SECTION 081100 - HOLLOW METAL (STEEL) DOORS AND FRAMES

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the hollow metal door and frame work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Wood Doors - Section 081400.

C. Door Hardware - Section 087100.

D. Glazing - Section 088000.

1.03 REFERENCES / STANDARDS

A. Labor, materials, fabrication, and erection shall meet requirements and recommendations of applicable portions of the following:

1. American National Standards Institute, ANSI
2. American Society for Testing and Materials, ASTM
3. American Welding Society, AWS
4. Steel Door Institute, SDI
5. Underwriters Laboratories Inc., UL - Building Materials Directory
6. Warnock Hersey International Inc., WH - Certification Listings
7. NFPA 80 - Fire Doors and Fire Windows.

B. Steel doors and frames shall comply with the following standards, as well as these specifications:

1. ANSI/SDI A250.6 Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
2. ANSI/SDI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; Latest Revision.
   a. SDI 111 - Recommended Standard Details for Steel Doors & Frames.
3. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames (Formerly SDI-105).
4. ANSI/NFPA 252 - Fire Tests of Door Assemblies.
5. ANSI/UL 10C - Positive Pressure Fire Tests of Door Assemblies.
6. ANSI/UL 1784 - Air Leakage Tests of Door Assemblies
7. DHI A115.1G - Installation Guide for Doors and Hardware.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide all products from a single manufacturer who is a member of the Steel Door Institute.

1.05 SAMPLES

A. Submit sections of jambs or other items of specified work. Indicate contours, methods of construction, various finishes proposed for use, when directed by the Architect.

1.06 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified.

B. Shop Drawings: Shop drawings shall meet requirements of applicable portions of General Conditions.

C. Shop drawings shall indicate: Elevations of each door type, details of each frame type, location in building for each item, conditions at openings with various wall thickness and materials, size, shape and thickness of materials, joints and connections.

1. Coordinate door/frame hardware reinforcement, as well as, wiring requirements with door hardware provided in Section 087100.

D. Doors, frames and frame components shall not be manufactured prior to Architect's approval of shop drawings.

E. Provide evidence of manufacturer's membership in the Steel Door Institute.

1.07 PROTECTION

A. Package and protect finished hollow metal work specified herein. Carefully store hollow metal work at site in upright position, protect from elements on wood blocking in manner to prevent damage, marring of finish.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hollow Metal (Steel) Doors, Frames and frame components, as hereafter specified, shall be manufactured from hot-dipped galvanized steel having a minimum zinc coating weight of 0.6 ounces per square foot (A60); steel shall conform to ASTM A653; galvanizing shall conform to ASTM A924. Acceptable manufacturers and Steel Door Institute Members are as follows: Steelcraft, Cincinnati, OH (an Allegion Company); Ceco Door Products Company, an ASSA ABLOY Group Company, Milan, TN; Curries, an ASSA ABLOY Group Company, Mason City, IA; and Amweld Building Company, Inc., Garrettsville, OH.

2.02 FABRICATION

A. Fabricate doors and frames in accordance with ANSI/SDI A250.8.

B. Best grade of modern shop and field practice known to recognized manufacturers specializing therein. Connections shall be made using welded seams and joints including reinforcements. Fit and fabricate accurately, with surfaces free from warp, wave, buckle and other defects; make all corners and angles square unless otherwise indicated. Set members in proper alignment with surfaces straight and to true plane. Make molds, edges and arrisers straight and sharp, unless coved or bull nosed are indicated. Miters and joints shall be well formed. All joints shall be welded, neat, clean, smooth and flush with surface of base metal. Make exposed face jointing invisible. Units broke down for shipment shall be properly joined, welded and ground smooth by the manufacturer.

C. Dents in frames caused by spot welding shall be filled and ground smooth.

D. Drilling: Drill and tap work as required for hardware attachment and for other indicated attached work. Locate drilling and tapping by template to secure accurate alignment.

