

**SECTION 08 10 00**  
**STEEL DOORS AND FRAMES**

**PART 1: GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

**1.02 SUMMARY**

- A. Section includes:

1. All hollow metal doors, and doorframes.
2. Rated doors and frames as scheduled.

- B. Related work specified in other sections:

1. Grouting of frames, anchors – Section 04 20 00.
2. Finish hardware – Section 08 71 00.
3. Glazing – Section 08 80 00.
4. Painting – Section 09 91 00.

**1.03 QUALITY ASSURANCE**

- A. Provide doors and frames complying with the SDI Standard 100-"Recommended Specifications Standard Steel Doors and Frames" and as herein specified.
- B. Obtain hardware templates from hardware supplier (Section 08 71 00) and obtain necessary hardware for factory application.
- C. Where noted on Door Schedule, provide nationally recognized testing agency label of proper classification. Label requirements take precedence over conflicting details. Advise the Architect of any conflict before fabricating work on that item is started.

**1.04 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.

1. Coordinate with any special conditions of anchorage. Submit door/opening schedule on shop drawings indicating relationship of door, number of room, number and function of door, such as Corridor A-13 to Lavatory A-14.
2. Shop Drawings: Include the following:
  - a. Elevations of each door design.
  - b. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  - c. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - d. Locations of reinforcement and preparations for hardware.

- e. Details of each different wall opening condition.
  - f. Details of anchorages, joints, field splices, and connections.
  - g. Details of accessories.
  - h. Details of molding, removable stops, and glazing.
  - i. Detail of conduit and preparations for power, signal, and control systems.
  - j. Rating of doors and frames as noted on door/opening schedule and/or Code Plan.
3. Submit documentation for UL 10C or other approved testing agency stating doors have passed UBC Standard 7-2.
  4. Provide factory certification that all components in scheduled stainless steel door and frame systems meet the grades and standards specified herein.
  5. Contract closeout submittals for stainless steel per Section 01 78 23:
    - a. Manufacturer's cleaning and regular maintenance instructions.

### 1.05 PRODUCT PROTECTION

- A. Deliver doors and frames in suitable crating or packaging to prevent damage in transit and storage.
- B. Storage at jobsite:
  1. Store frames on plywood and block at least 4" above plywood, under waterproof cover.
  2. Store doors under cover in a dry area with doors set upright with ¼ inch spacers between doors. Keep doors at least 4" above ground.
  3. Do not store HM material in a manner that traps excess humidity.
  4. Materials that are rusted prior to installation may be rejected.

## PART 2: PRODUCTS

### 2.01 MANUFACTURERS

- A. Approved Manufacturer(s): Steelcraft, Pioneer, Ceco, Curries, Amweld.
- B. Accompany any request for acceptance of alternative manufacturers by descriptive details or brochures demonstrating compliance with specifications, and sample frame corner.

### 2.02 MATERIALS

- A. Steel: Commercial quality, level, cold rolled steel conforming to ASTM A366, free of scale and surface defects. Commercial quality hot rolled and pickled steel conforming to ASTM A569 may be used at contractor's option for interior frames. Where noted, form frames of galvanized steel conforming to ASTM A526 or A527, A60 zinc coating. Gauges are as follows unless otherwise noted:
  1. Interior Frames: 16 gauge.
  2. Flush Doors: 18 gauge (interior).
  4. Rough Bucks and Stiffeners: 12 gauge.
  5. Miscellaneous Trim: 16 gauge.

**B. Rust-Inhibitive Primer**

1. Manufacturer's standard rust inhibitive baked-on primer. Provide additional primer for touch-up.
2. Pretreat galvanized metal in accordance with paint manufacturer's recommendations.

**2.03 FABRICATION**

- A. Make hardware mortises and reinforcements according to templates. Provide hinge, lock, door holder and closer hardware reinforcements. Mortise, drill tap for hardware; fabricate grooves, rabbets as necessary for weatherstripping, soundstripping.
- B. Fabricate doors to a maximum tolerance of 1/16 inch from a straight edge when laid on face of door in any direction, including diagonal.
- C. Attach proper testing agency's labels as indicated on the Drawings. Provide equal labeled frames for labeled doors. Frames with glazing in rated walls must conform to UBC Standard 7.4 (hose stream test). Provide intumescent fire and smoke material for fire rated openings as required by door and frame manufacturer to comply with UL 10C, UBC Test 7-2.
- D. Clearances: Edge clearances shall be provided as follows:
  1. Between doors and frame, at head and jambs - 1/8"
  2. At door sills:

where no threshold is used	—	5/8" maximum to finish floor surface
where threshold is used	—	1/4" maximum between door and threshold
where required for hardware operation	—	as recommended by hardware manufacturer
  3. Between meeting edges of pairs of doors - 1/8"

**2.04 METAL FRAMES**

- A. Provide custom metal frames of the types and styles indicated on the drawings or schedules and complying with SDI 100 for materials and construction requirements.
- B. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, as shown on the drawings. Provide thermally broken frames at exterior wall.
- C. Miter corners on face of all frames, internally weld face and grind smooth exterior. Die coped frames at mullions and stops. Provide with floor anchors.
- D. Provide one removable and one fixed stop at perimeter of openings for glazed frames. Removable stop on secure side.
- E. Provide closed metal covers over all hardware cutouts to protect against mortar.
- F. Provide integral channel frames, subframes and stiffeners to structure where indicated or required for fastening and stiffening frames.
- G. In masonry walls, provide three (3) - 16 gauge corrugated, adjustable, slip type standard frame anchors up to 7'-6" height jamb; frames 7'-6" to 8'-0" - 4 anchors; frames over 8'-0" - 1 anchor for each 2' or fraction thereof in height. In labeled frames, anchors shall be non-removable.
- H. Provide steel spreader temporarily attached to feet of both jambs for welded frames.

- I. Provide three factory installed silencers on single door frames at strike jamb; four (two at each head) silencers on double door frames.
- J. Hinge reinforcements to have 10 gauge straps welded directly above and below each hinge pocket.
- K. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26.

#### **2.05 FLUSH HOLLOW METAL DOOR**

- A. Provide custom metal doors for the types and styles indicated on the Drawings or schedules and complying with SDI 100 for materials and construction requirements. Fully insulate exterior doors.
- B. Close top and bottom edges of all doors with a continuous recessed steel channel not less than 16 ga., full width spot welded to both faces. Provide an additional flush closing channel at top edge for exterior doors. Provide openings to bottom closure of exterior door to permit escape of moisture.
- C. Edge profiles to be 1/8" bevel in 2".
- D. Provide glass light openings as indicated complete with one fixed stop and one removable stop fastened with flat head Phillips screws not over 10 inches o.c.
- E. For 60 minute and greater rated doors installed in enclosed stairways, conform to maximum transmitted temperature end point of 450° as specified in UBC Standard No. 43-2.
- F. All doors to have minimum 16-gauge lock reinforcement and either continuous 14-gauge hinge rail or minimum 8-gauge plate hinge reinforcement.
- G. All faced edge seams to be continuously wire welded, finished smooth.

#### **2.06 HARDWARE LOCATION**

- A. Prepare for hardware at mounting heights and locations as recommended by the Builder's Hardware Manufacturing Association.

#### **2.07 HOLLOW METAL PANELS**

- A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal frames.

#### **2.08 SHOP PAINTING**

- A. Completely clean all frames by degreasing process, followed by one coat rust inhibitive primer equal to a salt spray test (5% solution) of 70 hours. Thoroughly prime all surfaces without runs, smears, or bare spots, and under and inside all removable stops.
- B. Completely clean all doors of impurities and pressure sand to a smooth surface and correct all irregularities with metallic putty sanded smooth. Provide one (1) spray coat of primer, baked on. Thoroughly paint unexposed inside surfaces of exterior doors, fire doors, and other doors occurring in excessive moisture area.
- C. Provide vinyl wash pre-treatment of galvanized steel as recommended by shop primer manufacturer.
- D. Provide primer for field touch up of rusted areas, splices, connections, welds and abrasions.

## **2.09 MODIFICATIONS TO EXISTING HOLLOW METAL**

- A. Where modifications to existing doors or frames are required to accept new doors or hardware, neatly make modifications in field per hardware templates. Provide flush metal blank off plates, welded in place, ground smooth, filled with body putty, where existing hardware is removed. Or, provide new door or frame conforming to project requirements.

