Mullions	Von Duprin Series Use KR4954 with MT54 storage bracket kit.
Surface Closer	LCN 4011/4111. Exterior Doors to have EDA arms at out swinging doors with hold open.
Floor Closers	New: Do not specify. Existing: Remove and replace with continuous hinges if conditions permit.
Auto-Flush Bolts	Ives: FB50-60-626 Series.
Pivots	Ives 7200 series.
Hinges	Ives: 3CB1HW Ives: Continuous Hinges for high traffic doors as required.
Overhead Stops	Glynn Johnson 90 Series. Use only where floor or wall stops are inadvisable. When used, use heavy weight hinges or continuous hinges.
Floor Stops	Interior Doors: Ives FS436 / FS438 Series Exterior Doors: Ives FS18S
Wall Stops	On Interior Doors Only : Ives 50/60C Series (Use only when necessary)
Door plates:	Kickplates: Ives 8400 Series, 10" H x 2" less than door width (1" LDW at non-mullioned pairs) Push/Pull Plates: Ives 8200 Series
Thresholds	NGP
Hollow Metal Drs & Frames	Exterior: Steelcraft "L" series 16ga honeycomb core, galvanized, capped on top and with galvanized 14ga frames. Doors must be reinforced for door closers with 14 ga insert, prepped and reinforced as required for all locksets.
Aluminum Storefront Doors	All Storefront doors must be 6" wide stiles, with 12" mid rails and 12" bottom . Tempered Glass

Santa Clarita Community College District uses IR Security & Safety Consultant (626-359-5555) as its consultant for doors and finish hardware. Contact with the firm is Kevin Latimer and John Steele. We request that you contact our

consultants to write the hardware specification (Section 08710) for all district projects. There is no fee for their service. The district requires a post installation job walk by an authorize factory representative prior to job completion. District personnel are trained in the installation and maintenance of the above material and the maintenance department owns considerable stock of material for repair work. The district is not prepared to accommodate the adoption of additional hardware as the hardware standard in place serves the campus well.

Signed:

  
Jim Schrage: Vice President of Facilities Planning, Operations and Construction

Date:

4.18.11

Updated on March 23, 2011 by Kevin Latimer.

COLLEGE of the CANYONS

## SECTION 08 81 00 – GLASS GLAZING

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of three years successful in-service performance.
- B. Comply with published recommendations of glass product manufacturers and the following:
  - 1. GANA Publications: GANA's "Glazing Manual".
- C. Safety Glass: Comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.
  - 1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
- D. Fire Resistance Rated Glass: Provide products that are identical to those tested per ASTM E 152 and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Fire-Rated Assemblies: Provide assemblies that comply with NFPA 80 and that are listed and labeled for fire ratings indicated, based on testing per NFPA 252 for doors and NFPA 257 for windows.
- F. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

#### 1.4 PROJECT CONDITIONS

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when glazing substrates are wet due to rain, condensation, or other causes.

## PART 2 - MATERIALS

### 2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, manufacturers' glass products that may be incorporated in the Work include the following, or approved equal:
1. Tinted glass, clear glass:
    - a. Pilkington, [www.glasgruppen.dk/the+americas](http://www.glasgruppen.dk/the+americas)
    - b. PPG Industries, [www.corporate.ppg.com/PPG/SBU/flatglas](http://www.corporate.ppg.com/PPG/SBU/flatglas)
    - c. Or approved equal
  2. Wire glass:
    - a. AFGD Glass, [www.afgd.com](http://www.afgd.com)
    - b. Or approved equal
  3. Patterned glass:
    - a. Sumiglass, [www.sumiglass.com](http://www.sumiglass.com)
    - b. Or approved equal

### 2.2 GLASS DESIGNATION SCHEDULE

*Executive Architect to edit as required for this project*

- A. Glass type GL1:
- 1.
  - 2.
- B. Glass type GL2:
- 1.
  - 2.

### 2.3 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.



3. Colors: Provide color of exposed joint sealants to comply with the following:
  - a. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- B. Elastomeric Glazing Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements.
  1. Base Polymer: Neutral-curing silicone.
  2. Type: S, single component.
  3. Grade: NS, nonsag.
  4. Class: 25.
  5. Use Related to Exposure: NT (nontraffic).
  6. Use Related to Glazing Substrates: G, A, and O (including wood).
- C. Glazing Sealant for Fire-Resistant Glazing Products: Identical to product used in test assembly to obtain fire-resistive rating.

## 2.4 GLAZING GASKETS

- A. Select appropriate type as recommended by combined recommendations of glass and frame manufacturers for the installations indicated.
- B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced, of profile and hardness required to maintain watertight seal:
  1. Neoprene (not compatible with silicone sealant), ASTM C864.
  2. EPDM, ASTM C864.
  3. Thermoplastic polyolefin rubber, ASTM C1115.
  4. Silicone, ASTM C1115.
  5. Any material indicated above.
- C. Soft Compression Gaskets: Extruded or molded closed cell, integral-skinned gaskets of material indicated below, complying with ASTM C 509, Type II, black, and of profile and hardness required to maintain watertight seal.
  1. Neoprene (not compatible with silicone sealant).
  2. EPDM.
  3. Thermoplastic polyolefin rubber.
  4. Silicone.
  5. Any material indicated above.

## 2.5 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standards, requirements of manufacturers of glass and other glazing materials for application indicated, and with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.
- D. Spacers: Elastomeric blocks, or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement.
- F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

## 2.6 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer, referenced glazing standard, and applicable codes, to comply with system performance requirements.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine glass framing for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Do not allow glazing Work to proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates.

### 3.3 GLAZING, GENERAL

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- B. Protect glass from edge damage during handling and installation. Remove from Project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants.

### 3.4 GLAZING

- A. Install setting blocks of proper size in sill rabbet, sized and located to comply with referenced glazing standard. Set blocks in thin course of sealant which is acceptable for heel bead use.
- B. Do not exceed edge pressures stipulated by glass manufacturer.
- C. Provide spacers inside and out, of correct size and spacing to preserve required face clearances.

1. Provide recommended bite of spacers on glass and use thickness equal to sealant width.
- D. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- E. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- F. Where sealants are used, force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
  1. Tool exposed surfaces of sealants to provide a substantial "wash" away from glass. Install pressurized gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- G. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.
  1. Cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- H. For dry gasket glazing, fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
  1. Secure compression gaskets in place with joints located at corners to compress gaskets producing a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- I. Install gaskets so they protrude past face of glazing stops.
- J. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
  1. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
  2. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
  3. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
  4. Do not remove release paper from tape until just before each glazing unit is installed.
  5. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.



6. Apply cap bead of elastomeric sealant over exposed edge of tape if standard with manufacturer.

### 3.5 PROTECTION AND CLEANING

- A. Protect glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a week, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
- D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- E. Wash glass on both faces not more than 5 days prior to date scheduled for inspections intended to establish date of Completion. Wash glass by method recommended by glass manufacturer.

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.


Contractor's Initials      Contractor is to acknowledge with initials each submittal included.  
                                 Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1. Product Data: Submit for each glazing material and glass product required.
- \_\_\_\_\_ 2. Product certificates signed by glazing materials manufacturer certifying that their products comply with specified requirements.
- \_\_\_\_\_ 3. Samples of tinted, patterned, and sandblasted glasses.
- \_\_\_\_\_ 4. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.
- \_\_\_\_\_ 5. Installer's qualifications.
- \_\_\_\_\_ 6. Warranties: Special warranties specified in this Section.

END OF SECTION 08 81 00

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## SECTION 08 91 00 - LOUVERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 1 General Requirements Sections, apply to this Section.
- B. System based on sun studies included in the Bridge Documents.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. 4" aluminum stationary louver horizontal.
- B. Related Sections include the following:
  - 1. Division 5 **Section 05 12 00** - Structural Steel for supporting structure. *Section not provided.*

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide exterior louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of grille components including blades, frames, and supports; noise or metal fatigue caused by grille or screen component rattle or flutter; or permanent damage to fasteners and anchors.
  - 1. Wind Load: Uniform pressure of 30 lbf/sq.ft., acting inward or outward.
  - 2. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects:
    - a. Temperature Change.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of elements. Show unit dimensions related to wall openings and adjacent construction; profiles of frames at jambs, heads, and sills; and anchorage details and locations.
  - 1. For installed louvers indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory applied color finishes.
- D. Samples for Verification: Of each type of metal finish required, prepared on Samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

## 1.5 QUALITY ASSURANCE

- A. 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 kind indicated. Engineering services are defined as those performed for installations of grilles and screens that are similar to those indicated for this Project in material, design, and extent.
- B. Source Limitations: Obtain grilles and screens through one source from a single manufacturer where alike in one or more aspects regarding type, design, or factory-applied color finish.
- C. Welding Standards: As follows:
  - 1. Comply with AWS D1.2, "Structural Welding Code – Aluminum".
  - 2. Comply with AWS D1.3, "Structural Welding Code – Sheet Steel".
  - 3. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify supports and adjoining constructoin by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products manufactured by:
  - 1. The Airolite Company, Marietta, OH.
  - 2. or approved equal.

### 2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- 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. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
  - 1. Use types and sizes to suit unit installation conditions.
  - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- E. Anchors and Inserts: Of type, size, and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.
- F. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 but containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

### 2.3 FABRICATION, GENERAL

- A. Assemble grilles in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
  - 1. Continuous Vertical Assemblies: Where height of grille and screen units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates and without interrupting blade-spacing pattern.
- B. Maintain equal blade or bar spacing, including separation between blades and frames at head, sill and jambs, to produce uniform appearance.
- C. Fabricate frames to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining materials' tolerances, and perimeter sealant joints.
- D. Include supports, anchorages, and accessories required for complete assembly.

- E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer. At horizontal joints between grille or screen units, provide horizontal mullions, unless continuous vertical assemblies are indicated.
- F. Join frame members to one another and blade or bar components with fillet welds concealed from view, unless otherwise indicated or size of grille or screen assembly makes concealed bolted connections between frame members necessary.

