

**SECTION 08 1113  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire-rated hollow metal doors and frames.

**1.02 ABBREVIATIONS AND ACRONYMS**

- A. ANSI: American National Standards Institute.
- B. NFPA: National Fire Protection Association.
- C. UL: Underwriters Laboratories.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames 2019.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021.
- G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- J. ITS (DIR) - Directory of Listed Products current edition.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.
- O. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- P. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2013.
- Q. UL (DIR) - Online Certifications Directory Current Edition.
- R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Samples: Submit two samples of metal, 2 by 2 inches (51 by 51 mm) in size, showing factory finishes, colors, and surface texture.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company;: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Curries, an Assa Abloy Group company; : [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 3. Steelcraft, an Allegion brand; : [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

#### 2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
  - 7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Door Finish: Factory primed and field finished.
- B. Stair Tower Doors , Fire-Rated Doors:
  - 1. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  - 2. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  - 3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.

### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Door Frames, Fire-Rated: Full profile/continuously welded type.
  - 1. Fire Rating: Same as door, labeled.
  - 2. Terminated Stops: Provide at interior doors; closed end stop terminated 6 inch (150 mm), maximum, above floor at 45 degree angle.
  - 3. Frame Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.

### **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.
  - 1. Color: As selected by Architect from manufacturer's standard range.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door hardware as specified in Section 08 7100.
- E. Touch up damaged factory finishes.

**3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

**3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**3.06 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

**SECTION 08 1416  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush configuration; fire-rated, non-rated, and acoustical.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 2000 - Finish Carpentry: Wood door frames.
- B. Section 08 1213 - Hollow Metal Frames.
- C. Section 09 9123 - Interior Painting: Field finishing of doors.
- D. Section 09 9300 - Staining and Transparent Finishing: Field finishing of doors.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 4.0 2021.
- C. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Samples: Submit two samples of door veneer, 12 by 12 inches ( [ ] by [ ] mm) in size illustrating wood grain, stain color, and sheen.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- F. Test Reports: Show compliance with specified requirements for the following:
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.
- H. Warranty, executed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more

than one week, and break seal on site to permit ventilation.

### **1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  - 1. VT Industries, Inc; : [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 DOORS AND PANELS**

- A. Doors: See drawings for locations and additional requirements.
  - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location, Apartment Entry.
  - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

### **2.03 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

### **2.04 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

### **2.05 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.

## **2.06 FINISHES - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

#### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

#### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

#### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

#### **3.05 SCHEDULE**

- A. See Door and Frame Schedule appended to this section.

**END OF SECTION**

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**SECTION 08 4313  
ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Door hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 8000 - Glazing: Glass and glazing accessories.

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- E. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- H. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- J. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.
- K. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2020.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 12 X 12 inches (\_\_\_\_x\_\_\_\_mm) in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

### **1.08 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of Design: EFCO Corp., Series 526 (T) - Thermal Storefront Framing.
- B. Other Acceptable - Aluminum-Framed Storefronts Manufacturers:
  - 1. Kawneer North America; : [www.kawneer.com/#sle](http://www.kawneer.com/#sle).
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING**

- A. Center-Set Style, Thermally Broken, Wind-Borne-Debris Resistance Tested:

1. Basis of Design: EFCO Corp., Series 526 (T) - Thermal Storefront Framing.
2. Vertical Mullion Dimensions: 2-1/2 inches wide by 5 inches deep (63 mm wide by 127 mm deep).

### **2.03 BASIS OF DESIGN -- SWINGING DOORS**

#### **A. Entrance Doors, Various Stile Widths:**

1. Basis of Design: EFCO Corp., D300 - Medium Stile Door.
2. Thickness: 1-3/4 inches (43 mm).

#### **B. Substitutions: See Section 01 6000 - Product Requirements.**

1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

### **2.04 ALUMINUM-FRAMED STOREFRONT**

#### **A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.**

1. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
2. Finish: Superior performing organic coatings.
  - a. Factory finish all surfaces that will be exposed in completed assemblies.
  - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
3. Finish Color: As selected by Architect from manufacturer's standard line.
4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

#### **B. Performance Requirements**

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
  - a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency in accordance with ASTM E1996 for Wind Zone 3 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
3. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.