## **PART 3: EXECUTION**

### **3.01 INSTALLATION**

- A. Securely fasten Work in place, without twists, warps, bulges or other unsatisfactory defacing of workmanship. Set plumb, level square to proper elevation true to line and eye. Set clips and other anchors with piston driven fasteners equal to Ramset or drilled-in anchors as approved. Fasten units and trim together with neat, uniform and tight joints.
- B. As masonry is being laid fill jambs solid with mortar and provide accurately cut wood spreaders temporarily at mid-section of frames, install jamb anchors.
- C. At steel columns and/or concrete surfaces, install sub-frame or rough bucks as specified. At steel columns use 5/16" diameter self-tapping metal screws and at concrete use expansion bolts of the same diameter. Install frame to sub-frame and/or rough buck with countersunk self-tapping metal screws. Fill screw holes with a suitable metallic filler, sand and prime.
- D. Where field installed hardware is required, provide wood or other suitable filler to avoid drilling and tapping into mortar inside frames.
- E. For all attachments including removable stops, use flat head self-tapping screws. Drill and tap in the field for surface mounted closers, brackets, rim exit devices, door holders, and other surface hardware. At horizontal exterior surfaces, set screws with neoprene gaskets or set with caulking compound under screw head and wipe clean.
- F. All field splices to be welded and filled with body putty and ground smooth, no exposed screw heads will be accepted. Locate splices where shown on final reviewed shop drawings.
- G. Prime-Coat Touchup: Immediately after erection and when building envelope is watertight, sand smooth rusted, damaged, connection points and welded areas of prime coat and apply touchup primer.

### **3.02 PROTECTION**

- A. Protect installed hollow metal work against damage from other construction.
- B. Repair or replace all damaged work at no extra cost to Owner.

### **3.03 DEMONSTRATION**

- A. Instruct the Owner on the proper procedures for cleaning and regular maintenance for each grade of stainless steel specified. Refer to Section 01 79 00 Demonstration and Training.

**END OF SECTION 08 10 00**

## SECTION 08 14 00

### WOOD DOORS

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

A. Section includes:

1. Solid core flush wood doors and transom panels.
2. Rated doors as noted on schedule and/or Code Plan.
3. Factory finishing of wood doors.
4. Factory fitting to frames (prefitting).
5. Factory preparation for hardware (premachining).
6. Glazing, glazing stops and preparation of doors to receive glazing.

B. Related sections:

1. Finish hardware: Section 08 71 00.
2. Glazing: Section 08 80 00.

##### 1.03 REFERENCES

- A. Window and Door Manufacturers Association (WDMA) Industry Standard: WDMA I.S.1A-04
- B. NFPA 80-1997 Standard for Fire Doors and Fire Windows. National Fire Protection Association; 1997.
- C. American National Standards Institute (ANSI) A115.W Series.
- D. ASTM E 152-81a -- Standard Methods of Fire Tests of Door Assemblies; 1981.
- E. How to Store, Handle, Finish, Install and Maintain Wood Doors; National Wood Window and Door Association (NWWDA); undated.
- F. International Building Code (IBC) Current Edition.

##### 1.04 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.

1. Product Data: Submit door manufacturer's product data for each type of wood door, including details of core and edge construction, and trim for openings.

2. Shop Drawings:

- a. Location and size of each door.
- b. Elevation of each kind of door.
- c. Details of construction.
- d. Location and extent of hardware blocking.
- e. Fire ratings of doors as noted on door/opening schedule and/or Code Plan.
- f. Requirements for factory finishing.
- g. Documentation for UL 10C or other approved testing agency stating doors have passed UBC Standard 7-2.

3. Samples:

- a. Beads for glazed openings: Submit 6-inch-long sections of glazing beads for each material, type, and finish required.

#### 1.05 QUALITY ASSURANCE

A. Quality Standards: Provide flush doors complying with the following standards:

1. Manufacturer must be an approved WDMA Door Manufacturer in accordance with WDMA I.S.1A-04.

B. Fire-Rated Wood Doors:

1. Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152.
2. Acceptable testing and inspection agencies include:
  - a. Underwriters Laboratories, Inc.
  - b. Warnock Hersey International, Inc.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect wood doors during transit, storage, and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standard and recommendations of NWWDA I.S. 1, Appendix, "How to Store, Handle, Finish, Install, and Maintain Wood Doors," as well as with manufacturer's instructions.

1. Package doors at factory prior to shipping, using manufacturer's standard method.

B. Identify each door with individual opening numbers using temporary, removable, or concealed markings.

1. Correlate door identification with designation system used on shop drawings.

#### 1.07 WARRANTIES

A. 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 which warp (bow, cup, or twist), which show telegraphing of core construction in face veneers, or which do not conform to tolerance.

limitations of specified quality standards. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the contractor under the contract documents.

1. Include reinstallation which 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 substantial completion:
  - a. Solid core flush interior doors: Life of installation.
3. Submit per Section 01 78 23.

## **PART 2: PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

#### **A. Manufacturer:**

1. Provide products complying with requirements of the contract documents and made by one of the following:
  - a. Algoma Hardwoods, Inc.
  - b. Marshfield DoorSystems Inc.
  - c. Eggers Industries.

#### **B. Flush Doors: comply with requirements of WDMA I.S.1A-04.**

#### **C. Fire Rated Doors:**

1. Construction: Manufacturer's standard core construction in accordance with testing agency requirements for fire rating indicated, and as specified herein.
2. Edges: Provide manufacturer's standard laminated edge (stile) construction for use with mortise hinges and for indicated fire resistance ratings.
3. Labels: Permanently affixed to hinge stile.

### **2.02 SOLID CORE WOOD FACED DOORS**

#### **A. Solid Core Door (non-rated):**

1. PC-5 WDMA Premium
2. Application: Non-rated interior door.
3. Faces:
  - a. Wood Veneer:
    - 1) Species: Red oak
    - 2) Cut: Plain sliced.
      - 1) Natural ash or birch or maple (heartwood/sapwood).
      - 2) Cut: Plain sliced.
    - 1) White ash or birch or maple (sapwood).
    - 2) Cut: Plain sliced.



- 1) Brown ash or red birch (heartwood).
- 2) Cut: Plain sliced.

b. High Pressure Decorative Laminate (HPDL):

- 1) Laminate Color/Pattern: See Material Finish / Color Schedule on Architectural Drawings.

c. Medium Density Overlay (MDO):

4. Construction: 5-ply Standard construction is per Heavy Duty Performance Levels.
5. Core: Heavy duty wood based particleboard, PC.

B. Solid Core Door (rated):

1. FD-5 WDMA Premium
2. Application: Labeled fire door.
3. Faces: Same as non-rated door.
4. Core: High-density mineral core laminated to both sides of 3/4" fire retardant plywood.
5. Reinforcing for Hardware: Fire retardant treated top rail and lockblocks for secure anchorage of hardware, without thru bolts as noted in NWWDA I.S. I-A - 1997.
6. For 60 minute and greater rated doors installed in enclosed stairways, conform to maximum transmitted temperature end point of 450° as specified in UBC Standard No. 43-2.
7. Provide factory primed rated astragals or metal edges as required by listing agency.
7. Provide intumescent fire and smoke material for fire rated openings as required by door and frame manufacturer to comply with UL 10C, UBC Test 7-2.

- a. Positive Pressure Category "A" type doors required.

## 2.03 GLAZING

A. Glazing Stops:

1. Non-Rated and 20 minute
  - a. Wood, of the same species/compatible with door species.
2. Fire-Rated 45 minute or above, manufacturers options:
  - a. Flush, wood veneer clad PVC, of same species/compatible to door facing.
  - b. Veneer wrapped rolled steel, of same species/compatible to door facing.
  - c. Manufacturer to verify compatibility of glazing system with positive pressure requirements.

B. Glass and Glazing:

1. Provided by the wood door manufacturer in accordance with requirements of Section 08 80 00.

## **2.04 FABRICATION**

- A. Fixed Panels: Provide panels of same quality, construction, and appearance as adjacent doors, as follows:
  - 1. Grain and pattern matching: Comply with specified quality standards for matching of faces between doors and panels.
- B. Openings: Cut, trim, and seal openings in doors at the factory.
- C. Prefitting: Fabricate and trim doors to size at factory to conform to hollow metal frames as shown on approved frame shop drawings and floor finishes as indicated in the finish schedule.
- D. Premachining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedules, hardware templates, and door frame shop drawings.