## 2.4 LOUVERS

- A. Louver Construction: Provide louver with extruded-aluminum frames and bars or blades.
- B. Solar-Line Grilles by Airolite.
  - 1. Vertical Bar Spacing: See Drawings.
  - 2. Horizontal Bar Spacing: See Drawings.
  - 3. Horizontal Bar Angle: 60 degrees, unless otherwise indicated.
  - 4. Grille Depth: 4" max.
  - 5. Material Thickness: 0.081 inch to 0.250 inches unless otherwise indicated.

## 2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish louver after assembly.

## 2.6 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Cleaning: as specified below). Apply baked enamel complying with paint manufacturer's specifications to cleaning, conversion coating, and painting.
  - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 603.8, except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.
  - 2. Color: As selected by Architect from manufacturer's full range of colors.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Coordinate Setting Drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

### 3.2 INSTALLATION

- A. Locate and place grille units 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. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- G. Install concealed gaskets, flashings, joint fillers, and insulation, as grille installation progresses, where weathertight joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during grille installation.

### 3.3 ADJUSTING, CLEANING, AND PROTECTING

- A. Periodically clean exposed surfaces of grilles that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Protect grilles from damage during construction. Use temporary protective coverings where needed and approved by grille manufacturer. Remove protective covering at the time of Substantial Completion.
- D. Restore grilles damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.



1. Clean and touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

### 3.4 SUBMITTAL REQUIREMENTS AND SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's     Contractor is to acknowledge with initials each Submittal included.  
Initials         Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

- B. Submittal Schedule:

- \_\_\_\_\_ 1. Product Data: For each type of product specified.
- \_\_\_\_\_ 2. Product Data: On finish coating.
- \_\_\_\_\_ 3. Shop Drawings: For louver units and accessories. Include plans; elevations sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jams, heads, and sills; and anchorage details and locations.
- \_\_\_\_\_ 4. Samples: Of metal finish and color required, prepared on Samples of same thickness and material indicated for final Work, 6x4 inches minimum size.

END OF SECTION 08 91 00

# **Master Construction Specifications**

## **Samples**

Specs for Division 11



## SECTION 11 52 00 – AUDIO-VISUAL EQUIPMENT

### 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 PRODUCT HANDLING

- A. Delivery and storage of materials:
  1. Deliver all materials free from damage in original packages bearing manufacturer's label.
  2. Store all materials in such a manner as to protect them from corrosion, vandalism or damage in any form.

### PART 2 - MATERIALS

#### 2.1 INTERACTIVE WHITEBOARD

- A. Provide PolyVision, a Steelcase company, [www.polyvision.com](http://www.polyvision.com), ēno classic interactive whiteboard or approved equal, as follows:
- B. Model, ēno classic 2810 including:
  - Bluetooth-enabled stylus
  - Moveable magnetic icon strip
  - Bluetooth receiver for Windows or Macintosh (USB interface)
  - One AAA battery
  - PolyVision driver
  - Two replacement stylus tips
- C. Options included:
  - 24" magnetic tray (MCR 24)
  - Mobile adjustable height stand (MS 600)
- D. Approval: Must meet California Division of the State Architect's requirements.

#### 2.2 WALL MOUNT SHORT THROW PROJECTOR BRACKET

- A. Provide Epson, short throw projector mount or approved equal, as follows:
- B. Model: Epson ELPMB27 mounts.
- C. Approval: Must meet California Division of the State Architect's requirements.

### 2.3 FLAT PANEL CEILING MOUNT

- A. Provide Peerless Industries, Inc., flat panel ceiling mount For 32" to 71" LCD and Plasma Screens , phone: (800) 865-2112 or approved equal, as follows:
- B. Model: Peerless PLCM-UNL-CP. Verify projector sizes with owner prior to ordering mounts. Finish shall be black color: Epoxy.
- C. Options: Ceiling plate and manufacturer's adjustable extension column in length required for installation

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Coordinate and provide blocking above ceiling for proper and secure attachment of connection pipe and mounting flange at ceiling projector mount.
- B. Coordinate and provide blocking in walls for proper and secure attachment of LCD Monitor mounts.

### 3.2 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.
- B. Mounts are to be level and plumb.
- C. Touch up scratches on mounts or marks on ceiling and wall.
- D. Deliver mounting bolts or other loose accessories to the District in a clearly labeled carton for District's use in installing projector.

SECTION CONTINUES ON NEXT PAGE

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 Section 01 25 00 "Substitution Procedures" and Section 01 60 00 "Product Requirements" for substitution requests.


Contractor's	Contractor is to acknowledge with initials each submittal included.
Initials	Attach a letter of explanation for each submittal not included.
_____	All submitted products are as specified.

- B. SUBMITTAL SCHEDULE:

- |         |  |
|---------|--|
| _____1. | Submit product data of each type of bracket clearly identified.  |
| _____2. | Submit manufacturer's installation instructions including rough-in dimensions, mounting, backing and clearance requirements. |

END OF SECTION 11 52 00

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## SECTION 11 52 13 - PROJECTION SCREENS

### 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 DEFINITIONS

- A. Gain: Ratio of light reflected from or refracted by screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per FS GG-S-00172D(1).
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain screens through one source from a single manufacturer for each type. Obtain each screen as a complete unit, including necessary mounting hardware and accessories.
- B. Coordination of Work: Coordinate layout and installation of projection screens with wall framing.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver projection screens until building is enclosed, other construction within spaces where screens will be installed is substantially complete, and installation of screens is ready to begin.

### PART 2 - MATERIALS

#### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide screens of one of the following, or approved equal:
  - 1. Da-Lite Screen Co.: Basis of design.
  - 2. Bertford Manufacturing.
  - 3. Draper Shade & Screen.

#### 2.1 MANUALLY OPERATED SCREENS

- A. Material and Viewing Surface of Front-Projection Screens: Provide screens manufactured from mildew- and flame-resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Mildew Resistance: Provide mildew-resistance screen fabrics as determined by FS 191A/5760.
  2. Fire- Test-Response Characteristics: Provide projection-screen fabrics identical to materials that have been tested for flame resistance according to both small- and large-scale tests of NFPA 701.
  3. Seamless Construction: Provide screens in sizes indicated without seams.
  4. Provide extra drop length one foot high and as follows:
    - a. Color: Black.
    - b. Location: At top of screen.
- B. Provide Da-Lite Model C, spring-roller-operated screens designed and fabricated for wall installation and consisting of case, screen, mounting accessories, and other components necessary for a complete installation:
1. Case: 22-gage steel, baked enamel.
  2. Viewing surface: matte white.
  3. Screen size: 6 feet high by 8 feet wide.
  4. No.6 wall bracket-extends 6" non-adjustable extension brackets.
  5. Pull rod.
  6. No borders-black masking borders standard.
  7. CSR- controlled screen return.

## 2.4 AUTOMATIC ELECTRIC PROJECTION SCREENS

- A. Material and Viewing Surface of Front-Projection Screens: Provide screens manufactured from mildew- and flame-resistant fabric of type indicated for each type of screen specified and complying with the following requirements:
1. Mildew Resistance: Provide mildew-resistance screen fabrics as determined by FS 191A/5760.
  2. Fire- Test-Response Characteristics: Provide projection-screen fabrics identical to materials that have been tested for flame resistance according to both small- and large-scale tests of NFPA 701.
  3. Seamless Construction: Provide screens in sizes indicated without seams.
  4. Provide extra drop length one foot high and as follows:
    - a. Color: Black.
    - b. Location: At top of screen.
- B. Provide Da-Lite Tensioned director electrol, automatic electric projection screens designed and fabricated for concealed ceiling installation and consisting of case, screen, mounting accessories, and other components necessary for a complete installation:
1. Switching: Wireless remote control with infrared remote for low-voltage control system.
  2. Viewing surface: High contrast Da-Mat.
  3. Screen size: 6 feet high by 8 feet wide.
  4. Electrical Motors (2): 120 volt AC, (60 Hz) 1.2 amp (door motor); 1.4 amp (screen motor);



- 3 wire with ground, quick reversal stop action to prevent "coasting", oiled for life, automatic thermal overload cut-out, integral gears, UL listed.
- 5. Case & doors: Aluminum extruded, powder coated white, with self-trimming built-in flange, concealed hinges
- 6. No borders-black masking borders standard.

## **PART 3 - INSTALLATION**

### **3.1 INSTALLATION**

- A. General: Install projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front-projection screens with screen cases in position and relationship to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
  - 1. Test manually operated units to verify components operate correctly.

### **3.2 PROTECTING AND CLEANING**

- A. Protect projection screens after installation from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

SECTION CONTINUES ON NEXT PAGE

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's Initials      Contractor is to acknowledge with initials each submittal included.  
   Attach a letter of explanation for each submittal not included.

\_\_\_\_\_ All submitted products are as specified.

- B. SUBMITTAL SCHEDULE:

- \_\_\_\_\_ 1.      Product Data: For each type of screen specified.
- \_\_\_\_\_ 2.      Shop Drawings: Show layout and types of projection screens. Include the following:
- a.      Location of screen centerline relative to ends of screen case.
  - b.      Anchorage details.

END OF SECTION 11 52 13

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## SECTION 11 53 13 - LABORATORY FUME HOODS

### 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 DELIVERY, STORAGE AND HANDLING

- A. Schedule delivery of equipment so that spaces are sufficiently complete for installation immediately following delivery.
- B. Protect finished surfaces from soiling or damage during handling and installation.

#### 1.3 PROJECT CONDITIONS

- A. Do not deliver or install equipment until the following conditions have been met:
  - 1. Windows and doors are installed and the building is secure and weather-tight.
  - 2. Ceiling, overhead ductwork and lighting are installed.
  - 3. All painting is completed and floor tile located below hoods is installed.