## 2.05 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
  - 1. Framing members for interior applications need not be thermally broken.
  - 2. Glazing Stops: Flush.
- B. Glazing: See Section 08 8000.
- C. Swing Doors: Glazed aluminum.
  - 1. Thickness: 1-3/4 inches (43 mm).
  - 2. Finish: Same as storefront.

## 2.06 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- D. Glazing Accessories: See Section 08 8000.

## 2.07 FINISHES

- A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
  - 1. Manufacturers:
    - a. PPG Metal Coatings; Duranar: [www.ppgmetalcoatings.com/#sle](http://www.ppgmetalcoatings.com/#sle).
- B. Color: As selected by Architect from manufacturer's standard range.
- C. Touch-Up Materials: As recommended by coating manufacturer for field application.

## 2.08 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.
- E. Hinges: Butt type, swing clear; top and bottom.
- F. Push/Pull Set: Standard configuration push/pull handles.
- G. Door Closers: Concealed overhead.
- H. Locks: Dead latch with thumbturn inside ; keyed cylinder outside.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.

- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
- B. Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- C. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
  - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
  - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
  - 3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf (200 Pa).
    - a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce (14 gram) that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
- D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

**3.05 ADJUSTING**

- A. Adjust operating hardware and sash for smooth operation.

**3.06 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

**3.07 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

**SECTION 08 8000  
DOOR HARDWARE**

Part 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes but not limited to the following:

1. Mechanical and/or electrical hardware.
2. Cylinder for hardware specified in other sections.

- B. Related Requirements

1. Division 01 Section "Closeout Procedures"
2. Division 06 Section "Rough Carpentry".
3. Division 06 Section "Finish Carpentry".
4. Division 08 Section "Hollow Metal Doors and Frames".
5. Division 08 Section "Fiberglass Doors".

- C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 101 - Life Safety Code.
5. State Building Codes, Local Amendments.

1.3 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

1.4 COORDINATION AND MEETINGS

- A. Location: Conduct conferences on project site or other location as directed by the Architect/Owner.
- B. Preinstallation Conference

1. Purpose of the Preinstallation conference is to:
  - a. Coordinate between trades, so all understand their responsibilities.
  - b. To instruct the installing contractors' personnel on the proper installation and adjustment of their respective products.
    1. Hardware supplier is responsible for bringing the installation instructions to the meeting.
  - c. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - d. Review sequence of operation narratives for each unique access-controlled opening.
  - e. Review the requirements for local and state building codes and how they apply to doors, frames, and hardware.
    1. Opening forces to follow DOJ's "2010 ADA Standards for accessible design".
  - f. Review any special applications.
2. Conference participants shall include but not limited to:
  - a. General Contractor.
  - b. Installer for doors, frames, and hardware.
  - c. Supplier Representative.
  - d. Owner and/or Owners Representative.
  - e. Construction Manager (if applicable).
  - f. Engineer and/or Engineers Consultant.

## 1.5 SUBMITTALS

- A. Submittal Sequence to follow in this order and each are to be submitted under separate cover:
  1. Door Hardware Schedule.
  2. Hardware Product Data.
  3. Samples.
  4. Keying Schedule (Only after the keying meeting has taken place).
  5. Closeout Submittals.
  6. Submit door hardware schedule concurrent with submissions of Product Data, Samples, Riser Diagrams.
- B. Information Submittals:
  1. Qualification Data: Submit qualification data for the Installer and Supplier as defined under Quality Assurance of the Section.
  2. Product Certifications:
    - a. Certify that door hardware for use on each type and size of labeled fire-rated doors complies with listed fire-rated door assemblies.
- C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  1. Format: Use same scheduling sequence and use same door numbers as in the Contract Documents.



2. Content: Include the following information:
  - a. Index of openings showing hardware set assignments.
  - b. Identification number, location, hand, fire rating, size, degree of opening, and material of each door and frame.
  - c. Locations of each door hardware set, cross-referenced to floor plans, and to door and frame schedule.
  - d. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
  - e. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
  - f. Fastenings and other installation information.
  - g. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
  - h. Mounting locations for door hardware.
  - i. Complete list of related door devices specified or supplied in other Sections for each door and frame.
  