## **2.05 FACTORY FINISHING**

- A. Doors to be factory finished to meet or exceed WDMA I.S. 1A TR-6.
- B. Transparent Finish:
  - 1. Type: Factory finish to be water-based stain and ultraviolet (UV) cured polyurethane sealer to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations. Finish must meet or exceed performance standards of AWI TR-6 catalyzed polyurethane.
  - 2. Stain color/finishing: See Material Finish/Color Schedule, on Architectural Drawings.
  - 3. Grain effect: Closed.
  - 4. Sheen: Satin (low luster).
  - 5. Grade: Premium.

## **PART 3: EXECUTION**

### **3.01 INSPECTION**

- A. Require installer to examine door frames after their installation, and doors prior to their hanging, for the following purposes:
  - 1. To 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. To verify that doors are free of defects.
- B. Obtain installer's written report listing conditions detrimental to compliance with requirements of this section.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Condition doors to average prevailing humidity in installation area prior to hanging.
- B. Hardware Installation: Section 08 71 00.

- C. Install wood doors in accordance with manufacturer's instructions and referenced standards.
  - 1. Installation of the wood doors, and labeled wood doors shall comply with WDMA I.S.1A-04, Installation and NFPA 80.
  - 2. Dimensional tolerances for hardware cutouts, undercuts, meeting edges, heights and width shall comply with WDMA I.S.1A-04
- D. Prefit Doors: Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for fit and uniform clearance at each edge.
- E. Shop-Finished Doors: Restore finish on edges of shop-finished doors before installation, if fitting or machining is required at the project site. Touch up any scratched doors to satisfaction of Architect prior to substantial completion or replace doors.

### **3.03 CLEANING AND ADJUSTMENT**

- A. Replace doors that are warped, twisted, show through or not true in plane and that do not follow the warranty.
- B. Operation: Rehang or replace doors which do not swing or operate freely, as directed by the Architect.
- C. Refinish or replace doors damaged during installation, as directed by the Architect.
- D. Institute protective measures as recommended and accepted by door manufacturer to ensure that wood doors will be without damage or deterioration at time of substantial completion.

**END OF SECTION 08 14 00**

## SECTION 08 16 00

### FRP FLUSH DOORS

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

- A. This Section includes the following:
1. FRP flush doors
- B. Related work specified in other sections:
1. Section 08 40 00 - Aluminum Storefront and Curtainwall
  2. Section 08 71 00 - Finish Hardware.
  3. Section 08 80 00 - Glazing

##### 1.03 QUALITY ASSURANCE

- A. Standards: comply with requirements and recommendations in applicable specification and standards by NAAMM and AAMA, including the terminology definitions and specifically including the "Entrance Manual" by NAAMM, except to the extent more stringent requirements are indicated.
- B. Performance: A minimum ten-year record of production of frames, doors and panels and completion of similar projects in type and size.
- C. Instruction: The manufacturer or his representative will be available for consultation to all parties engaged in the project including instruction to installation personnel.
- D. Field Measurement: Field verify all information prior to fabrication and furnish of materials. Furnish and install materials omitted due to lack of verification at no additional cost.
- E. Regulation and Codes: Comply with the current edition in force at the project location of all local, state and federal codes and regulations, including the Americans with Disabilities Act of 1992 and Michigan Barrier-Free.
- F. Thermal Movements: Provide systems, including anchorage, that accommodate thermal movements of systems and supporting elements resulting from the following maximum change (range) in ambient and surface temperatures without buckling, damaging stresses on glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other operating units to function properly, and other detrimental effects.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient: 180 deg F (100 deg C), material surfaces.
- G. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding stock systems according to test methods designated.
- H. Thermal Transmission (exterior doors): U-value of not more than 0.09 (BTU/Hr. x sf x degrees F.) per AAMA 1503.01.

I. Flame Spread/Smoke Developed: Provide FRP doors and panels with the following ratings in accordance with ASTM E 84-79a: Flame Spread: Exterior faces not greater than 345 (Class C); interior faces not greater than 320 (Class A).

J. Additional Criteria: Provide FRP doors and panels with the following performance:

- ASTM D 256- nominal value of 13.5
- ASTM D 1242 – nominal value of .23 percent
- ASTM D 570 – nominal value of .20 to .40 percent
- ASTM D 2583 – nominal value of 50

K. Wind Loads: Provide systems, including anchorage, capable of withstanding wind-load design pressures calculated according to requirements of authorities having jurisdiction of the American Society of Civil Engineers' ASCE 7, "Minimum Design Loads for Buildings and Other Structures", 6.4.2, "Analytical Procedure," whichever are more stringent.

#### 1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

1. Product Data: Manufacturer's product data, specifications and instructions for each type of door and frame required.
  - a. Include details of core, stile and rail construction, trim for lites and all other components.
  - b. Include details of finish hardware mounting.
  - c. Include sample of each aluminum alloy to be used on this project. Where normal finish color and texture variations are expected, include two or more samples to show the range of such variations.
  - d. Include one sample of typical fabricated section, showing joints, fastenings, quality of workmanship, hardware and accessory items before fabrication of the work proceeds.
2. Shop drawings for the fabrication and installation of the doors and frames, and associated components. Details to be shown full scale. Include glazing details and finish hardware schedule.

#### 1.05 PRODUCT PROTECTION

- A. Deliver materials to jobsite in their original, unopened packages with labels intact. Inspect materials for damage and advise manufacturer immediately of any unsatisfactory materials.
- B. Package door assemblies in individual corrugated cartons so no portion of the door has contact with the outer shell of the container. Package and ship frames pre-assembled to the greatest possible extent.

### PART 2: PRODUCTS

#### 2.01 MANUFACTURERS

A. Manufacturer(s): Subject to compliance with requirements, provide products of the following:

1. Special – Lite, Inc., Decatur, Michigan
2. Manko Window Systems Inc., Manhattan, Kansas
3. Cline Aluminum Doors, Bradenton, Florida.

#### 2.02 MATERIALS

A. Aluminum Members: Alloy and temper as recommended by manufacturer for strength, corrosion resistance and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate with aluminum wall thickness of 0.125".

- B. Components: Furnish door and frame components from the same manufacturer. "Splitting" of door and frame components is not permitted.
- C. Fasteners: Aluminum non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors and other items being fastened. For exposed fasteners (if any) provide oval Phillips head screws with finish matching the item to be fastened.
- D. Glazing Gaskets: For glazing factory-installed glass, and for gaskets which are factory-installed in "captive" assembly for glazing stops. Manufacturer's standard stripping of molded neoprene, complying with ASTM D 2000 (Designation 2BC415 to 3BC620), or molded PVC complying with ASTM C 509 Grade 4.

### **2.03 FIBERGLASS REINFORCED POLYESTER FRP FLUSH DOORS**

#### **A. Materials and Construction**

1. Construct 1-3/4" thickness doors of 6063-T5 aluminum alloy stiles and rails minimum 2-5/16" depth. Provide joinery of 3/8" diameter full width tie rods through extruded splines top and bottom as standard .125" tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.
2. Extruded top and bottom rail legs for interlocking continuous rail rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum stiles and rails.
3. Door face sheeting .120" thickness fiberglass reinforced polyester, Spec Lite 3. SL-17 doors with pebble-like embossed pattern of the standard colors.
4. Core of Door Assembly: Minimum five pounds per cubic foot density poured-in-place polyurethane free of CFC. Minimum "R" value of 11. Ballistic rating is as indicated. Meeting stiles on pairs of doors, and weather bars with nylon rush weatherstripping.
5. Manufacture doors with cutouts for vision-lites or panels as indicated and scheduled. Factory furnish and install all glass and panels prior to shipment. 1" insulated, tempered glass.
6. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule. Factory install hardware.

- B. Color: See Material Finish/Color Schedule, on Architectural Drawings.

### **2.04 FABRICATION**

- A. Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the drawings.
- B. Coordination of Fabrication: Field measure before fabrication, and show recorded measurements on first shop drawings.
- C. Complete cutting, fitting, forming, drilling and grinding of all metal work prior to assembly. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".
- D. No welding of doors or frames is acceptable.
- E. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support mechanical joints, with hairline fit at contacting members.

### **2.05 PROJECT WARRANTY**

- A. Provide a written warranty signed by manufacturer, installer and contractor, agreeing to replace, at no cost to the Owner, any doors, frames or factory hardware installation which fail in materials or workmanship within the warranty period. Failure of materials or workmanship includes: excessive deflection, faulty operation of entrances,

deterioration of finish, or construction in excess of normal weathering and defects in hardware installation. The minimum time period of warranty is ten (10) years from substantial completion.