#### 1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Laboratory fume hoods included in this section and specification sections listed below shall be manufactured or furnished by a single laboratory supplier. Proposals from brokers or multiple suppliers will not be accepted.
  - 1. Laboratory Sinks, Mechanical and Electrical Fixtures, Fittings and Accessories
  - 2. **Section 12 35 53** Laboratory Casework
- B. The supplier for work in this section shall use established organizations with production facilities including test facilities in the manufacturing plant, all tools, equipment and special machinery necessary for specializing in the fabrication and installation of the type of equipment specified, with skilled personnel, factory trained workmen and an experienced engineering department. Each shall have the demonstrated knowledge, ability and the proven capability to complete an installation of this size and type within the required time limits:
  - 1. Five years or more experience in manufacture of laboratory and equipment of type specified.
  - 2. Ten installations of equal or larger size and requirements within the last five years. Provide contact at each.

3. ASHRAE 110 test report must be submitted for each hood type and size. Containment must meet ANSI Z9.5 recommendations.
  4. The hood must comply with NFPA, ANSI Z9.5, and the National Electric Code recommendations.
- C. Installer's qualifications: Factory certified by the manufacturer. Provide outline of certification program.

## PART 2 - MATERIALS

### 2.1 CHEMICAL FUMEHOODS

- A. Manufacturer: Design of chemical fume hoods are based on product manufactured by Thermo Fisher Scientific, Inc. The chemical fume hood shall be the product of one manufacturer. Additional manufacturers such as Kewaunee, Jamestown, or other pre-approved manufacturers will be acceptable provided they meet the product characteristics specified may supply equal products.

*Note: Include for projects that require approval prior to bid date.*

- B. For manufacturers not listed, the Architect must receive a submittal for approval 10 days prior to bid, no exceptions.

### 2.2 DESIGN REQUIREMENTS

- A. Fume hoods shall function as ventilated, enclosed work spaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.
- B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20% of the average face velocity at any designated measuring point as defined in this section.
- C. Average illumination of work area: Minimum 80 foot candles. Work area shall be defined as the area inside the superstructure from side to side and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.
- D. Fume hood shall be designed to minimize static pressure loss with adequate baffle slot area and a rectangular-to-round transition exhaust outlet. Maximum average static pressure loss readings taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed .14" of water column at 60 FPM face velocity with sash in full open position:
- E. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50-NC value when connected to a 50-NC source. Reading shall be taken in front of a full open sash, 5' off the floor.
- F. Fume hoods shall be field convertible, from bypass type to auxiliary air by simple component replacement or addition. Change-over shall be accomplished without construction modifications and without special tools.

## 2.3 EXTERIOR AND LINER SURFACE FINISH PERFORMANCE REQUIREMENTS

### A. Finish

1. Preparation: Spray clean, pre-treat with iron phosphate, water rinse, and final seal. Immediately dry in heated ovens and gradually cool prior to finish application.
2. Application: Electrostatically apply U.V. stable urethane powder coat and bake in controlled high temperature oven to assure a smooth, satin finish. Epoxy and/or liquid based finishes—not acceptable.
3. Finish drawer bodies in matching or harmonizing color and apply corrosion-resistant treatment to selected, concealed interior parts.

### B. Surface Finish test

Performance characteristics shall be in full compliance with SEFA 8 standards. Independent, third party performance tests must be submitted to validate compliance to the specification.

#### 1. Chemical spot test

##### 1.1 Purpose of test

To evaluate the resistance to chemical spills.

##### 1.2 Test Procedure

Place sample [14"x24"] panel on a flat surface, clean with soap and water and dry. Condition the panel for 48-hours at 73 degrees and 50% relative humidity. Test the panel using 49 different chemical reagents by one of the following methods:

**Method A** – Test chemicals by placing a cotton ball saturated with reagent in the mouth of a one-ounce bottle and inverting the bottle on the surface of the panel.

**Method B** – Test chemicals by placing five drops of the reagent on the surface of the panel and covering with a 24mm watch glass, convex side down.

For both of the above methods, leave the reagents on the panel for a period of one hour. Wash off the panel with water, clean with detergent and naphtha, and rinse with deionized water. Dry and evaluate after 24 hours at 73 degrees and 50% relative humidity using the following rating system:

Level 0 – No detectable change

Level 1 – Slight change in color or gloss

Level 2 – Slight surface etching or severe staining

Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

C. Test Results: Interior and Exterior finishes

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	A
2.	Acetate, Ethyl	A
3.	Acetic Acid 98%	B
4.	Acetone	A
5.	Acid Dichromate, 5%	B
6.	Alcohol, Butyl	A
7.	Alcohol, Ethyl	A
8.	Alcohol. Methyl	A
9.	Ammonium Hydroxide, 28%	B
10.	Benzene	A
11.	Carbon Tetrachloride	A
12.	Chloroform	A
13.	Chromic Acid, 60%	B
14.	Cresol	A
15.	Dichlor Acetic Acid	A
16.	Dmethylformamide	A
17.	Dioxane	A
18.	Ethyl Ether	A
19.	Formaldehyde, 37%	B
20.	Formic Acid, 90%	B
21.	Furfural	A
22.	Gasoline	A
23.	Hydrochloric Acid, 37%	B
24.	Hydrochloric Acid, 48%	B
25.	Hydrogen Peroxide, 3%	B
26.	Iodine, Tincture of	B
27.	Methyl Ethyl Ketone	A
28.	Methylene Chloride	A
29.	Mono Chlorobenzene	A
30.	Naphthalene	A
31.	Nitric Acid, 20%	B
32.	Nitric Acid, 30%	B
33.	Nitric Acid, 70%	B
34.	Phenol, 90%	A
35.	Phosphoric Acid, 85%	B
36.	Silver Nitrate, Saturated	B
37.	Sodium Hydroxide, 10%	B
38.	Sodium Hydroxide, 20%	B
39.	Sodium Hydroxide, 40%	B
40.	Sodium Hydroxide, Flake	B
41.	Sodium Hydroxide, Saturated	B
42.	Sulfuric Acid, 33%	B
43.	Sulfuric Acid, 77%	B
44.	Sulfuric Acid, 96%	B

Test No.	Chemical Reagent	Test Method
45.	Sulfuric Acid, 77% & Nitric Acid, 70%	B
46.	Toluene	A
47.	Trichloroethylene	A
48.	Xylene	A
49.	Zinc Chloride, Saturated	B

1 Acceptance Level

Laboratory grade finishes should result in no more than four Level 3 conditions. Suitability for a given application is dependant upon the chemicals used in a given laboratory.

2. Hot Water Test

2.1 Purpose of Test

The purpose of this test is to insure the coating is resistant to hot water.

2.2 Test Procedure

Hot water, 190 degrees F to 205 degrees F (88 to 96 degrees C) shall be allowed to trickle with a steady stream and a rate of not less than 6 ounces per minute on the surface, which shall be set at an angle of 45 degrees, for a period of five minutes.

2.3 Acceptance Level

After cooling and wiping dry, the finish shall no visible effect from hot water.

3. Impact Test

3.1 Purpose of Test

The purpose of this test is to evaluate the ductility of the coating.

3.2 Test Procedure

A one-pound, 2" diameter ball shall be dropped from a distance of 12" onto a flat horizontal surface, coated to manufacturers standard manufacturing method.

3.3 Acceptance Level

There shall be no visible evidence to the naked eye of cracks or checks in the finish due to impact.

4. Paint Adhesion on Steel Test

4.1 Purpose of Test

The paint adhesion test is used to determine the bond of the coating to steel.

4.2 Test Procedure

This test is based on ASTM D2197-86 "Standard Method of Test for Adhesion of Organic Coating"

4.3 Acceptance Level

Ninety or more of the 100 squares shall show finish intact.

5. Paint Hardness on Steel Test

5.1 Purpose of Test

The paint hardness test is used to determine the resistance of the coating to scratches.

5.2 Test Procedure

A 4H or harder grade pencil shall be sharpened on emery paper to a wide sharp edge. Pencil shall be pushed across the paint film in a chisel-like manner.

5.3 Acceptance Level

The paint shall show no sign of cutting or scratching of the film.

D. Quality Control Testing of Fume Hoods:

1. Evaluation of manufacturer's standard product shall take place in UL Certified manufacturer's test facility, with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer at no cost to the Owner. Test requirements shall meet the standards of ASHRAE-110-1995 and UL 1805.
2. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.
3. Hood shall achieve a rating of 4.0 AM 0.05 P.P.M. or better.

2.4 MATERIALS AND FINISHES



- A. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A1008; gauges U. S. Standard and galvanized.
- B. Stainless Steel: Type 304; gauges U. S. Standard.
- C. Ceiling Closure Panels: Minimum 18 gauge; finish to match hood exterior.
- D. Bypass Sill Area: Low resistant type, 16 gauge steel-perforated.
- E. Safety Glass: Nominal 7/32" thick laminated safety glass or 3/8" thick laminated safety glass viewing panel.
- F. Sash Chain: ANSI #35 steel, single strand. Average tensile strength of 2,400 pounds; maximum working load of 480 pounds.
- G. Sash Guides: UHMW Polyethylene.
- H. Pulley Assembly for Sash Chain: Finish bored steel drive sprockets and keyed drive, ½" diameter front connector shaft. Rear idler sprockets; double sealed ball bearings type, lubricated. All sprockets steel with zinc dichromate finish.
- I. Sash Pull: Corrosion resistant steel with chemical resistant powder coating.
- J. Exterior and interior access to plumbing required.
- K. Fastenings:
  - 1. Exterior structural members attachments: Sheet metal screws, zinc plated.
  - 2. Interior fastening devices concealed.
  - 3. Exterior side access panel member fastening devices to be un-exposed.
- L. Instruction Plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories and use of sash.

*Note: Add this complete section (1-2) if L.E.E.D / Environmental Compliance is required*

## 2.5 ENVIRONMENTAL COMPLIANCE

- A. RECYCLED STEEL CONTENT FOR LABORATORY CASEWORK. All steel used in the product fabrication shall comply with the LEED II (Leadership in Energy and Environmental Design) Green Building Rating System. The manufacturer must submit documentation (i.e. "Source of Materials", Invoices, Third Party Validation, etc.) for steel purchased for this project providing recycled content. Such documentation shall be submitted to the Owner Representative/Architect for approval - prior to award of contract.