- D. Door Hardware Product Data: Prepared by or under the supervision of supplier.
  1. Provide an index of products used grouped by manufacturer.
  2. Each product shall be highlighted or marked accordingly.
    - a. Do not include pages or products that are not applicable to the project. If they appear on the same page as a product being used, they shall be crossed out.
  
- E. Samples:
  1. Provide a finish sample for each exposed product in each finish specified, in manufacturer's standard size.
  2. Tag Samples with full product description to coordinate samples with the door hardware schedule.
  
- F. Keying Schedule: Only after a keying meeting with the owner has taken place, prepare a keying schedule detailing final instruction. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions.
  1. The owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
  
- G. Closeout Submittals:
  1. After final approval is received from the architect, submit a Record Copy of the Door and Hardware Schedule with all the content as previously required.
    - a. Submittal must be stamped "RECORD COPY".
    - b. The Record Copy will be given to the installer for the installation of the hardware.
  2. Warranty Submittal: Warranty information to include the following information:
    - a. Original factory order number.
    - b. Date order was placed.
    - c. Date of installation (approximately if unknown).
  3. Operating and Maintenance Manuals:

- a. Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- H. Submittals that do not comply with all the requirements above will be rejected and will have to be resubmitted. Any project delays caused by incorrect/incomplete submittals will be the responsibility of the General Contractor and Hardware Supplier.

## 1.6 QUALITY ASSURANCE

### A. Installer Qualifications:

- 1. A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

### B. Door Hardware Supplier Qualifications:

- 1. Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project.
- 2. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.

## 1.7 DELIVERY AND STORAGE

### A. All hardware for field installation shall be delivered to the project site.

- 1. Any hardware that is required to be factory installed shall be delivered to the factory at the cost of the supplier of the doors or frames requiring the factory installation.

### B. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site.

- 1. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- 2. Storage area must be maintaining low humidity and a temperature between 60 to 90 degrees Fahrenheit.

### C. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

### D. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

## 1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Ten (10) years for mechanical mortise locks.
  - 2. Ten (10) years for mechanical exit hardware.
  - 3. Ten (10) years for mechanical, manual overhead door closers.

## 1.9 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## Part 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of door hardware from single manufacturer.
  - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- B. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design".
  - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
  - 2. Comply with the following maximum opening-force requirements:
    - a. Interior, Hinged Doors: 5 lbf applied perpendicular to door.
    - b. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
    - c. Provide thresholds not more than 1/2 inch high.
    - d. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

- e. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

## 2.3 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. For products furnished, but not installed, under this Section, Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
- C. All necessary drop, filler, protection and correction plates are the responsibility of the provider.
- D. Equals: Requests for equals and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01. Approval of requests is at the discretion of the architect, owner, and their designated consultants.
- E. Substitutions: Are not allowed unless the specified product(s) are no longer available.

## 2.4 HINGES

- A. Hinges are to meet or exceed ANSI/BHMA A156.1 requirements.
- B. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
- C. Hinge Size: Provide the size listed in the hardware sets.
- D. Hinge Type: Provide the type listed in the hardware sets.
- E. Manufacturers:
  - 1. PBB Hinge Company (PBB). (Basis of Design).
  - 2. Hager (HA).
  - 3. Stanley Hardware (ST).

## 2.5 CONTINUOUS HINGES

- A. General Requirements:
  - 1. Continuous Hinges are to meet or exceed ANSI/BHMA A156.26 Grade 1 Requirements.
  - 2. Fabricated to full height of door and to template screw locations; with components finished after milling and drilling are complete.
  - 3. Hinges are to be non-handed.
  - 4. Factories to prepare for electrical cut-outs.
  - 5. Hinge Type: Provide the type listed in the hardware sets.
  - 6. Coordinate with door manufacturers for the exact type required, as it varies between door manufacturers and application.
- B. Continuous, Gear-Type Hinges:

1. Manufactured out of 6063-T6 extruded-aluminum, pin-less, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating bearings.
2. Manufacturers:
  - a. Select (SEL) (Basis of Design).
  - b. PBB Hinge Company (PBB).
  - c. National Guard Products (NGP).