- B. Submit in accordance with Section 01 78 23

### **PART 3: EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of entrance and storefront systems. Do not proceed with installation until unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joint free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- D. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Division 7 Section "Joint Sealants."
- E. Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- F. Install glazing to comply with requirements of Division 8 Section "Glazing", unless otherwise indicated.
- G. Install perimeter sealant to comply with requirements of Division 7 Section "Joint Sealants", unless otherwise indicated.
- H. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet; 1/4 inch over total length.
  2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
  3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

#### **3.03 ADJUSTING AND CLEANING**

- A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.
- B. Remove excess sealant and glazing compounds, and dirt from surfaces.

### **3.04 PROTECTION**

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure entrance and storefront systems are without damage or deterioration at the time of Substantial Completion.

### **3.05 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door operation. At a minimum, provide 2 hours of demonstration.
  - 1. Provide adjustment tools and instruction sheets for Owner's use.
- B. Refer to Section 01 79 00 Demonstration and Training.

**END OF SECTION 08 16 00**



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## SECTION 08 40 00

### ALUMINUM ENTRANCES, STOREFRONTS AND CURTAINWALLS

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

A. Section Includes:

1. Entrance Framing noted as "CW-#" on drawings.
2. Glass
3. Joint sealants in contact with aluminum components.

B. Products installed but not furnished under this Section:

1. Finish hardware - Section 08 71 00.

C. Related Sections:

1. Finish hardware - Section 08 71 00.
2. Joint Sealants - Section 07 92 00.
3. Glazing Section - 08 80 00.

##### 1.03 REFERENCES

- A. NAAMM - Metal Finishes Manual, 3rd ed., Jan. 1976.
- B. AAMA 501 - Methods of Test for Metal Curtain Walls.
- C. AAMA 2605 -- Methods of Testing Windows.
- D. AAMA 2605 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
- E. NFRC 500 - Voluntary Test Method for Condensation Resistance of Windows, Doors and Glazed Wall Sections.
- F. NFRC 500 - Voluntary Test Method for Thermal Transmittance of Windows, Doors and Glazed Wall Sections.
- G. AAMA 606.1 - Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
- H. AAMA 607.1 - Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- I. AAMA 608.1 - Voluntary Guide Specifications and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.

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- J. ASTM E 283 - Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors; 1984.
- K. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1984.
- L. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1986.
- M. ASTM C 509 - Specification for Cellular Elastomeric Preformed Gasket and Sealing Material.
- N. ASTM D 3656 - Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Fiber Yarn.
- O. ASTM E 783 - Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
- P. ASTM E 1105 - Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform Cyclic Static Pressure Difference.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Exterior Assemblies: Design and fabricate to comply with the performance characteristics listed below.
- B. Thermal Movement: Allow for expansion and contraction resulting from ambient temperature range of 120 degrees F (49 degrees C).
- C. Provide capacity to withstand the following loads without deformation and without deflection greater than L/175 to spans up to 13'-6" and L/240 + 1/4" to spans greater than 13'-6" with the following Wind Load Provision of ANSI/ASCE 7:
  - 1. Basic Wind speed  $V = 90$  mph
  - 2. Exposure Category: B
  - 3. Importance Factor:  $I = 1.15$
  - 4. Occupancy Category: 3
  - 5. Mean Roof Height: 28' at Redford Union H.S., 16' at MacGowan El. And Stuckey Center
- D. Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with NFRC 500 showing condensation resistance (CR) of not less than: 77 for 5500 Series Curtain Wall framing based on an overall depth of 6".
- E. Thermal Transmittance: Provide framing systems that have an overall U-value of not more than 0.37 BTU/(hr. x sq. ft. x deg. F) at 15 mph exterior wind velocity when tested in accordance with NFRC 100 with specified glazing.
- F. Air Infiltration Rate
  - 1. Fixed windows/storefront/entrance curtain wall not be more than 0.06 cfm per sq. ft. of window area for an inward test pressure of 6.24 lbf per sq. ft., when tested in accordance with ASTM E 283.
- G. Water Penetration: There will be not water penetration, as defined in ASTM E 331, when tested in accordance with ASTM E 331 at an inward test pressure of 15.00 lb per sq. ft.

#### 1.05 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
  - 1. Shop Drawings: Submitted for approval by Architect, prior to fabrication. Indicate installation details, materials used, quantity and size required. Refer to Submittals Section to submittal requirements.

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2. Samples:

- a. Color: One (1) 12-inch extrusions with specified finish, properly labeled.
- b. Glass: One (1) 12 inch square samples of each glass type indicated, properly labeled.

3. Letter from manufacturer approving contractor to install windows.

5. Test reports showing compliance with performance requirements.

B. Warranty: Submit per Section 01 78 23.

**1.06 PROJECT CONDITIONS**

A. Check actual unit opening by accurate field measurement before fabrication. Coordinate fabrication schedule with construction progress to avoid delay of work.

**1.07 QUALITY ASSURANCE**

A. Manufacturer to be fully responsible for engineering fabrication and overseeing installation to insure a weather tight installation.

B. Installer Qualifications: Authorized representative of the manufacturer, with not less than five (5) years experience in the fabrication and installation of products similar to those specified under this Section.

C. Warranty:

1. Fabricated products: Manufacturer to provide written warranty agreeing to repair or replace product that fail in materials or factory workmanship within ten (10) years from the date of Substantial Completion.
2. Glass: Provide written warranty of thermal and physical integrity of insulating glass units for ten (10) years from date of Substantial Completion.

**PART 2: PRODUCTS**

**2.01 MANUFACTURERS**

A. The following manufacturers/products are approved as noted below with the understanding they will meet the actual products specified: EFCO, Wausau, Manko.

**2.02 MATERIALS - GENERAL**

A. Aluminum Members: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate.

B. Fasteners: Aluminum, nonmagnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components.

1. Do not use exposed fasteners except where unavoidable for application of hardware.
2. Exposed fasteners: Match finish of members and hardware being fastened.

C. Concealed Flashing: Dead-soft stainless steel, 26 gage minimum; or extruded aluminum, 0.062 inch minimum; or an alloy and type selected by manufacturer for compatibility with other components.

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- D. Brackets and Reinforcements: High-strength aluminum where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.
- E. Concrete/Masonry Inserts: Cast iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 123.
- F. Dissimilar Metal Coating: Cold-applied asphalt mastic, zinc chromate paint, or other nonconductive, nonabsorbent material.
- G. Glazing Gaskets: Comply with ASTM C 864; style as recommended by manufacturer.
- H. Glass and Glazing Accessories: Provide products specified Section 08 80 00.
- I. Joint sealants: conform to requirements of Section 07 92 00.  
Color: See Material Finish/Color Schedule, on Architectural Drawings.
- J. Door Weatherstrip: Silicon treated plastic pile.

### 2.03 FINISH

- A. See Material Finish/Color Schedule, on Architectural Drawings.

### 2.04 ENTRANCE FRAMING (CW# )

- A. Frame Model:
  - 1. Exterior: EFCO Durastile Framing; Manko Series
    - a. Minimum wall thickness: 0.125".
    - b. Frame profile: 4 ½ minimum depth x 2" minimum face with 12" sidelite base as detailed.
    - c. Frame reinforcing (hinge and latch): Continuous full height 1" x 1 ¼" x 3/16" galvanized steel angle.
    - d. Thermal barrier: Poured in place, two part polyurethane structural barrier.

### 2.05 GLASS

- A. Provide products and conform to requirements specified in Section 08 80 00.

### 2.06 ALUMINUM PANELS

- A. Materials
  - 1. Exterior Panels: Flush, minimum 0.125-inch thick laminated to rigid wall insulation (conform to Section 07 21-00, Insulation). Fabricate so panel is glazed into glazing stop and face is flush with outside face of mullion cap.
  - 2. Interior panel, flush, minimum 0.125-inch thick aluminum install with concealed clips so panel is flush with face of adjacent mullion.

### 2.07 FABRICATION

- A. Any dimensions which may vary are indicated on drawings, with maximum and minimum dimensions required to achieve design requirements and coordination with other work. Field verify all opening dimensions.
- B. Fabrication: To greatest extent possible, complete fabrication assembly, and finishing at manufacturers plant before shipment to project site. Disassemble components only as necessary for shipment and installation.
  - 1. Maintain accurate relation of planes and angles, with hairline fit of contacting members.