1. Sheet Steel: All "Cold Rolled" sheet steel used in the fabrication of laboratory cabinets, fume hoods and modular laboratory systems shall have a minimal of 20% recycled steel content.
  2. Recycled Steel Content: Of this 20% recycled content, 60% shall be purchased scrap (i.e. old cars, appliances) with the remaining 40% from generated in-house scrap and manufacturing fall-off.
  3. Fabricators Scrap: Fabricators shall provide documentation that manufacturing fall-off is recycled to respective steel mills and does not enter the solid waste system and/or become a product of landfill space.
- B. FINISH FOR STEEL LABORATORY PRODUCTS. All Steel Laboratory Products shall utilize a dry powder coat paint process by means of electro-statically spray, providing high-transfer efficiency low waste generation. Any liquid-applied coatings shall not be acceptable. Manufacturer shall supply documentation that waste generated during the painting process, is a solid, non-hazardous material.
1. Pretreatment: Finish process shall incorporate a phosphate conversion coating during the pretreatment/cleaning operation. Electrostatic application of dry powder shall follow. Coated parts shall pass through curing ovens, which shall cause the powder to melt, flow, gel, cure and bond onto the phosphatized steel substrate.
  2. Chemically Resistance Finish: Only highly chemically resistant, dry powder coated finishes that passes the SEFA 8 casework specifications for chemical and durability resistance , will be acceptable. A letter from a third-party validator, verifying independent test results, shall be submitted to the Owner Representative/ Architect for approval - at time of bid submittal.
  3. Operator Protection: The application is convenient and easily mastered through robotic application plus manual detailing. The painting process is cleanly contained and has no solvent odor and is performed in an air-conditioned room.
  4. Overspray Powder Paint: Shall be captured and re-sprayed. Efficiency shall be 99% effective in coating usage, reducing waste generation. A closed collection system shall be utilized for over-spray that is not reused. Powder over-spray, which can not escape the facility, is collected in bulk, eliminating the need for daily replacement/disposal of filter media.
  5. VOC Emissions: Powder paint shall be sprayed and baked with a near zero (.29 lbs per gallon maximum) VOC (Volatile Organic Compounds) emissions.
  6. Off-gassing: After all steel powder coated parts have cooled from the curing ovens, the coating shall be firm and stable. No further emissions or "Off-gassing/Decomposition" vapors shall occur at room temperature.

## 2.6 FUME HOOD TYPES

*Note: Select from the following fume hood types: More than one hood type may be required.*  
*NOTE: Restricted bypass hoods are to be specified when a variable air volume mechanical system (V.A.V.) is specified in Division 23.*

- A. Restricted Bypass Fume Hood: Shall be sufficient in size to allow the NFPA recommended minimum flow with sash closed. Bypass must be achieved through low resistance sill. Bypass shall be designed to provide a constant volume when attached to a constant volume system or be compatible with VAV applications. VAV control provided by **Division 23**.
- B. Bypass Type Fume Hoods:
  - 1. Constant volume type with built-in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.
  - 2. Bypass: Positive in action and controlled by the sash operation.
  - 3. Low impedance, directionally louvered panel provided in the lintel bypass area and one inch bypass provided immediately above the work surface and directly below the bottom horizontal sash rail. Designs which require all bypass air to enter hood over front solid panel are not acceptable.
  - 4. As sash is lowered, bypass design shall limit the increase in face velocity to maximum of four times the average face velocity with the sash fully open.
- C. Auxiliary Air Fume Hoods:
  - 1. Constant volume type with built-in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.
  - 2. Bypass: Positive in action and controlled by the sash operation.
  - 3. As sash is lowered to a six inch opening, bypass design shall limit the increase in face velocity to maximum of four times the average face velocity with the sash fully open.
  - 4. Design hood to utilize 50% to 70% supplemental air supplied to the hood directly above and immediately in front of the fume hood face, with a percentage of auxiliary air introduced below front foil to enhance capture at the work surface. Balance of the air shall be taken from the room. Provide a cover to eliminate contact between the contaminated back of the sash and the room environment when the sash is in the raised position. Light shall be accessed from below the chamber by going through front panel of the hood superstructure.
  - 5. Design air supply system to handle supply air from room temperature to 20 degrees F. above room temperature with a capture efficiency of 95% minimum, with all air introduced at a low and controlled velocity. Maximum auxiliary air velocity in a plane even with the top of the sash open: 150 feet per minute in any position.

6. Auxiliary Air Chamber: Design to provide an even distribution of air and to operate at reasonable static pressure loss levels. Chamber assembly shall be removable without requiring removal of the front access panels, light or remote handles to facilitate installation through normal door openings. Fabricate chamber of 20 gauge sheet steel finished with reagent resistant powder coat.
7. Air distribution shall be accomplished by deflection baffles, pressure inducing media and deflection vanes.

D. Perchloric Acid Fume Hoods:

*Note: Design is used both on Constant Air Volume or Variable Air Volume mechanical systems.*

1. Restricted bypass design to contain washdown water.
2. Liner, Work Surface and Trough: 16 gauge 304 stainless steel with all vertical and horizontal corners and seamless joints between work surface and sides and back coved to a 1/2" radius, continuous, welded, ground and blended to a fine grained finish. Seams between working surface and sides and back are not acceptable.
3. Water Wash Down System: Provide raised edge at front of work surface and continuous trough across the full width at back of the work surface. Include 4 (four) each stainless steel or plastic fog nozzles, internal piping, control valve and two 1-1/2 inch waste outlets, capable of flowing 30 G.P.M.. Perforated pipe washdown systems are not acceptable.
4. Light Fixture: Incandescent, vapor proof, fume resistant and UL listed fixture, installed in roof with bulb replacement from interior.

E. Radioisotope Fume Hoods:

*Note: Radioisotope hoods can be furnished with restricted bypass for VAV systems. It would require extended lead time for manufacturing. If VAV is required, use same verbiage as used for restricted bypass hoods and delete items 1 thru 5.*

1. Constant volume type with built-in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.
2. Bypass: Positive in action and controlled by the sash operation.
3. Low impedance, directionally louvered panel provided in the lintel bypass area and one inch bypass provided immediately above the work surface and directly below the bottom horizontal sash rail. Designs which require all bypass to enter hood over front solid panel are not acceptable.
4. As sash is lowered to a six inch opening, bypass design shall limit the increase in face velocity to maximum of four times the average face velocity with the sash fully open.

5. Perimeter of Access Opening: Air foil, radiused or angled. Bottom horizontal foil shall provide nominal one-inch bypass when sash is in the closed position. Bottom foil shall be removable without use of special tools. Provide powder coating on bottom foil to increase resistance to acid and abrasion.
6. Reinforce work surface to handle heavy loads (200 pounds per sq. ft.) with lead shielding.
7. Liner to be 304 stainless steel with integral work surface. Liner and work surface to be one piece with coved corners.

## 2.7 FUME HOOD CONSTRUCTION

- A. Superstructure: Rigid, self-supporting assembly of double wall construction, maximum 4 7/8" thick front post, maximum 2" wide at work area to provide maximum interior work area.
  1. Wall consists of a sheet steel outer shell with urethane powder finish and a corrosion resistant inner liner, this wall houses and conceals steel framing members, attaching brackets and remote front-reseatable service fixture mechanisms and services. Panels must be attached to structural framing. Panels and brackets attached to eliminate screw heads from hood interior.
  2. Access to fixture valves concealed in wall provided by exterior and/or interior removable access panels.
  3. Interior shall be a minimum of 47 inches high.
  4. Hood shall be designed to maximize the view of interior apparatus with a minimum 43" high front viewing height and maximum sized side viewing panels. Hoods without side viewing panels – not acceptable.
- B. Exhaust outlet: Rectangular-to-round transition/collar shall be utilized to maximize hood interior work area and minimize static pressure loss. Round collar without transition – not acceptable.
- C. Access opening perimeter: Airfoil or streamlined shape with all right angle corners radiused or angled. Bottom horizontal foil shall provide nominal one-inch bypass when sash is in the closed position. Bottom foil shall be removable without use of special tools. Bottom foil shall provide access area sufficient in size to pass thru hospital grade electrical plugs. Bottom foil: Steel with urethane powder coating to increase acid and abrasion resistance. Airfoil and sill to be low profile design and perforated. A secondary containment trough shall be located in front of the work surface and extend below the airfoil sill.
- D. Fume hood Sash: (Vertical) Full view type with clear, unobstructed, side-to-side view of fume hood interior and service fixture connections. Hood to have a 43-inch high sight line, a 26" vertical access height, and an 18" operating opening.

Sash must have full vertical travel and complete side retention from full open for access to full closed to work surface for safety. Flip up panels – not acceptable - due to lack of retention and containment of outward forced reactions. All glass to have exposed edges polished.

- E. Fume hood Sash: (Combination) Vertical and horizontal sash access. Sash shall be top hung on nylon tired stainless steel ball bearing wheels. Sash frame on bottom and sides shall be no more than 1.5" thick. Area above the maximum sash opening shall be glazed with a minimum 3/8" thick laminated safety glass. A exposed glass edges to have polished edge treatment. Combination sash available on Restricted Bypass hood only.
- F. Counter balance system: Single weight, sprocket and chain, counter balance system which prevents sash tilting and permits ease of operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full height of operating sash opening. Life cycle test sash and weight. Provide independent test data. Close sash against rubber bumper stops.
- G. Airfoil: The airfoil will be low profile, relatively flush to the work surface with ample room for electrical hospital grade cords to fit beneath the airfoil. Sill to be ergonomically radiused on front edge and the flat portion is perforated. Sill must pivot forward to provide cord and trough access. Airfoil sills that are not low profile are not acceptable. Secondary spill trough required.
- H. Fume hood liner: Laboratory grade Urethane powder coat steel. Must be UV stable. Epoxy based finishes – not acceptable.
- I. Directed Air Technology [DAT]: Fume hood must be of an "active" design which provides activated air plenums and directed airflow introduction into the hood on the backside of each front post. This DAT is activated when the sash is more than 8" open and powered by low voltage fan units. This DAT enhances airflow patterns into and through the hood to provide more robust containment at higher sash openings. Conventional "passive" hood designs – not acceptable.
- J. Auto-Sash: Shall be designed to promote usage as an upper body and face shield. Sash shall be fully retained in side tracks over full height of sash. Sash shall close to work surface vertically with one movement. Flip sash designs that require multiple sash actions to close in event of a run-away reaction – not acceptable. Face velocities and volumes shall be based on an 18" operating opening. Sash shall have the capability to be raised to full 26" vertical opening for loading or unloading of large apparatus. Sash shall lower automatically to the operating position when released from any position above 18". Sash and front viewing area shall be slanted at a minimum 7 degree angle to enhance comfort & viewing.
- K. Service fixtures and fittings [Specified option]: Color-coded hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color-coded index handles.
  - 1. Valves: Needlepoint type with self centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable from outside the front of the corner post.
  - 2. Provide piping for all service fixtures from valve to outlet: Copper for water, air and vacuum and gas services.
  - 3. Fixtures exposed to hood interior: Brass with chemically resistant color-coded powder coating.
  - 4. Four-arm handle color-coded index buttons.