## 2.6 MANUAL FLUSH BOLTS

- A. Bolts are to meet or exceed ANSI/BHMA A156.3 and A156.16, Grade 1 requirements.
- B. Furnish Dustproof Strikes for all bottom bolts at interior doors.
- C. Provide related accessories or mounting brackets as required for appropriate installation and operation.
- D. Manufacturers:
  1. Ives (IVE) (Basis of Design).
  2. Rockwood Manufacturing (ROC).
  3. Trimco (TRI).

## 2.7 CYLINDERS AND KEYING

- A. Cylinders: Original manufacturer cylinders complying with the following:
  1. Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
  2. Meet or exceed ANSI/BHMA A156.5 Grade 1 requirements.
  3. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
  4. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
    - a. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes. Stamped collars are not allowed.
  5. Face finished to match lockset.
  6. Core Type: To be provided with lockset.
  7. Coordinate with owner for master key meeting.

## 2.8 MECHANICAL LOCK AND LATCHING DEVICE

- A. Cylindrical Locks:
  1. Locks shall meet or exceed ANSI/BHMA A156.2 Series 4000 Operation Grade 1 requirements.
  2. Locks are to be non-handed and fully field reversible.
  3. Basket:
    - a. 2-3/4" unless noted otherwise.
  4. Lock trim and function as shown in hardware sets.
  5. Latch bolt:
    - a. Provide deadlocking latch bolt for all locks with a keyed function.
  6. Manufacturers:
    - a. TownSteel (TST). CDCI Series (Basis of Design)
    - b. Schlage (SCH) ND Series.

c. Sargent Manufacturing (SAR) 10 Line.

2.9 EXIT DEVICES

- A. Exit Devices and Auxiliary Items shall meet or exceed ANSI/BHMA A156.3, Grade 1 requirements.
- B. Where function of the Exit Device requires a cylinder, provide a cylinder per the requirements of the Keying System.
- C. Function and Trim design as listed in the Hardware Sets.
- D. Provide mounting bracket or spacers as required for proper installation and operation.
- E. Do not cut perimeter gasket to mount the Exit Device Strikes. Adjust template accordingly.
- F. Manufacturers:
  - 1. TownSteel (TST) ED9700 Series (Basis of Design).
  - 2. Falcon (FAL) 25 Series.
  - 3. Detex (DET) Advantex Series.

2.10 SURFACE CLOSERS

- A. Surface Closers shall meet or exceed ANSI/BHMA A156.4, Grade 1 requirements.
- B. Surface Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
- C. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.
- D. Provide Surface Closers complying the Americans with Disabilities Act, ANSI ICC/A117.1.
- E. Provide accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation and operation.
- F. Coordinate with Overhead Holder/Stop installation, provide special templates as required to avoid hardware conflicts.
- G. Manufacturers:
  - 1. TownSteel (TST). TDC-40 Series (Basis of Design).
  - 2. Norton (NOR) 9500 Series.
  - 3. LCN (LCN) 4040XP Series.

2.11 OVERHEAD STOPS AND HOLDERS

- A. Stops and Holders shall meet or exceed ANSI/BHMA A156.8, Grade 1 requirements.
- B. Provide units that are through bolted on all Wood Door applications.
- C. Coordinate with door closer installation, special templating may be required.

- D. Where stops and holders are specified, coordinate with door manufacturer to insure proper application, installation, and operation.
- E. Function as show in Hardware Sets.
- F. Manufacturers:
  - 1. Glynn Johnson (GLY) (Basis of Design).
  - 2. Architectural Builders Hardware (ABH).
  - 3. Rixson (RIX).

## 2.12 ARCHITECTURAL TRIM

- A. Protective Plates:
  - 1. Shall meet ANSI/BHMA A156.6 requirements.
  - 2. Protective plates, fabricated from the following:
    - a. Stainless Steel: 300 grade, 050-inch thick.
  - 3. Kick Plates are to be installed on the push side of the door, unless stated otherwise.
  - 4. Size: Fabricate protection plates not more than 1 1/2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates.
  - 5. Provide Plates with countersunk screw holes.
  - 6. Provide Plates are to be beveled on all 4 edges.
  - 7. Height: 10", unless noted otherwise.
  - 8. Manufacturers:
    - a. Ives (IVE) (Basis of Design).
    - b. Rockwood Products (ROC).
    - c. Burns Manufacturing (BUR).