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2. Select members for fabrication so that adjacent anodized extruded aluminum members do not have color or texture variation greater than half the range indicated in the submitted samples.
  3. Factory-install all hardware except surface-mounted items.
  4. Perform fabrication operations, including cutting, fitting, forming, drilling, and grinding of metal work, in manner which prevents damage to exposed finish surfaces.
    - a. For hardware, perform these operations prior to application of finishes.
- D. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- E. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance, and rigidity; separate dissimilar metals as specified under "Installation."

### **PART 3: EXECUTION**

#### **3.01 PREPARATION**

- A. Verify and coordinate installation tolerances.
- B. Verify that openings are properly prepared, with blocking installed and cavities sealed.

#### **3.02 INSTALLATION**

- A. Comply with manufacturer's instructions and recommendations for installation of components.
- B. Set units plumb, level, and true to line, without warp or rack. Provide proper support and anchor securely in place.
  1. Anchorage to allow for normal thermal movement specified building movement and specified wind loads.
- C. Separate aluminum exposed to weather from dissimilar metals; coat dissimilar metals that are in drainage cavities using one of the materials specified. Aluminum, stainless steel, zinc, cadmium, and small areas of white bronze are not considered dissimilar from each other.
- D. Coat all metals that come into contact with masonry, concrete, and treated wood, using one of the materials specified.
- E. Install surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements.
- F. Install joint sealers between framing and adjacent surfaces as indicated, to provide weathertight construction. Comply with requirements of Section 07 92 00 for installation of joint sealers.
- G. Install glass as specified in Section 08 80 00 and according to the framing manufacturer's printed instructions.
- H. Install aluminum panels and flashing as shown on Drawings.

#### **3.03 ADJUST AND CLEAN**

- A. Adjust operating hardware to function properly without binding, and to close doors tightly. Ensure that weatherstrip makes contact with door surfaces.

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- B. Clean completed systems inside and out, promptly after erection and after installation of glass and sealants, taking care to avoid damage to finishes. Remove excess sealants, dirt, and other substances from aluminum surfaces.
- C. Clean glass surfaces as specified elsewhere.

**END OF SECTION 08 40 00**

**SECTION 08 71 00**

**FINISH HARDWARE**

**PART 1: GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

**1.02 SUMMARY**

- A. This Section includes the furnishing of butt hinges and the furnishing and installing of all finish hardware material specified herein, listed in the hardware schedule, or required by the Drawings.
- B. Items of hardware include:
1. Finish hardware
  2. Aluminum door hardware, except weatherstripping.
  3. Thresholds and weatherstrip

**1.03 RELATED WORK SPECIFIED ELSEWHERE**

- A. B. Section 08 10 00 - Hollow Metal Doors and Frames.
- B. Section 08 14 00 - Wood Doors.
- C. Section 08 16 00 - FRP Flush Doors.
- D. G. Section 08 40 00 - Aluminum Curtainwall.
- E. Division 28 - Electromagnetic Holders.

**1.04 REFERENCES**

- A. Builders' Hardware Manufacturers Assoc., Inc. (BHMA), 60 E. 42nd St., New York, NY 10017.
1. Recommended locations for builders' hardware.
- B. American National Standards Institute, Inc. (ANSI), 1430 Broadway, New York, NY 10018.
1. A115.2 - Specifications for standard steel door and frame preparations for bored cylindrical locks for 1-3/8" and 1-3/4" doors.
- C. National Fire Protection Association, Inc. (NFPA), Battery March Park, Quincy, MA 02269.
1. NFPA 80 - Standard for fire doors and windows.
  2. NFPA 101 - Code for safety to life from fire in buildings and structures.
- D. Underwriters Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062.

1. Building Materials Directory.
- E. Builders' Hardware Manufacturers Assoc., Inc. (BHMA), 60 E. 42nd Street, New York, NY 10017.
  1. Recommended locations for builders' hardware.
- F. Building Codes: International Building Code, Adopted Edition.
  1. Include State amendments modifying model codes in jurisdiction where project is constructed.

#### **1.05 QUALITY ASSURANCE**

- A. Except where specified in the hardware schedule, furnish products of only one manufacturer for each type of hardware.
- B. Supplier: Company specializing in the builders' hardware industry.
- C. Provide hardware for fire-rated openings conforming to UBC Standard 7-2.
- D. Provide hardware for fire-rated openings conforming in compliance with NFPA 80 1995 Edition.

#### **1.06 REGULATORY REQUIREMENTS**

- A. Furnish hardware listed by UL testing agency for all rated openings in conformance with requirements for the class of opening scheduled.
- B. Rating requirements have precedence over this specification where conflict exists.
- C. Furnish and install hardware that is in compliance with American with Disabilities Act of 1990 (ADA) technical standards, and current State Building Code.

#### **1.07 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.
  1. Schedules
    - a. Immediately after award of the hardware contract, submit a detailed, vertical type hardware schedule and cut sheets for each type of hardware for approval. On existing buildings field verify existing swings and functions prior to submitting schedule.
    - b. Itemize hardware in the sequence and format established by this specification.
      1. List and describe each opening separately; include door number, room designations, degree of swing, and hand.
      2. List related details; include dimensions, door and frame material, and other conditions affecting hardware.
      3. List all hardware items; include manufacturer's name, quantity, product name, catalog number, size, finish, attachments, and related details where applicable.
    - c. Submit manufactures cut sheets on each type of hardware proposed.
    - d. Resubmit the corrected schedule when required.



- e. Determine keying requirements by meeting with the Owner coordinated through the Architect, and submit a detailed keying schedule for review; resubmit the corrected schedule when required.
3. Samples: Submit samples of hardware items as may be required by the Architect; identify each sample and indicate the location of subsequent installation in the project.
4. Templates: Furnish a copy of the approved hardware schedule and all pertinent templates or template information to each fabricator of material factory-prepared for the installation of hardware.
5. Include documentation for UL 10C or other approved testing agency stating hardware has passed UBC Standard 7-2.

### 1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver hardware to the job site in the manufacturer's original containers that have been marked to correspond with the approved hardware schedule for installation location.
- B. Store hardware in dry surroundings and protect against loss and damage.

## PART 2: PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS/MATERIALS

#### A. Hinges

1. Butt hinge manufacturers and respective catalog numbers:

	<u>IVES</u>	<u>Hager</u>	<u>Stanley</u>	<u>McKinney</u>	<u>Bommer</u>
a.	5PB1	1279	F179	T2714	5000
b.	5BB1	BB1279	FBB179	TB2714	BB5000
c.	5BB1 630	BB1191	FBB191	TB2314	BB5002
d.	5BB1HW	BB1168	FBB168	T4B3786	BB5004
e.	5BB1HW630	BB1199	FBB199	T4B3386	BB5006

2. Continuous hinges manufacturers and respective catalog numbers:

#### Select

#### SL11HD Series

- a. Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 pounds. Edge mount (unless noted otherwise).
- b. Hinges shall be constructed of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of .25 and the exterior barrel diameter of .438.
- c. Hinge shall be non-handed with symmetrical templated hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.
- d. Each knuckle to be 2", including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.
- e. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to three hours. Note: Fire label for doors and frames should be placed on the header and top rail of rated doors and frames.

- f. Provide adjusting screws equal to Markar's "AdjustaScrew" for continuous hinges specified as HG-305. Adjustment to be able to correct frame fit problems up to 3/8".

3. When hinges are specified on the hardware schedule, furnish:

- a. Interior openings through 36 inches wide and 60 inches high without a door closer: Two (2) standard-weight, plain bearing hinges #1279 per leaf.
- b. Interior openings through 36 inches wide and 90 inches high without a door closer: Three (3) standard-weight, plain bearing hinges #1279 per leaf.
- c. Interior openings through 36 inches wide and 60 inches high with a door closer: Two (2) standard-weight, ball bearing hinges #BB1279 per leaf.
- d. Interior openings through 36 inches wide and 90 inches high with a door closer: Three (3) standard-weight, ball bearing hinges #BB1279 per leaf.
- e. Interior openings over 36 inches in width and/or 90 inches in height: One (1) continuous hinge per leaf.
- f. Exterior hollow metal or stainless steel openings: One (1) continuous hinge per leaf.
- g. Exterior aluminum openings through 36 inch wide and 90 inches high: Four (4) heavyweight ball bearing hinges #BB1199xNRP per leaf.
- h. Exterior aluminum openings over 36 inches wide in width and/or 90 inches in height: One (1) continuous hinge per leaf.