5. Services: As shown or specified.
- L. Service fixtures and fittings:  
[Specified Option]
  1. Service treatment: Fittings are to be coated with a chemically resistant polyester powder lacquer electrostatic ally applied and backed on for a uniform finish.
  2. Handle and outlet nozzle will be color coded to the media. Outlet nozzles shall be made of the same high quality brass as the valve bodies. Other materials may be in contact with media where appropriate.
  3. Provide piping for all service fixtures from valve to outlet: Copper for water, air and vacuum and gas services.
  4. Fixture fittings shall incorporate quickly-connect compression fittings on the valve body (for the media inlet and media outlet) as well as the fume hood outlet nozzle. With this system, no soldering or brazing should be required to complete mechanical connections.
  5. Fixtures exposed to fume hood interior shall have a chemically resistant finish.
  6. Fixtures are to be provided with easy-to-mount attachment device for secure mounting. System to be installed with simple hand tools.
  7. Fittings are to be constructed to operate with the following maximum working pressure without leak or failure.
    - Water Fittings: 145 PSI
    - Non-Burning Gas: 145 PSI
    - Burning Gases: 100 PSI
    - Special Water Fittings: 145 PSI
    - Oxygen Fittings: 145 PSI
  8. All outlets shall have detachable serrated nozzles.
- M. Hood light fixture: T8 - Two lamp, rapid start, UL listed fluorescent light fixture with sound rated ballast installed at roof of hood. Lamps are sealed from hood interior and cannot be relamped from the contaminated hood interior.
  1. Interior of fixture: White, high reflecting plastic enamel.
  2. Size of fixture: Largest possible up to 48" for hoods up to seven feet wide. Provide two 36" fixtures for hoods eight feet wide.
  3. Include lamps with fixtures. Hoods without lamps – not acceptable.
  4. Illumination: Per performance values, Part 1 of this Section.

- N. Hood light fixture: LED – Two lamp, UL listed fixture. Maximum 12w or 16w lamps included for 3' and 4' fixture.
- O. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Flush plates: Black acid resistant thermoplastic.
- P. Work surfaces: 1 1/4" thick surface, dished a nominal 3/8" to contain spills.
- Q. Safety Trough – Fume hood shall be equipped with a full width secondary safety spill trough at the front edge of the work surface to capture spills which overflow the dished work surface.
- R. Safety Monitor/Alarm System: (specified option)
- S. Fume hood shall provide an audible and visual alarm if airflow drops below the predetermined values. UL listed.

## 2.8 SOURCE QUALITY CONTROL TESTING OF FUME HOODS

- A. Evaluation of manufacturer's standard product shall take place in manufacturer's own test facility, with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer at no cost to the Owner.
- B. Submit test report consisting of the following test parameters and equipment for each hood width and configuration specified.
- C. Hood shall achieve a rating of 4.0 AM 0.05 PPM or better. Tested to ASHRAE-110-1995.
- D. Test facility: Sufficient size to provide unobstructed clearance of five feet each side and ten feet in front of fume hood. Provide make-up air to replace room air exhausted through fume hood and to obtain a negative 0.2" w.g. room pressure. Introduce make-up air in a manner that minimizes drafts in front of hood to less than 30 FPM. Connect ductwork to provide an exhaust volume to achieve 60 fpm through full open sash.
  - 1. Examine facility to verify conformance to the requirements of this Section.
  - 2. Test room shall be isolated from all personnel during test procedure.
- E. Testing equipment:
  - 1. Properly calibrated hot wire thermal anemometer probes equal to Sierra Model 600-02; correlate with computer data acquisition format to provide simultaneous readings at all points.
  - 2. Pitot tube and inclined manometer with graduations no greater than 0.2 inch of water equal to F.W. Dwyer Model 400. Calibration curves based on 20. Pitot traverse readings and correlated to a digital readout indicator to provide quick and accurate adjustment of airflows.



3. Tracer gas: Sulfur hexa-fluoride or equivalent supplied from a cylinder at a test flow rate of four liters per minute.
4. Ejector system: Tracer gas ejector equal to IHE No. 525-014. Submit sufficient proof of ejector system calibration.
5. Critical orifice: Sized to provide tracer gas at four liters per minute at an upstream pressure of 30 PSIG.
6. Detection instruments: Ion Track Model 61 Leak Meter II sulfur hexa-fluoride detector instrument.
7. Recorder with accuracy better than plus or minus 0.5% of full scale.
8. Three dimensional manikin, overall height 67", clothed in a smock.
9. Smoke generation source. [high & low volume]

F. Preliminary Test and Data:

1. Provide sketch of room indicating room layout, location of significant equipment, including test hood and other hoods. Provide sketch of air supply system indicating type of supply fixtures.
2. Reverse airflows and dead space:
  - a. Swab strip of titanium tetrachloride along both walls and floor of hood in a line 6" behind and parallel to the hood face, and along the top of the face opening. Swab an 8" diameter circle on the back of the hood. All smoke should be carried to the back of the hood and exhausted.
  - b. Test the operation of the bottom air bypass airfoil by running the cotton swab under the airfoil.
  - c. If visible fumes flow out of the front of the hood, the hood fails the test and receives no rating.
3. Face velocity measurements: Face velocity shall be determined by averaging minimum of four and maximum of eight readings at the hood face. Take readings at center of a grid made up of sections of equal area across the top half of the face and sections of equal area across the bottom half of the face. Take simultaneous readings at each point with a series of calibrated hot wire anemometers over a one-minute period of time. Probes shall be correlated to a computer data acquisition package, which will provide an average of each reading over that one-minute period and also an overall average. During the one-minute monitoring period, all velocities must automatically update average at a maximum of four-second intervals.

G. Test Procedure:

1. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up

or down. Position sash in the recommended operating position.

2. Verify desired exhaust volume via multi-point duct traverse.
3. Record static pressure reading via 4 readings 90 degrees apart in exhaust duct, three feet above collar connection.
4. Install ejector in test positions. For a typical bench-type hood, three positions are required: left, center and right as seen looking into the hood. In the left position the ejector centerline is 12" from the left inside wall of the hood; center position is equal distance from the inside sidewalls; and the right position is 12" from the right inside wall. The ejector body is 6" in from the hood face in all positions. Location of ejector may require modification for hoods of unusual dimensions.
5. Install manikin positioned in front of the hood, centered on the ejector.
6. Fix detector probe in the region of the nose and mouth of the manikin. Take care that method of attachment of the probe does not interfere with the flow patterns around the manikin. Locate nose of manikin and the ejector in compliance to the most recent version of ASHRAE 110.
7. Open tracer gas block valve. Correlate readings with a computer data acquisition package, which is capable of monitoring and visually recording a minimum of one reading per second for a minimal three minute time period at each of the three positions.
8. The control level rating of the hood shall be the maximum of the three average values for the three test positions.
9. Record performance rating of the fume hood as XXAMyyy, where XX equals the release rate in liters per minute (4.0) and AM represents the as manufactured test sequence and yyy equals the control level in parts per million.
10. All data on the above test conditions including instrumentation and equipment, test conditions, preliminary test and data information shall be provided on a one page report, including a printout of the average face velocities, and a separate graph-type performance curve on all three tracer gas positions.

H. Restricted Bypass Fume Hoods:

1. Conduct test as outlined above with the sash open.
2. Generate a high volume of smoke within the fume hood work area to verify that the fumes are quickly and efficiently carried away. Move the smoke source about the fume hood work area, checking near fume hood ends and work surface to verify that there is no reverse flow of air at these locations.

## 2.9 BASE CABINETS

### A. Wood

1. Exposed veneer to be: Plain sliced red oak.
2. Cabinet ends: 3/4" thick plywood as specified, with 3mm nominal 1/8" thick exposed hardwood facer on front edges. Interior faces, as appropriate, for shelf support holes.
3. Front top rail: 1" x 3" solid hardwood. Secure and glue to cabinet ends with 8mm dowel joinery as required.
4. Vertical back rails: 3/4" x 3-3/4" hardwood secured to cabinet ends with 8mm dowel system and metal fasteners. Provide to rear rail.
5. Front hardwood toe space rail, 3-3/4" x 3/4" mounted between end panels, forming a 4" high x 2-1/2" deep toe space, closed to cupboard bottom. Secure rails to cabinet and panels with 8mm dowel joinery.
6. Base unit bottoms: 3/4" thick plywood as specified. Set flush and joined to cabinet end panels with 8mm dowels on 96mm dowel spacing and metal fasteners.
7. Cupboard unit backs shall be removable one piece 3/16" hardboard.
8. Shelves: 3/4" thick full depth, 7-ply veneer core plywood.
9. Provide 3mm nominal 1/8" select hardwood facer to front edge of all shelves. Base unit shelves are to be adjustable on 32mm centers. Metal pin and socket supports.
10. Door heads shall be 3-ply, 45 pound density, particleboard 3/4" thick banded on all sides with 3mm nominal 1/8" edge banding. Edges to be same material as exposed hardwood. Doors to have a minimum 1/8" reveal between doors and 1/16" reveal between door and cabinet ends. Grain to be vertical in direction.
11. Not used.
12. Hardware: Stainless steel wire pulls. Stainless steel 5-knuckle institutional-type.
13. Door catches: Adjustable type, spring actuated nylon roller catches or magnetic type.
14. Finish: Highly chemical resistant acrylic urethane finish applied over stain of selected color from manufacturer's standard color offering.
  - a. Preparation: Sand exposed surfaces smooth, free from dirt and defects.
  - b. Stain application: Apply stain of color selected to all exposed casework surfaces. Apply in a manner to achieve a match with the selected color sample upon completion of application of the finish.
  - c. Finish application: Apply finish coats evenly, force dry in dust-free atmosphere, sand and wipe clean surfaces between coats to produce a smooth, satin luster

- finish. Surfaces exposed to view shall be water clear and bright. Cloudy, muddy finishes carrying tinting pigments will not be acceptable.
- d. Finish schedule: Apply an acrylic urethane finish to the following areas:
- 1) Exposed surfaces: Multiple coats sanded between coats with final 1.5 dry mil thick, minimum finish.
  - 2) Semi-exposed surfaces: Multiple coats with sanding between coats with final 1.0 dry mil thick, minimum, finish.
  - 3) Unexposed surfaces: No finish required.