## 2.13 DOOR STOPS AND HOLDERS

- A. Door Stops and Holders shall comply with ANSI/BHMA A156.16, Grade 1 requirements.
- B. Provide wall bumpers, either convex or concave types as required.
- C. Provide Door stops with anchorage required based upon wall or floor application.
- D. Do not mount floor stops where they will impede traffic.
- E. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
- F. Manufacturers:
  - 1. Ives (IVE). (Basis of Design).
  - 2. Burns Manufacturing (BUR).

3. Trimco (TRI).

#### 2.14 THRESHOLDS

- A. Thresholds shall comply with ANSI/BHMA A156.21 requirements.
- B. Thresholds shall be fabricated to full width of opening.
- C. Provide non-slip surface.
- D. Provide Stainless Steel Fasteners, type as detailed or required for specific floor conditions.
- E. Manufacturers:
  1. K.N. Crowder (KNC) (Basis of Design).
  2. Reese Enterprises (RES).
  3. National Guard Products (NGP).

#### 2.15 GASKETING

- A. Door Gasketing shall comply with ANSI/BHMA A156.22 requirements.
- B. Provide with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- C. Perimeter gasketing should not be cut around door hardware. Gaskets must maintain a continuous seal at top and vertical edges. Adjust hardware templates accordingly.
- D. Manufacturers:
  1. K.N. Crowder (KNC) (Basis of Design).
  2. Reese Enterprises (RES).
  3. National Guard Products (NGP).

#### 2.16 SILENCERS

- A. Provide "push-in" type silencers for hollow metal or wood frames.
- B. Provide one silencer per 30 inches of height on each single frame, and two for each pair frame.
- C. Omit where gasketing is specified.
- D. Manufacturers:
  1. Ives (IVE) (Basis of Design).
  2. Burns (BUR).
  3. Rockwood (ROC).

#### 2.17 FABRICATION



- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
  - 1. The use of Aluminum or Brass/Bronze based screws is not acceptable.
- C. Fasteners: Provided by door hardware manufacturer, to comply with published installation instructions, templates and as test for fire rated applications.
  - 1. The use of other fasteners will be rejected.
  - 2. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.
  - 3. The use of Self-Drilling or Self-Tapping Screws is not permitted.
  - 4. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners.
  - 5. Gasket Fasteners: Provide Stainless Steel fasteners.
  - 6. Threshold Fasteners:
    - a. Concrete floors: Provide ¼-20 Stainless Steel Machine Screws and Expansion Shields.
  - 7. Hinge Fasteners:
    - a. Provide screws our of steel or stainless Steel to match hinge base material.
    - b. Provide Machine Screws for metal door and frame applications.

## 2.18 FINISHES

- A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## Part 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware.
- C. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

### 3.3 INSTALLATION

- A. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- B. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI' s "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".
  - 2. Comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities".
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Self-closing doors must close and latch completely from the fully opened position.
- F. Correction Plates.
  - 1. Supplier is responsible for all correction plates as needed to apply new hardware to any existing application.
  - 2. Correction plates includes:
    - a. Drop Plates.
    - b. Filler Plates.
    - c. Wraps.
    - d. Angle brackets.
    - e. Blocking spacers.
- G. Thresholds: Set thresholds in full bed of sealant, and caulk around all edges, complying with requirements specified in Section 079200 "Joint Sealants."
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch or cut perimeter gasketing to install other surface-applied hardware.
- I. Door Bottoms: Apply to bottom of door, forming seal with floor or threshold when door is closed.
- J. Door Closers: Adjust closers to follow opening forces listed under this sections Performance Requirements.
  1. Degree of opening: Template the closer to allow for the maximum degree of opening the conditions will allow.
  2. Back Check valve shall be adjusted so it engages 10 degrees prior to the door reaching full swing.
  3. Latch Speed valve shall be adjusted so the door latches properly without slamming.
  4. When through-bolts are used on wood doors, do not overtighten, and crush the door. If this happens the door is to be replaced.
- K. Wall Bumpers or Stops: Note that blocking in drywall partitions where wall stops, or other wall mounted hardware is located is required.