B. Exit Devices

1. Manufacturers and respective catalog numbers:

<u>Von Duprin</u>	<u>Precision Hardware</u>
99	APEX 2000 Series

- 2. Furnish exit device series and functions specified in the hardware schedule.
- 3. Furnish sex bolt attachments for devices specified for mineral core door application.
- 4. Furnish reinforced cross bars for door over 40" wide.
- 5. Furnish rod and latch guards on all surface mounted vertical rod exit device, on bottom rods.
- 6. Vandal Resistant Lever Design: Von Duprin 996L; Precision Hardware V4900. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.
- 7. Removable mullion: KR4954/KR1654. Provide with cylinder to match building system.
- 8. Provide cylinder dogging on all non-rated devices. Provide cylinder to match building system.

D. Locks

1. Manufacturers and respective catalog numbers:

<u>Schlage</u>	<u>Sargent</u>	<u>Best</u>
L9000 03A	18-8200 LNJ	45H 3H

2. Furnish lock types and functions specified in the hardware schedule, with the following provisions:
  - a. Strikes:
    - 1) Wrought box type for the inactive leaf of pairs of wood doors, or wood frames.
    - 2) Lip length sufficient to protect trim, frame or inactive leaf.
  3. Furnish knurled lock knobs or lever handles on doors to stairs other than exit stairs, loading platforms, stages, boiler rooms, and other hazardous locations.
  4. Lever handles must be cast brass, bronze or stainless steel construction and conform to ASNI A117.1.

E. Cylinders: Schlage

F. Pulls, Push Plates/Bars, Flush cup pulls

1. Manufacturers and respective catalog numbers:

	<u>Hem</u>	<u>Hagar</u>	<u>Hiawatha</u>	<u>Burns</u>	<u>Rockwood</u>
a. Pull		10Q 18"	518B-18"	26C-18"	118
b. Push Plate (flush doors		30s 8x16	200K	57	70F
c. Push Plate (6" stile doors)		30s 4x16	200F	54	70C
d. Pushbar		130s	1081LBP	422	47
e. Flush Cup Pulls		27p	-	-	BF97

G. Closers

1. Manufacturers and respective catalog numbers:

<u>LCN</u>	<u>Sargent</u>
4011/4111 EDA	281/281P10

2. Where closers are listed in the hardware schedule, furnish 4011/4111 EDA, 281/281P10 series unless other functions/series are specified in the hardware groups.
3. Furnish complete with all mounting brackets, drop plates and special shoes as may be required by the door and frame conditions.
4. Furnish through bolt attachments for closers specified for mineral core doors, unless solid wood blocking is provided for attachment.
5. Determine closer size in accordance with manufacturer's recommendations for application on the room side of corridor doors, stair side of stair doors, and interior side of exterior doors.
6. Provide SRI rust inhibitor primer for all closers in pools and corrosive areas.

H. Kick Plates: Where kick plates are specified in the hardware schedule, furnish 16 gauge, .050" plates, with the following dimensions:

1. Width: 2" less than door width.
2. Height: 8" (unless noted different on door schedule.)

I. Overhead Stops

1. Manufacturers and respective catalog numbers:

	<u>Glynn-Johnson</u>	<u>Rixson-Firemark</u>
a.	GJ450	10
b.	GJ90	9
c.	GJ100	1

- Furnish a GJ90 series overhead stop for all doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall and for all doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate.
- Furnish a GJ90 or GJ100 series overhead holder where listed in the Hardware Schedule.
- Furnish sex bolt attachments for mineral core door applications, unless solid wood blocking is provided in the door for attachment.

J. Floor and Wall Stops and Holders

1. Manufacturers and respective catalog numbers:

	<u>Ives</u>	<u>Hager</u>	<u>Burns</u>
a. Wall bumper	WS407CVX	232W	570
b. Wall stop	WS11X	255W	530
c. Holder	WS20X	254W	
d. Floor stop	FS435/FS436	241F/246B	510/525
e. Wall holder	WS40	326W	533
f. Exterior Floor Stop	FS9		

- Furnish a WS407CVX series wall stop, as applicable, for each door leaf except where wall bumper WS11X, floor stops FS435/FS436, holders WS20X, wall holder WS40 or overhead stops/holders are specified in the hardware schedule.
- Where wall stops are not applicable, furnish overhead stops as previously specified within this section of the specification.

K. Thresholds, Weatherstrips and Jamb Gaskets

1. Manufacturers and respective catalog numbers:

	<u>Reese</u>	<u>Pemko</u>	<u>National Guard</u>
a. Saddle threshold	S205A	171A	425E
b. Half saddle threshold	S245A	229A	325 Alum
c. Bumper seal threshold	S483AV	2005AV	896 Alum (Vinyl)
d. Weatherstrip	755A	2891APK	700NA
e. Astragal weatherstrip	804	Pair 309	185
f. Sweep	964C	18061CP	B606A
g. Head and Jamb Gasket	797	S88	5050
h. Drip	R201	346	16

- Where specified in the hardware groups, furnish the above products unless otherwise details in groups.
- Furnish 5050 head/jamb gaskets and NGP 9605 edge stile astragals for pairs, at all fire labeled doors whether listed in group or not. \*Reese and Pemko equivalents approved based on passing UL 10C, UBC test Standard 7-2.

4. Coordinate with door manufacturer the intumescent fire and smoke material for fire rated openings as required by door and frame manufacturer to comply with UL 10C, UBC test 7-2.
5. When "threshold" appears within a hardware group provide the following:
  - a. At aluminum entrances on new buildings provide a half saddle threshold.
  - b. At aluminum entrances on existing buildings provide a saddle threshold.
  - c. At interior door ways provide a saddle threshold.
  - d. At exterior doorways from occupied rooms and HM or FRP exit only doors provide a bumper seal threshold.
  - e. At exterior HM or FRP doors to receiving areas, loading docks and boiler rooms provide a saddle threshold.

L. Lock Protectors

1. Manufacturers and respective catalog numbers.

Ives  
LG1-LG14

M. Accessibility Closers

1. Manufacturer: LCN is specified.
  - a. When the term "accessibility closers" appears on the hardware schedule, provide a complete system, including all necessary brackets, mounting plates, and the following items:
    - 1) Closer: Auto Equalizer #4600
    - 2) "Wireless" Receiver #8310-865
    - 3) Actuators: Surface Mount Kit #8310-3856WS. Provide two (2) per door leaf.

Q. Electric Strikes

1. When the term "electric strike" appears on the hardware schedule, provide a complete system including all necessary parts and the following items:
  - a. Von Duprin series #6000, Fail Secure (FS), 24 VDC (verify voltage with Architect before ordering).
  - b. Provide PS 861 BK battery backup with key lock power supply. Standard input 120 VAC at 0.6 amps.
  - c. Provide and install wiring from electric strike to power supply.

**2.04 ACCESSORIES AND ATTACHMENTS**

- A. Furnish all necessary hardware accessories such as wood or machine screws, bolts, nuts, anchors, toggle bolts, and other fasteners, each of the type, size, material and finish for its intended purpose and each according to the material to which the hardware is being applied.

## 2.05 FINISH AND BASE METALS

### A. Finish and Base Metal:

Butt Hinges- Exterior	US32D on stainless steel
Butt Hinges-Interior	US26D on steel
Flush Bolts	US26D on brass or bronze
Exit Devices	US26D on brass or bronze
Locks	US26D on brass or bronze
Pulls And Push Plates/Bars	US32S on stainless steel
Coordinators	USP on steel
Closers	Sprayed AL on cast iron or aluminum
Protective Plates	US32D on stainless Steel
Overhead Stops	US26D on brass, bronze, or steel
Wall Stops	US26D on brass, bronze, or steel
Magnetic Holder	Sprayed SA on cyclocac
Thresholds	Mill aluminum
Weatherships and Sweep Strips	Clear anodized aluminum
Key Cabinets	Gray enamel on steel
Miscellaneous	US26D on brass or bronze

## 2.06 KEYING

- A. Change key and masterkey all lock cylinders as directed by the Architect.
- B. Furnish two change keys for each lock, six masterkeys for each masterkey set, and two removable core control keys.
- C. Stamp keys with file key number and "Do Not Copy."
- D. Ship masterkeys and control keys to the Owner via registered mail.

## PART 3: EXECUTION

### 3.01 INSTALLATION

- A. Install hardware in accordance with manufacturer's recommendations / instructions, and the adopted Building Code.
- B. Install hardware on UL labeled openings in accordance with manufacturer's requirements, so as to maintain the label.
- C. Install hardware mountable weatherstripping continuous throughout opening prior to installation of other hardware.
- D. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.
- E. Remove, cover or protect hardware after fitting until paint or other finish is applied; permanently install hardware after finishing operations are complete.
- F. Install closers on the room side of corridor doors, stair side of stairways, and interior side of exterior doors.
- G. Mounting heights:
  - 1. Install hardware at mounting heights conforming to the recommended mounting locations of the Builders' Hardware Manufacturing Association, and the adopted Building Code.