*Note: Include if acid/bases liners will be required on any of the wood base cabinets. Delete "15" if not required.*

*Note: The Uniform Fire Code considers acids and bases hazardous material and could require double wall steel construction with a 1 1/2" space between the walls with a minimum 2" liquid tight bottom. Check with local Fire Marshal.*

*NOTE: Single wall cabinets may be approved on a job-by-job basis with a 2" pan provided at the bottom of cabinet. Self-closing doors would need to be provided.*

15. Acid/Bases liner and venting:

- a. Lining: Cabinets shall be lined with 1/4" thick chemical resistant Resisto-Roc lining. Cabinets shall include one adjustable shelf lined with 1/4" Resisto-Roc.
- b. Vent cabinets up through the work surface behind the lower baffle approximately 4' off the work surface. Venting shall provide approximately 10 air changes per hour in each unit.
- c. Identification: All acid storage cabinets shall be marked with conspicuous lettering "Acid - Corrosives."
- d. Units shall contain a bottom tray on full extension guides to allow tray to be totally pulled out of unit for access. Tray shall support 50 lb. load.
- e. Provide where required on drawings.

*Note: Delete section 2.17 if steel solvent cabinets are not required.*

## 2.10 STEEL SOLVENT STORAGE CABINETS

*Note: Due to conflicts with local codes and vent pipe material requirements, solvent cabinets should not be vented. Venting is not required by any agency. Confirm local fire marshal requirements.*

- A. Top, Bottom and Sides: 18 gauge steel, double wall construction with 1-1/2" air space, removable access and back panels; all joints welded. Set bottom of door two inches above bottom of cabinet to create two in deep well to contain spillage of liquids.
- B. Hardware:
  1. 3-point latching device and lock.

2. Full length piano hinge.
3. Door operation: Self-closing with fusible link.
- C. Upper and Lower Arrester Vents: Factory Mutual approved vents located so that they can be plugged both internally and externally to assure isolation of stored fluid, but can be opened for ventilation means if required by applicable codes.
- D. Cabinet Grounding Attachment: Screw at base of cabinet for firm attachment of grounding wire.
- E. Cabinet Color and Markings:
  1. Cabinet Color: from manufacturer's standard colors.
  2. Mark with Factory Mutual and UL approval.
  3. Warning signs: Label cabinet conspicuous lettering: FLAMMABLE - KEEP FIRE AWAY.
- F. Shelving: Provide one (1) full width adjustable shelf.

*Note: Fisher Hamilton is the only manufacturer that has removable back panel that has been tested to meet F.M. and U.L.*

- G. Provide removable back panel.
- H. Finish shall meet the requirements of 2.3 and 2.4, M of this section.

#### 2.11 ADA COMPLIANCE:

- A. Provide as shown or scheduled on drawings
- B. Provide cabinet height at 32". (Nominal 34" height including countertop.)
- C. Construct units to allow access for forward mounted cupsink locations.

#### 2.12 HEIGHT ADJUSTABLE TABLES

*Note: Select from the following: (Tables can be used for ADA compliance.)*

- A. Four leg adjustable-height table: Provide as detailed on drawings.
  1. Height range: (28" to 37'-3/8").
  2. Freestanding table capable of supporting suspended base cabinets.
  3. Table can be equipped with levelers.

4. Outer leg: 11-gauge cold rolled steel C-channel.
5. Inner telescoping leg: 16 gauge cold rolled steel rectangular tubing.
6. Adjustable mechanism: Mechanical with locking bolts.
7. Weight capacity: Levelers - 1000 pounds; caster - 300 pounds.

## 2.13 CANOPY HOODS

### A. Canopy Hoods:

1. Canopy hoods shall be designed to collect and exhaust heat, steam and odors, as detailed on the drawings. Canopy hood shall be laboratory type with a suspended, removable, horizontal baffle installed to maximize perimeter slot velocities and control fumes.
2. Hoods shall be fabricated into one piece units for ease of handling and installation. Four 1/2" threaded steel rods and four (4) turnbuckles attached to 18 gauge brackets shall be provided for installation support from ceiling. Ceiling support shall be provided by **Division 5**.
3. Hoods shall be:
  - a. 304 stainless steel 18 gauge with satin finish.
4. Design shall incorporate a 6" high fascia on ends and front with roof sloping three ways to 2" high round exhaust collar sized 12" in diameter located on center line of hood, 8" from back. Connection of exhaust duct to collar will be provided by: *(insert option)*.

## 2.14 SNORKELS

*Note: Select from the following:*

- A. Movex MiniTEX Wall Mounted Arm, (4" (100mm) Diameter), 40" long, and a circular aluminum epoxy coated pickup hood.
  1. The MiniTeX wall mounted telescope arm has (2) articulated joints. Each articulated joint has (2) friction adjustments. The adjustable articulated joints are external to the air stream to minimize the static pressure. The arm should have a 180 degree lateral movement at the base of the wall bracket. The tubes to be fabricated out of sheet steel and epoxy coated inside and outside. Each arm should have a manual damper that is air tight down to an underpressure of 14" W.G. The manual damper is to be made of polypropylene. The compressed length of the arm should be 27" and the extended length should be 40".



2. The Arm shall be a Movex MiniTEX MT 1000-100 V that includes the arm with the wall bracket. The arm should have no internal components or support mechanisms to keep the static pressure to a minimum and make it very easy to make friction adjustments or disassemble.
- B. Unit(s) shall be equal to Enviroflex International, Inc. Part #Movex MiniTEX MT 1000-100 V wall mounted telescope lab arm, wall bracket and (1) M-100 hood (epoxy coated aluminum). Other units will be considered as equal, provided that they meet the requirements of this specification.
- C. Movex Ceiling Mounted Arm, (3" (75MM) Diameter), 60" long, Ceiling Column 40" long and a Dome style pickup hood.
1. The Ceiling Mounted arm has (3) articulated joints. Each articulated joint has a large adjustment knob rotating on a ball bearing to prevent it from rubbing on the knuckle joint itself. The articulated knuckle joints should have a low friction rubber sealing ring at each joint to prevent air leakage. The arm base should have a 2-layer configuration, thus allowing a 360 degree rotation of the arm at the bottom of the ceiling column. The base of the arm should have a spring in it to prevent any type of sag problems. All bolts and springs should be surface treated to prevent any type of corrosion against solvents, etc. The tubes are to be fabricated out of thin walled anodized aluminum with a very good corrosion resistance against solvents, etc. The tubes should have good resistance between PH 4 and PH 9. Each arm should have a manual damper that is air tight down to an underpressure of 14" W.G. The manual damper is to be made of polypropylene. All knuckle joints are to be fabricated out of polypropylene. The aluminum tube on the hood end should have a slot ½ the way around the front tube to give the hood lateral movement. The base of the arm should also have an internal spring to give the arm further support to eliminate any sag problems. The A section of the arm should be 30" long. Section B should be 18" and the vertical tube that is inserted into the bottom of the column should be 10" long.
  2. The Arm shall be a Movex T 1500-75 that includes the arm with 3 ajustable articulated joints that can be adjusted with one hand. The articulated knuckle joints should be aerodynamically designed to minimize the pressure drop at each knuckle joint. This design tapers the knuckle joint such that it becomes larger at the end. This tapering effect minimizes the pressure drop and minimizes the tension required on the knuckle joints, because the end of the knuckle joint has a larger diameter. This gives us a larger surface area and consequently minimizes the required pressure to be applied at the knuckle joints to avoid sagging of the arm.
  3. Each knuckle joint should have reinforcing polypropylene on the inside of the articulated link to minimize cracking if too much pressure is applied to the knuckle joint. Each knuckle joint should have a minimum O.D. of 5-1/8", thus allowing minimum tension required, thus eliminating any sagging.
- D. Unit(s) shall be equal to Enviroflex International, Inc. Part #T1500-75 Movex Mini Extractor Lab Arm with TIM 1000 support column and (1) K350-75 hood. Other units will be considered as equal, provided they meet the requirements of this specification.

## 2.25 SNORKELS

*Note: Select from the following:*

- A. Fume Snorkel: Where shown provide snorkel complete with cone and clamping room, support arm, mounting bracket, and flexible duct.
  - 1. Cone shall be 12" diameter at mouth, 18 gauge, type 304 stainless steel unless otherwise note and shall be complete with clamping collar.
  - 2. Stainless steel support arm, rod and brackets shall be 18 gauge, type 304 stainless steel, adjustable in all four dimensions.
  - 3. Flexible duct shall be high temperature exhaust hose as manufactured by McMaster Carr, catalog #5525K34, or approved equal. Flexible duct shall have aluminum finish to match connecting collar to the cone.
- B. Fume Removal System: Articulated arm (3" diameter) and joint exhaust system spring counter balanced. Springs located inside duct; hidden from view. Arms constructed from anodized aluminum with threaded stays and springs in stainless and acid-proof steel. Polypropylene joint construction; red in color. Maximum air temperature of 180 degrees Fahrenheit. Hood attachment 8" diameter round aluminum optional wall, table, or ceiling mount brackets.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Installation:
  - 1. Install fume hoods in accordance with manufacturer's instructions.
  - 2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
  - 3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.
  - 4. Provide user training and product support manuals.
- B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.
- C. Provide cut-outs as required for VAX monitor.