### 3.4 FIELD QUALITY CONTROL

- A. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating, and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
- B. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
  1. Submit documentation of incomplete items in PDF electronic format.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

### 3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

### 3.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.9 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.
- B. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required.

Abbreviation	Name
ABH	Architectural Builders Hardware Mfg.
BOW	By Owner
EAC	Electronic Access Control
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
KNC	K.N. Crowder Mfg. Inc.
PBB	PBB Inc
SDC	Security Door Controls
SEL	Select Products Ltd
SPL	Special-Lite Inc
TST	TownSteel Inc

Hardware Group No. 001

For use on Door #(s):

104                      106                      113                      119                      122  
124                      144                      204                      209

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	ELECTRIC STRIKE	25-4 FSE	626	SDC
1	EA	DOOR CONTACT	BY EAC PROVIDER	GRY	EAC
1	EA	CARD READER	BY EAC PROVIDER	BLK	EAC
1	EA	SURFACE CLOSER	TDC40	689	TST
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	KICKPLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	W-22	GRY	KNC

Theory of Operation: Door remains locked unless opened by means of card reader. Free egress is always allowed.

Hardware Group No. 002

For use on Door #(s):

114                      126                      130                      134                      135                      118

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	SILENCERS	SR-64	GRY	IVE

Hardware Group No. 003

For use on Door #(s):

115                      116                      117                      105                      107                      108  
                    109                      110                      128                      129                      131                      132

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	ENTRY/OFFICE LOCK	CDC-109-S	626	TST
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	W-22	GRY	KNC

Hardware Group No. 004

For use on Door #(s):

121                      203                      205                      210                      211

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	PRIVACY LATCH	CDC-76-S	626	TST
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	SILENCERS	SR-64	GRY	IVE

Hardware Group No. 005

For use on Door #(s):

123

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5" NRP	626	PBB
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	ELECTRIC STRIKE	25-4 FS	626	SDC
1	EA	DOOR CONTACT	BY EAC PROVIDER	GRY	EAC
1	EA	CARD READER	BY EAC PROVIDER	BLK	EAC
1	EA	SURFACE CLOSER	TDC40 CUSH	689	TST
1	EA	KICKPLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	W-22	WHT	KNC

Theory of Operation: Door remains locked unless opened by means of card reader. Free egress is always allowed. Electric strike is Fail Safe.

Hardware Group No. 006

For use on Door #(s):

125                    127                    133

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	PASSAGE LATCH	CDC-75-S	626	TST
1	EA	SURFACE CLOSER	TDC-40 EDA	689	TST
1	EA	KICKPLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	SILENCERS	SR-64	GRY	IVE

Hardware Group No. 007

For use on Door #(s):

139                    141

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5" NRP	626	PBB
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	ELECTRIC STRIKE	25-4 FS	626	SDC
1	EA	DOOR CONTACT	BY EAC PROVIDER	GRY	EAC
1	EA	CARD READER	BY EAC PROVIDER	BLK	EAC
1	EA	SURFACE CLOSER	TDC40 CUSH	689	TST
1	EA	KICKPLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	W-22	GRY	KNC

Theory of Operation: Door remains locked unless opened by means of card reader. Free egress is always allowed. Electric strike is Fail Safe.

Hardware Group No. 008

For use on Door #(s):

120                      136                      202                      212                      300                      301

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	ROLLER LATCH	1891	626	ABH
1	EA	PUSH PLATE	8200 4x16	630	IVE
1	EA	PULL PLATE	8103 4x16	630	IVE
1	EA	SURFACE CLOSER	TDC-85	689	TST

Note: Remainder of hardware ETR. Provide correction plates as required.