2. Install wall stops WS11X, wall holders WS20X, and magnetic holders to strike near top of doors, but not more than 78" from the finished floor line; install wall stops WS407CVX to engage knobs, levers or pulls.
- H. Install pulls at 40" to top of pull and push bars at 36" above finished floor. Off set pull on exterior door rails to allow access to cylinders.
  - I. Deliver to the Owner one complete set of installation and adjustment instructions, and tools as furnished with the hardware.
  - J. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar to be conducted on the rough-in of electrical boxes for hardware and the installation of hardware, specifically of locksets, closers/accessibility closers, exit devices, hardware, mountable weatherstrip and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical product samples. The architect needs to be informed of the meeting and contractor is to distribute meeting minutes on issues raised at seminar.
  - K. Install per door and/or frame manufacturer's supplemental "S" label instructions on fire rated openings.

### 3.02 ADJUSTING AND CLEANING

- A. At final completion, adjust and test all hardware for function, performance, building code compliance and leave in good operating condition. Panic Hardware device manufacturer's representative to inspect panic hardware installation and provide a report to contractor and architect on items that need correction.
- B. Clean all hardware to restore the original finish.

### 3.03 PROTECTION

- A. Protect the finished installation until acceptance of the project.
- B. Provide final adjustment or cleaning where necessary.

### 3.04 DEMONSTRATION

- A. Engage a factory-authorized service representative(s) to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. At a minimum, provide the following training:

1. Miscellaneous hardware	1 hour
2. Exit devices	2 hours
3. Locks	1 hour
4. Closers	1 hour
5. Electromagnetic locks	2 hours
6. Accessibility closers	2 hours

Refer to Section 01 79 00 Demonstration and Training.

### 3.05 HARDWARE SETS

#### HW SET: 01

1	EA	CONTINUOUS HINGE	SL11HD	628	SEL
1	EA	PANIC HARDWARE	CD98NL-OP	626	VON
2	EA	CYLINDER		626	BES
1	EA	ELECTRIC STRIKE	6111 FSE 24VDC	630	VON
1	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)	AL	SPE
1	EA	ACCESSIBILITY CLOSER	4642	689	LCN
1	SET	WEATHER SEAL	BY FRAME SUPPLIER	AL	B/O
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION	AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE
1	EA	CARD READER	BY SECURITY CONTRACTOR		B/O
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O

OPERATION: WHEN THE EXIT DEVICE IS DOGGED DOWN, THE SWITCHES LOCATED ON EACH SIDE OF THE DOOR WILL ACTIVATE THE ACCESSIBILITY CLOSER. WHEN THE DOOR IS LOCKED, THE CARD READER WILL RELEASE THE ELECTRIC STRIKE FOR ENTRY. KEY OVERRIDE ON EXTERIOR SIDE

#### HW SET: 02

1	EA	CONTINUOUS HINGE	SL11HD	628	SEL
1	EA	PANIC HARDWARE	CD98EO	626	VON
1	EA	CYLINDER		626	BES
1	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)	AL	SPE
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	OVERHEAD STOP	900S	630	GLY
1	SET	WEATHER SEAL	BY FRAME SUPPLIER	AL	B/O
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION	AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE

#### HW SET: 03

1	EA	CONTINUOUS HINGE	SL11HD	628	SEL
1	EA	PANIC HARDWARE	CD98NL-OP	626	VON
2	EA	CYLINDER		626	BES
1	EA	ELECTRIC STRIKE	6111 FSE 24VDC	630	VON
1	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)	AL	SPE
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	SET	WEATHER SEAL	BY FRAME SUPPLIER	AL	B/O
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION	AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE
1	EA	CARD READER	BY SECURITY CONTRACTOR		B/O
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O



HW SET: 04

1	EA	CONTINUOUS HINGE	SL11HD	628	SEL
1	EA	PANIC HARDWARE	CD98NL-OP	626	VON
2	EA	CYLINDER		626	BES
1	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)	AL	SPE
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	OVERHEAD STOP	900S	630	GLY
1	SET	WEATHER SEAL	BY FRAME SUPPLIER	AL	B/O
1	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION	AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE

HW SET: 06

1	EA	CONTINUOUS HINGE	SL11HD	628	SEL
1	EA	STOREROOM LOCK	L9080BD	626	SCH
1	EA	ELECTRIC STRIKE	6111 FSE 24VDC	630	VON
1	EA	CYLINDER CORE		626	BES
1	EA	SURFACE CLOSER	4011 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B4E	630	IVE
1	EA	WALL STOP	WS33	626	IVE
1	EA	DOOR SWEEP	C627A	AL	NGP
1	SET	SEALS	2525B	BRN	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM		SCE
1	EA	CARD READER	BY SECURITY CONTRACTOR		B/O
1	EA	POWER SUPPLY	BY SECURITY CONTRACTOR		B/O

HW SET: 07

3	EA	HINGE AS REQUIRED			
1	EA	CLASSROOM LOCK	L9070	626	SCH
1	EA	SURFACE CLOSER	4111	689	LCN
1	EA	KICKPLATE		630	IVE
1	SET	SEALS	2525B	BRN	NGP

HW SET: 08

3	EA	HINGE AS REQUIRED			
1	EA	PANIC HARDWARE	98NL	626	VON
1	EA	CYLINDER		626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICKPLATE		630	IVE
1	EA	WALL STOP			

HW SET: 09

2	EA	CONTINUOUS HINGE	SL11HD.	628	SEL
1	EA	PANIC HARDWARE	CD98NL-OP	626	VON
1	EA	PANIC HARDWARE	CD98EO	626	VON
4	EA	CYLINDER		626	BES
1	EA	KEYED REMOVEABLE MULLION			
2	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)	AL	SPE
2	EA	SURFACE CLOSER	4111 EDA	689	LCN
2	EA	OVERHEAD STOP	900S	630	GLY
1	SET	WEATHER SEAL	BY FRAME SUPPLIER	AL	B/O
2	EA	DOOR SWEEP	C627A	AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION	AL	NGP
2	EA	DOOR POSITION SWITCH	679-05 HM		SCE

HW SET: 10

3	EA	HINGE AS REQUIRED			
1	EA	PANIC HARDWARE	98DT	626	VON
1	EA	CYLINDER		626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICKPLATE		630	IVE
1	EA	WALL STOP			

HW SET: 11

6	EA	HINGE AS REQUIRED			
1	EA	MORTISE DEADBOLT	L462	626	SCH
2	EA	CYLINDER		626	BES
2	EA	SURFACE CLOSER	4111	689	LCN
1	EA	MANUAL FLUSH BOLT			
1	EA	DUSTPROOF STRIKE			
1	EA	DOOR PULL	8102-8		
1	EA	PUSH	8200 4X16		
1	EA	KICKPLATE		630	IVE

HW SET: 12

3	EA	HINGE AS REQUIRED			
1	EA	CLASSROOM LOCK	L9070	626	SCH
1	EA	KICKPLATE		630	IVE

HW SET: 13

2	EA	CONTINUOUS HINGE	SL11HD		628	SEL
1	EA	PANIC HARDWARE	CD98NL-OP		626	VON
2	EA	CYLINDER			626	BES
1	EA	MANUAL FLUSH BOLT		1		
1	EA	DUSTPROOF STRIKE				
2	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)		AL	SPE
1	EA	KEYED REMOVEABLE MULLION				
2	EA	SURFACE CLOSER	4111 EDA WITH HOLD		689	LCN
1	SET	WEATHER SEAL	BY FRAME SUPPLIER		AL	B/O
1	EA	DOOR SWEEP	C627A		AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION		AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM			SCE

HW SET: 14

2	EA	CONTINUOUS HINGE	SL11HD		628	SEL
1	EA	STOREROOM LOCK	L9080		626	VON
1	EA	MANUAL FLUSH BOLT		1		
1	EA	DUSTPROOF STRIKE				
2	EA	FLUSH PULL	SL-82 (BY DOOR SUPPLIER)		AL	SPE
1	EA	KEYED REMOVEABLE MULLION				
2	EA	SURFACE CLOSER	4111 EDA WITH HOLD		689	LCN
1	SET	WEATHER SEAL	BY FRAME SUPPLIER		AL	B/O
1	EA	DOOR SWEEP	C627A		AL	NGP
1	EA	THRESHOLD	PER SPECIFICATION		AL	NGP
1	EA	DOOR POSITION SWITCH	679-05 HM			SCE

END OF SECTION 08 71 00

## SECTION 08 80 00

### GLAZING

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

A. Section includes:

1. Interior Glazing
  - a. Safety glass in locations identified in Part 3.
  - b. Clear glass in HM doors and frames.
  - c. Clear glass in wood doors.
  - d. Safety glass in existing sliding tracks (Display Case).
2. Exterior Insulated Glazing
  - a. Safety glass in locations identified in Part 3.
  - b. Clear glass in FRP doors.
  - c. Clear glass in storefront.
3. Safety Glass (1/2" thickness) and Glass Fittings for guardrails

B. Related work specified in other sections:

1. Steel doors and frames - Section 08 10 00.
2. Wood doors - Section 08 14 00.
3. FRP doors - Section 08 16 00.
4. Aluminum Entrances, Storefronts and Curtainwalls - Section 08 40 00.