### 3.2 FIELD QUALITY CONTROL TESTING OF FUME HOODS

- A. Field testing requirements:



1. Perform tests in field to verify proper operation of the fume hoods before they are put in use, using only qualified personnel.
  2. Perform tests after installation is complete, the building ventilation system has been balanced, all connections have been made, and written verification has been submitted that the above conditions have been met.
  3. Verify that the building make-up air system is in operation, the doors and windows are in normal operating position, and that all other hoods and exhaust devices are operating at designed conditions.
  4. Correct any unsafe conditions disclosed by these tests before request of test procedures.
- B. Testing equipment:
1. Properly calibrated hot wire thermal anemometer equal to Alnor Model No. 8500D-1 Compuflow.
  2. Low volume smoke source.
- C. Test procedure
1. Check room conditions in front of fume hood using a thermal anemometer and a smoke source to verify that the velocity of cross drafts does not exceed 20% of the specified average fume hood face velocity. Eliminate any cross drafts that exceed these values before proceeding.
    - a. NOTE: No fume hood can operate properly if excessive cross drafts are present.
  2. Perform the following test to verify conformance of actual fume hood face velocities to those specified. Turn on the exhaust blower with the sash in the 18" operating position. Determine the face velocity by averaging the velocity of six readings taken at the fume hood face: at the centers of a grid made up of three sections of equal area across the top half of the fume hood face and three sections of equal area across the bottom half of the fume hood face.
    - a. If not in accordance with specifications, refer to manufacturer's Troubleshooting Guide for aid in determining cause of variation in airflow.
  3. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down.
- D. Field testing of airflow in fume hoods:
1. Turn fume hood exhaust blower on. With sash in the operating position check airflow into the fume hood using a low volume smoke source. Verify that airflow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face.

2. Move the smoke source throughout the fume hood work area directing smoke across the work surface and against the sidewalls and back. Verify that smoke is contained within the fume hood and rapidly exhausted.
3. With sash in the open position check airflow into the fume hood using a cotton swab dipped in titanium tetrachloride or other smoke source. Verify that airflow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face.

### 3.3 ADJUSTING

- A. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.
- B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

### 3.4 CLEANING

- A. Clean equipment, touch up as required.

### 3.5 PROTECTION OF FINISHED WORK

- A. Provide all necessary protective measures to prevent exposure of equipment from exposure to other construction activity.
- B. Advise contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of other trades.

SECTION CONTINUES ON NEXT PAGE

## PART 4 - SUBMITTALS

### 4.1 SUBMITTALS SCHEDULE

- A. Include this form with submittals of this Specification Section, unless a substitute product is being proposed, in which case refer to Division 1 **Section 01 25 00** "Substitution Procedures" and **Section 01 60 00** "Product Requirements" for substitution requests.

Contractor's <u>Initials</u>	Contractor is to acknowledge with initials each submittal included. Attach a letter of explanation for each submittal not included.
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\_\_\_\_\_ All submitted products are as specified.

B. SUBMITTAL SCHEDULE:

\_\_\_\_\_ 1. Product Data: Submit manufacturer's data for each component and item of laboratory equipment specified. Include component dimensions, configurations, construction details, joint details, and attachments, utility and service requirements indicate location, size and service requirements for each utility connection. See Division 1 for additional requirements.

\_\_\_\_\_ 2. Shop Drawings:

- a. Provide 1/2" = 1'0" scale elevations of individual and battery of hood units showing cross sections, rough-in and anchor placements, tolerances and clearances. Indicate relation of units to casework, other laboratory equipment, surrounding walls, ceilings, windows, doors and other building components.
- b. Provide 1/4" = 1'0" rough-in plan drawings for coordination with trades. Rough-in shall show free area.

\_\_\_\_\_ 3. Top Samples: Submit product sample of each type of hood top.

\_\_\_\_\_ 4. Finish Samples: Submit 3" x 5" samples of each color of metal finish for hoods and other prefinished equipment and accessories specified for selection by the Owner's Representative. Submit samples from manufacturer's standard color offering.

\_\_\_\_\_ 5. Liner Samples: Submit product samples for each type of hood liner.

\_\_\_\_\_ 6. Instructions: Submit for review and approval.

- a. Instructions to be inscribed on instruction plate to be attached to chemical fume hoods, as specified in Part 2 of this Section.
- b. Written instructions in booklet form providing additional details on safe and proper operation and maintenance.

- \_\_\_\_\_7. Test Data: Submit test reports on each size and type of chemical fume hood verifying point of manufacture conformance to test performances specified below:
- a. ASHRAE 110 - 1995.
  - b. Sound level compliance of the following maximum criteria:
    - 1) Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. All readings taken 3" in front of open sash at 100 fpm face velocity.

- \_\_\_\_\_8. UL 1805: Written verification of UL 1805 compliance

*Note: Select for projects requiring seismic anchoring. Delete if seismic anchoring is not required.*

- \_\_\_\_\_9. Submit detailed seismic anchorage and attachment drawings and calculations complying with all Uniform Building Code requirements and regulations for seismic restraint.
- \_\_\_\_\_10. ASHRAE test report (as manufactured) for each fume hood type.
- a. Test one fume hood of each type and size specified in accordance with the method prescribed in ASHRAE Standard ANSI/ASHRAE 110-1995. The minimum overall performance rating of each test shall be 4.0 AM 0.05 with 4.0 equal to liters per minute of tracer gas release, AM identifying an "as manufactured" test, and 0.05 indicating the level of tracer gas control in parts per million.
  - b. Hood test shall take place in the manufacturer's UL Certified test facility. Test facility with testing personnel, samples, apparatus, instruments, and test materials supplied by the manufacturer.
  - c. Submit a test report, for each hood tested.
  - d. Submit written verification that the test facility is UL certified to test for UL 1805 standard.

END OF SECTION

# **Master Construction Specifications**

## **Samples**

Supplemental Information for Specs



## Product Data Guide: Semi-Transparent Stain 2100-2300 Series - 100 VOC

**SUPERDECK® Semi-Transparent Stain** is a high solids, professional grade, wood finish developed to give superior protection and beautiful color to exterior wood. Superdeck Semi-Transparent Stains use the highest quality iron oxide pigments to inhibit damage caused by the sun, a tung and linseed oil system to provide superior protection, and a highly effective mildewcide to inhibit growth of mildew on the stain's surface. Superdeck Semi-Transparent Stains contain Carnauba for an extremely durable finish and a beautiful lustrous sheen with mar and scuff resistance. Superdeck Semi-Transparent Stains will not track and are resistant to foot traffic patterning

**USES:** All exterior wood including pressure treated wood.

### **COLORS:**

SC 2100-WEATHERED GRAY, tints to DB 2101-2120

SC 2200-CEDAR, tints to DB 2201-2220

SC 2300-REDWOOD, tints to DB 2301-2320

**VOC:** 100

### **PRODUCT HIGHLIGHT:**

- One Coat Coverage
- Fortified with Carnauba
- Moderate Grain Clarity
- Use on All Exterior Wood

**SURFACE PREPARATION: DO NOT APPLY OVER SEALED SURFACES.** Remove previous oxidized stains with Superdeck® Wood Cleaner. **NEW WOOD** that has not been kiln dried must be allowed to season 2 to 4 weeks before applying product. Dry time will vary depending on weather and moisture content of wood. Wood may be clean enough to directly apply stain. If not, or if wood has mill glaze, clean redwood and cedar surfaces with Superdeck® Wood Brightener; clean pressure treated wood surfaces with Wood Cleaner. **WEATHERED WOOD** should be free from dirt and other foreign materials. Thoroughly clean all wood surface types with Wood Cleaner and rinse. For redwood and cedar, follow with Wood Brightener to remove tannin stains and brighten wood to its original color.

NOTE: This product is lead free. **WARNING!** If you scrape, sand or remove old paint, you may release lead dust. **LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE.** Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800- 424-LEAD or log on to [www.epa.gov/lead](http://www.epa.gov/lead).

**PRODUCT PREPARATION:** Product should be shaken or stirred before and during application.

**THINNING:** None required.

**TINTING:** May use up to 4 ounces of colorant per gallon.



**APPLICATION METHODS:** Product may be brushed, rolled or sprayed. If sprayed, use the lowest possible pressure needed for a reasonable spray pattern. Back rolling is suggested when spraying, working the product smoothly and evenly into the wood. This will decrease the possibility of pools or puddles on the surface and ensure a properly penetrated finish.

**APPLICATION:** Proper application is essential in order to accomplish the full benefits of product appearance and performance. Different wood species, textures and natural color will affect finished shade. Always test a small area first for color satisfaction before coating entire project. Semi-Transparent Stain is a penetrating stain that must be applied only at a rate the wood will absorb. Do not pool or puddle product on surface. Excess product allowed to sit on surface will result in a tacky finish and extended dry time. Remove tacky finish with mineral spirits within 24 hours of application or with a mild solution of Wood Cleaner after 24 hours. When properly applied, the wood surface will have a positive dry and the wood fibers beneath the surface will maintain excellent lubrication. Thoroughly coat the porous ends of all boards with product.

**NUMBER OF COATS:** One coat depending on wood porosity and wood moisture content.

**APPLICATION TEMPERATURE:** 40° F.– 95° F. Do not apply if wood surface is hot to touch or if rain is likely to occur.

**DRY TIME @ 77° F:** 8 hours to touch, 24 hours for traffic; depending on weather conditions.

**SPREAD RATE:** Approximate spread rate: Smooth Surfaces: 250–350 sq. ft./gal.; Rough Sawn: 150–250 sq. ft./gal.

**STORAGE:** Pour remaining product into smaller container to reduce skin forming on product. If skin does form, remove it and strain product before re-use.

**CLEAN UP/DISPOSAL:** Clean brushes and equipment with mineral spirits. Dispose of empty container or unused portion in accordance with local, state, and federal regulations. Soak oily rags, steel wool, roller covers, and other stain soaked materials in water after use to avoid spontaneous combustion.