Hardware Group No. 009

For use on Door #(s):

146                      147

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5"	626	PBB
1	EA	PUSH PLATE	8200 4x16	630	IVE
1	EA	PULL PLATE	8103 4x16	630	IVE
1	EA	SURFACE CLOSER	TDC40	689	TST
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	SILENCERS	SR-64	GRY	IVE

Hardware Group No. 010

For use on Door #(s):

206

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	BB81 4.5" NRP	626	PBB
2	EA	MANUAL FLUSH BOLT	FB458 12"	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	DOOR CLOSER	TDC-40 HCUSH	689	TST
1	EA	OVERHEAD STOP	450H	626	GLY
2	EA	SILENCERS	SR-64	GRY	IVE



Hardware Group No. 011

For use on Door #(s):

ST1-2            ST2-2            ST3-2            ST1-1            ST2-1A            ST2-1B  
                  ST3-1            ST1-3            ST2-3            ST3-3

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5" NRP	626	PBB
1	EA	PANIC DEVICE	ED9700	630	TST
1	EA	PANIC TRIM	KES-908R	626	TST
1	EA	SURFACE CLOSER	TDC40 CUSH	689	TST
1	EA	GASKETING	W-22	GRY	KNC
1	EA	DOOR SWEEP	W-24S	CLR	KNC
1	EA	THRESHOLD	CT-10	MIL	KNC

Hardware Group No. 012

For use on Door #(s):

142

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BB81 4.5" NRP	626	PBB
1	EA	STOREROOM LOCK	CDC-86-S	626	TST
1	EA	ELECTRIC STRIKE	25-4 FS	626	SDC
1	EA	DOOR CONTACT	BY EAC PROVIDER	GRY	EAC
1	EA	CARD READER	BY EAC PROVIDER	BLK	EAC
1	EA	SURFACE CLOSER	TDC40 CUSH	689	TST
1	EA	KICKPLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	W-22	GRY	KNC
1	EA	DOOR SWEEP	W-24S	CLR	KNC
1	EA	THRESHOLD	CT-10	MIL	KNC

END OF SECTION.

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**SECTION 08 8000  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulating glass units.
- B. Glazing compounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 4313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- B. Section 08 5400 - Composite Windows

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).
- D. ASTM C1036 - Standard Specification for Flat Glass 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- G. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021.
- H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.
- J. GANA (SM) - GANA Sealant Manual 2008.
- K. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- L. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2017.
- M. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).
- N. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Insulating Glass Unit, Glazing Unit  
Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 6 by 6 inch size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

#### **1.07 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### **1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Glass Fabricators:
  - 1. Vitro Architectural Glass: [www.vitroglazings.com/](http://www.vitroglazings.com/)
  - 2. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES**

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  - 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  - 2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  - 3. Glass thicknesses listed are minimum.
- B. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

### 2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with industry established testing requirements.

### 2.04 INSULATING GLASS UNITS

- A. Manufacturers:
  1. Pilkington North America Inc; : [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).Pilkington North America Inc[www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  2. Vitro Architectural Glass (formerly PPG Glass); [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulating Glass Units:
  1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Spacer Color: Black.
  4. Edge Seal:
    - a. Color: Black.
  5. Purge interpane space with dry air, hermetically sealed.
- C. Type 1 - Insulating Glass Units: Vision glass, double glazed.
  1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with air.
  3. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Clear.
    - b. Coating: Low-E (passive type), on #2 surface.
  4. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Clear.
  5. Total Thickness: 1 inch (25.4 mm).
  6. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.32, nominal.

- D. Type 1\* - Tempered, Insulating Glass Units: Safety glazing.
  - 1. Applications:
    - a. Locations in "hazardous areas" as specified by the 2015 IBC with NYS Supplements, as indicated on drawings.
  - 2. Space between lites filled with air.
  - 3. Glass Type: Same as Type 1 except use fully tempered float glass for both outboard and inboard lites.
  - 4. Total Thickness: 1 inch (25.4 mm).
  - 5. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.32, nominal.

## 2.05 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal; \_\_\_\_x\_\_\_\_ inch (\_\_\_\_x\_\_\_\_ mm) size.
- C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

## 2.06 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Provide shop inspection and testing for Type [\_\_\_\_\_] glass.

## PART 3 EXECUTION

### 3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### 3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

### **3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

### **3.06 CLEANING**

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove nonpermanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### **3.07 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

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