##### 1.03 QUALITY ASSURANCE

- A. Reference Specification: Glazing Manual by Flat Glass Marketing Association.
- B. Materials: Conform in all respects to the "Safety Standard for Architectural Glazing Materials" (16CFR 1201) issued by the Consumer Product Safety Commission and Chapter 24 of the Uniform Building Code.
- C. Insulating glass units to be CBA rated with the Insulating Glass Certification Council (IGCC) in accordance with ASTM Specifications E-773 and E-774.

##### 1.04 SUBMITTALS

- A. Submit per Section 01 33 00.
1. Manufacturer's recommended installation instructions.
  2. Samples for each type glass specified.

## 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Package, handle, deliver and store at the job site in a manner that will avoid damage. Reject scratched glass.

## 1.07 WARRANTY

- A. **Manufacturer's Special Warranty for Coated-Glass Products:** Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

- 1. Warranty Period: 10 years from date of Substantial Completion.

- B. **Manufacturer's Special Warranty on Insulating Glass:** Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

- 1. Warranty Period: 10 years from date of Substantial Completion.

- C. Submit per Section 01 78 23.

## PART 2: PRODUCTS

### 2.01 MANUFACTURERS/FABRICATORS

- A. **Glass Manufacturers and/or Coating Manufacturers:** PPG Industries, [www.ppgglazing.com](http://www.ppgglazing.com); Guardian Industries, [www.sunguardglass.com](http://www.sunguardglass.com); AGC Flat Glass North America, [www.afglass.com](http://www.afglass.com); Pilkington North America, Inc., [www.pilkington.com](http://www.pilkington.com); Visteon Corporation, [www.visteon.com](http://www.visteon.com); Viracon, [www.viracon.com](http://www.viracon.com).
- B. **Safety Glass Manufacturers:** SAFTI First, [www.safli.com](http://www.safli.com). Comparable products as manufactured by Technical Glass Products, [www.fireglass.com](http://www.fireglass.com) are acceptable.
- C. **Interlayer Manufacturers:** Solutia/Saflex, [www.saflex.com](http://www.saflex.com) or equal.
- D. **Glass Product Fabricators:** As certified by glass manufacturers and/or coating manufacturers.

### 2.02 INTERIOR GLAZING

- A. Clear:

- 1. Clear Float Glass, 1/4" thick.

- B. Safety:

- 1. Clear heat-tempered float glass, 1/4" thick.

- A. Fire Rated:

- 1. Square pattern clear wire glass, 1/4" thick, conforming to CPSC 16 CFR 1201, CAT II as manufactured by SAFTI First (SuperLite I-W) or equal and tested by UL or Intertek Warnock/Hersey. Equivalent products by Technical Glass Products (FireLite, NT, Premium Grade) are acceptable.

## 2.03 EXTERIOR GLAZING

- A. Low-E glass to be solar control (MSVD coating process).
- B. For fire rated glazing, substitute appropriate lites with Fire Rated Glazing as specified under interior glazing.
- C. For locations requiring safety glazing, provide heat-tempered glass for inboard and outboard lites, unless laminated glazing is called out on drawings or specified.
- D. Clear Insulated Glass:
  - 1. 1" overall thickness insulated glass.
    - a. Exterior glass ply: 1/4" clear.
    - b. Coating: Solarscreen Low-E on Surface #2.
    - c. Airspace: 1/2" argon filled with [mill, black painted, stainless steel] finish.
    - d. Silicone: [Gray, Black]
    - e. Interior glass ply: 1/4" clear.
  - 2. Performance Requirements:
    - a. Transmittance
      - 1) Visible Light 70%
      - 2) Solar Energy 31%
      - 3) Ultra-Violet 10%
    - b. Reflectance
      - 1) Visible Light Exterior 11%
      - 2) Visible Light Interior 12%
      - 3) Solar Energy 31%
    - c. ASHRAE U-Value
      - 1) Summer Daytime 0.21 Btu
      - 2) Winter Nighttime 0.25 Btu
    - d. Shading Coefficient 0.43
    - e. Relative Heat Gain 89 Btu/hr x Sq.Ft.
    - f. Solar Factor (SHGC) 0.37
    - g. LSG 1.9
  - 3. For units requiring "Safety Glazing" per Part 3 of Specification, provide "safety" glass plys. Specified under interior glazing.

## 2.04 GLASS PANELS FOR GUARDRAIL PANELS

- A. Glass Panels: 1/2" fully tempered ASTM C 1048 Kind FT Quality q3.
  - 1. Edge Finishing: Fabricate glazing finished edges to produce smooth edges without chips or scratches, polished, and warp-free.

## 2.05 ACCESSORIES

- A. Glass Fittings for guardrail glass:
  - 1. Manufacturer: C.R. Laurence Co., CRL Fixed Double Arm Glass Fitting, #RB50FBS
    - a. Provide 1/16" thick neoprene gasket material between existing aluminum guardrail posts and glass fittings.
- B. Glazing Sealant: Two-part silicone similar to Dow Corning 982 Insulating Glass Sealant. Glazer is responsible to verify compatibility to primary seal material.
- C. Setting Blocks: 70-90 Shore "A" durometer, sized to accommodate size of glass used, compatible with glazing sealant.
- D. Spacers: Warm edge space, compatible with sealant used.
- E. Primer - Sealers, Cleaners: As recommended by glass manufacturer.

## PART 3: EXECUTION

### 3.01 INSPECTION

- A. Check that glazing channels are free of burrs, irregularities, and debris.
- B. Check that glass is free of edge damage or face imperfections.
- C. Do not proceed with installation until conditions are satisfactory.

### 3.02 PREPARATION

- A. Field Measurements:
  - 1. Measure size of frame to receive glass.
  - 2. Compute actual glass size, allowing for edge clearances.
- B. Preparation of Surfaces:
  - 1. Remove protective coatings from surfaces to be glazed.
  - 2. Clean glass and glazing surfaces, to remove dust, oil and contaminants. Wipe dry.

### 3.03 SAFETY GLAZING

- A. Install safety glazing at the following locations and/or as required by local building codes.
  - 1. Doors and adjacent glazing.
    - a. In doors when glass is wider than 2 15/16".
    - b. Glass within 24" of vertical door edges and to a point 60" above the floor.
  - 2. Individual fixed or operable panels when all of the following conditions are met:
    - a. Individual panes 9 square feet and greater.
    - b. Glass within 18" of the floor.
    - c. When exposed individual pane is greater than 36" above the floor, except when a horizontal mullion is detailed between 34" and 38" above the floor.
    - d. Walking surfaces within 36 inches horizontally of the pane of glazing.

3. Athletic facilities.

- a. Glazing in gymnasiums, swimming pools, multi-purpose athletic rooms.
- b. Wall mirrors in multi-purpose athletic rooms.

**3.04 INSTALLATION**

- A. Install glass in accordance with glass manufacturer's current printed instructions.
- B. Install sliding glass doors in accordance with manufacturer's instructions and as shown on Drawings.

**3.05 CLEANING**

- A. Remove excess glazing compound from installed glass.
- B. Remove labels from glass surface as soon as installed.
- C. Wash and polish both faces of glass.
- D. Remove debris from work site.

**3.06 PROTECTION OF COMPLETED WORK**

- A. Attach crossed streamers away from glass face.
- B. Do not apply markers to glass surface.
- C. Replace damaged glass.

**END OF SECTION 08 80 00**