**DANGER! AVOID SPONTANEOUS COMBUSTION:** Product contains drying oils (linseed oil & tung oil). Rags, steel wool, roller covers, or any other waste soaked with product may spontaneously catch fire if improperly discarded. Immediately after each use, place rags, steel wool, roller covers, or any other waste in a sealed water-filled metal container.

**CONTAINS PETROLEUM DISTILLATE.** Keep away from heat, sparks and flame. May be irritating to eyes and skin. Do not use product indoors, for exterior use only. Avoid breathing vapors or mist. Use only in areas with adequate ventilation. Wear a vapor/mist respirator during spray applications. If you experience eye watering, headaches or dizziness, increase fresh air or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Close container after each use. While using do not eat, smoke or drink. Wear protective clothing, gloves and goggles. Do not use on surfaces intended for food, feed, potable water, livestock or dairy animals.

**FIRST AID:** If swallowed, do not induce vomiting. Call a physician immediately. In case of eye contact, flush immediately with plenty of water for at least fifteen minutes and get medical attention; for skin,



wash thoroughly with soap and water. Remove contaminated clothing and wash before reuse. Call a physician if any irritation persists.

**WARNING:** This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm. Notice: Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

**KEEP OUT OF REACH OF CHILDREN**

**SPECIFICATIONS:**

<i>MATERIAL:</i>	Tung oil, Linseed oil, Carnauba Wax, Alkyd Resin
<i>SOLVENT:</i>	Mineral Spirits/VOC exempt solvent blend
<i>PIGMENT:</i>	Iron Oxide/Titanium Dioxide
<i>TYPICAL LBS./GAL.:</i>	8.30-8.57
<i>SPECIFIC GRAVITY:</i>	0.99-1.03
<i>VISCOSITY:</i>	600-800 CPS 12 RPM/SP#2 @ 77° F.
<i>TOTAL SOLIDS by WEIGHT:</i>	77%
<i>TOTAL VOLATILE by WEIGHT:</i>	23%
<i>V.O.C.:</i>	Less than 100 grams/liter
<i>FLASH POINT:</i>	111° F. (T.C.C)
<i>D.O.T. CLASSIFICATION:</i>	Combustible Liquid

**GUARANTEE:** If you are not completely satisfied with the performance of this product after applying according to label directions, we will replace the product or refund the purchase price at the manufacturer's option. Proof of purchase, complaint description, and photograph required. Manufacturer's liability limited to refund of purchase price or product replacement. In no event shall manufacturer be responsible for labor, personal injury, or damage.



# Material Safety Data Sheet

24 Hour Assistance:  
1-847-367-7700  
Rust-Oleum Corp.  
[www.rustoleum.com](http://www.rustoleum.com)

## Section 1 - Chemical Product / Company Information

Product Name: Varathane Waterbased Interior Satin      Revision Date: 09/07/2007  
Identification Number: 200200  
Product Use/Class: Crystal Clear Waterbased Finish  
Supplier: Rust-Oleum Corporation      Manufacturer: Rust-Oleum Corporation  
11 Hawthorn Parkway      11 Hawthorn Parkway  
Vernon Hills, IL 60061      Vernon Hills, IL 60061  
USA      USA  
Preparer: Regulatory Department

## Section 2 - Composition / Information On Ingredients

Chemical Name	CAS Number	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Dipropylene Glycol Monomethyl Ether	34590-94-8	5.0	100 ppm	N.E.	N.E.	N.E.
Dipropylene Glycol Monobutyl Ether	29911-28-2	5.0	N.E.	N.E.	N.E.	N.E.

## Section 3 - Hazards Identification

\*\*\* Emergency Overview \*\*\*: Use ventilation necessary to keep exposures below recommended exposure limits, if any.

Effects Of Overexposure - Eye Contact: Causes eye irritation.

Effects Of Overexposure - Skin Contact: Substance may cause slight skin irritation.

Effects Of Overexposure - Inhalation: Low hazard for usual industrial handling or commercial handling by trained personnel.

Effects Of Overexposure - Ingestion: Substance may be harmful if swallowed.

Effects Of Overexposure - Chronic Hazards: No Information.

Primary Route(s) Of Entry: Skin Contact, Skin Absorption, Inhalation, Ingestion, Eye Contact

## Section 4 - First Aid Measures

First Aid - Eye Contact: Hold eyelids apart and flush with plenty of water for at least 15 minutes. Get medical attention.

First Aid - Skin Contact: Wash with soap and water. Get medical attention if irritation develops or persists.

First Aid - Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

First Aid - Ingestion: Swallowing less than an ounce will not cause significant harm. For larger amounts, do not induce vomiting, but give one or two glasses of water to drink and get medical attention.

## **Section 5 - Fire Fighting Measures**

Flash Point: 205 F  
(CALC)

LOWER EXPLOSIVE LIMIT: 0.6  
UPPER EXPLOSIVE LIMIT : 17.0

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: FLASH POINT IS TESTED TO BE GREATER THAN 200 DEGREES F.

Special Firefighting Procedures: Water may be used to cool closed containers to prevent buildup of steam.

## **Section 6 - Accidental Release Measures**

Steps To Be Taken If Material Is Released Or Spilled: Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers.

## **Section 7 - Handling And Storage**

Handling: Wash hands before eating. Wash thoroughly after handling. Avoid contact with eyes.

Storage: Keep from freezing. Keep container closed when not in use.

## **Section 8 - Exposure Controls / Personal Protection**

Engineering Controls: Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Respiratory Protection: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin Protection: Nitrile or Neoprene gloves may afford adequate skin protection. Use gloves to prevent prolonged skin contact.

Eye Protection: Use safety eyewear designed to protect against splash of liquids.

Other protective equipment: Refer to safety supervisor or industrial hygienist for further information regarding personal protective equipment and its application.

Hygienic Practices: Wash thoroughly with soap and water before eating, drinking or smoking.

## **Section 9 - Physical And Chemical Properties**

Boiling Range:	80 - 999 F	Vapor Density:	Heavier than air
Odor:	Ammonia -like	Odor Threshold:	ND
Appearance:	Slightly cloudy, particle free liquid	Evaporation Rate:	Slower than ether
Solubility in H2O:	Good		
Freeze Point:	ND	Specific Gravity:	
Vapor Pressure:	ND	PH:	8.8 - 9.2
Physical State:	Liquid	Viscosity:	28 - 32 sec. (4 Ford)

(See section 16 for abbreviation legend)

## Section 10 - Stability And Reactivity

Conditions To Avoid: Avoid contact with strong acid and strong bases.

Incompatibility: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

Hazardous Decomposition: When heated to decomposition, it emits acrid smoke and irritating fumes. By open flame, carbon monoxide and carbon dioxide.

Hazardous Polymerization: Will not occur under normal conditions.

Stability: This product is stable under normal storage conditions.

## Section 11 - Toxicological Information

Product LD50: ND

Product LC50: ND

### **Chemical Name**

Dipropylene Glycol Monomethyl Ether  
Dipropylene Glycol Monobutyl Ether

### **LD50**

5350 mg/kg RAT  
4400 mg/kg oral RAT

### **LC50**

N.E.  
N.E.

## Section 12 - Ecological Information

Ecological Information: Product is a mixture of listed components.

## Section 13 - Disposal Information

Disposal Information: Dispose of material in accordance to local, state and federal regulations and ordinances. Do not allow to enter storm drains or sewer systems.

## Section 14 - Transportation Information

DOT Proper Shipping Name: NON REGULATED  
DOT Technical Name: ---  
DOT Hazard Class: NON REGULATED  
DOT UN/NA Number: NON REGULATED

Packing Group: ---  
Hazard Subclass: ---  
Resp. Guide Page: 127

## Section 15 - Regulatory Information

The following components are not subject to reporting in Section 2:

<b><u>Chemical Name</u></b>	<b><u>CAS Number</u></b>	<b><u>Wt% Less Than</u></b>
Water	7732-18-5	62.75
Acrylic Emulsion	NOT AVAILABLE	20.18
Polyurethane Dispersion	NOT AVAILABLE	5.04
Chemically prepared Silicone Dioxide	112926-00-8	1.28
Propylene Glycol	57-55-6	1.08
Defoamer	PROPRIETARY	0.34
Dispersing Agent	NOT AVAILABLE	0.23
Urethane Polymer	PROPRIETARY	0.22
Silicone Resin Solution	NOT AVAILABLE	0.18
WB Anti-settling	NOT AVAILABLE	0.16
Triethylamine	121-44-8	0.15
Ethylene Glycol Monopropyl Ether	112-34-5	0.11

### CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD, FIRE HAZARD

SARA Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

**U.S. State Regulations: As follows -**

**New Jersey Right-to-Know:**

The following materials are non-hazardous, but are among the top five components in this product.

<b><u>Chemical Name</u></b>	<b><u>CAS Number</u></b>
Water	7732-18-5
Acrylic Emulsion	NOT AVAILABLE
Polyurethane Dispersion	NOT AVAILABLE

**Pennsylvania Right-to-Know:**

The following non-hazardous ingredients are present in the product at greater than 3%.

<b><u>Chemical Name</u></b>	<b><u>CAS Number</u></b>
Water	7732-18-5
Acrylic Emulsion	NOT AVAILABLE
Polyurethane Dispersion	NOT AVAILABLE

**California Proposition 65:**

This product contains no known chemicals known by the State of California to cause cancer.

This product contains no known chemicals known by the State of California to cause birth defects or other reproductive harm.

**International Regulations: As follows -****CANADIAN WHMIS:**

This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

**CANADIAN WHMIS CLASS:** D2B

<b>Section 16 - Other Information</b>
---------------------------------------

**HMIS Ratings:**

Health: 1

Flammability: 1

Reactivity: 0

Personal Protection: x

**VOLATILE ORGANIC COMPOUNDS, GR/LTR:** 278

**REASON FOR REVISION:** Regulatory Update

**Legend:** N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The information contained on this MSDS has been checked and should be accurate. However, it is the responsibility of the user to comply with all Federal, State, and Local laws and regulations.