E. Glass: As specified in Section 088000. All doors and frames hereinafter specified shall have glass field installed.

2.03 FINISHING

A. Prime finish: Doors and frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, baked-on. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

B. All welding spots and seams shall receive a coat of zinc chromate before prime painting.

C. Each coat shall be applied evenly and baked at proper temperature for time cycle recommended by paint manufacturer to secure maximum protection. Baked primer finishes shall be free from craze, cracks and bubbles.

2.04 CONSTRUCTION OF FRAMES

A. All frames shall be double rabbit, unless otherwise detailed on drawings.
   1. Frames for masonry partitions shall be Type "F".
   2. Frames for steel stud and gypsum board partitions may be Type "MU" or Type "F".
   3. Where double egress frames are required, frames shall be “FE-Series” for all types of wall construction.

B. Flush interior frames to be 16 gauge steel as specified in Paragraph 2.01, unless noted otherwise, and exterior frames to be 14 gauge steel as specified in Paragraph 2.01. Frames shall be set-up and arc (SUA) welded, (see Paragraph 2.02.B above), corners shall be mitered. Frames shall have 8 gauge steel hinge reinforcement and prepared for 4-1/2" x 4-1/2" standard or heavy weight template hinges. Strike reinforcement shall be 16 gauge. Reinforcement for surface closer shall be 14 gauge. Provide cutouts and reinforcement as required for other specified hardware. Frames shall be furnished with a minimum of six wall anchors and two base anchors of manufacturers standard design and as required for various wall construction types. All reinforcement and anchors shall be galvanized. Knocked-down (KD) frames will not be accepted.
   1. Deliver welded frames with removable spreader bars across bottom of frames, tack welded to jambs. Tack welds shall be totally removed and surface ground smooth, prior to field finish painting of frames.

C. All new hollow metal door frames as well as all existing hollow metal door frames to be painted, shall be supplied with rubber bumpers, three per strike jamb and two per head for pairs of doors. Bumpers shall be turned over to painter for installation.

D. Hardware Reinforcements: Prepare frames to receive hardware in accordance with applicable standards of ANSI. Spot weld reinforcing plates to inner surface of frames, hinges, locks, latches and other hardware locations. Drill and tap necessary holes for field installation of hardware from templates furnished to frame manufacturer by hardware contractor. Do no drilling and tapping at factory for application of

surface applied hardware.

E. Head Reinforcing: For door openings wider than 42" and multiple openings, reinforce head members full length with 12 gauge steel channel.

2.05 CONSTRUCTION OF DOORS

A. Flush doors shall be full flush seamless construction fabricated from 16 gauge steel ("Level 3 – Extra Heavy Duty" class) as specified in Paragraph 2.01. Interior doors shall be reinforced, stiffened, sound deadened and insulated with impregnated kraft honeycomb core completely filling the inside of the doors and laminated to inside faces of both panels. Exterior doors shall be same construction as interior doors except insulation shall be polystyrene solid core, fully weathersealed. Doors shall have continuous vertical mechanical inter-locking joints at lock and hinge edges with edge seam filled and ground smooth. Tops of all doors shall have "snap-in" steel top cap. Doors shall have 1/8" in 2" beveled hinge and lock edges. Top and bottom steel reinforcement channels shall be 14 gauge and spot welded within the doors. Hinge reinforcement shall be 8 gauge, lock reinforcement shall be 16 gauge and closer reinforcement 14 gauge. Adequate reinforcements shall be provided for other hardware as required. All reinforcements shall be galvanized. Doors shall be prepared for specified hardware only. Non-handed doors will not be acceptable. No field patching of doors will be accepted.

1. Sound Rating for Interior Doors:
    a. STC of 30-32, measured in accordance with ASTM E413.
    b. Mechanical and/or Boiler Room doors shall meet an STC of 40 with the provision of perimeter seals applied to the head and jambs of the frame, a surface applied door bottom, and an ADA compliant aluminum threshold with applied sound seal. Undercut door as required to suit threshold with seal. Note: if hardware set scheduled in Section 087100 includes appropriate seals as herein specified for mechanical and/or boiler room doors, omit seals specified herein.
2. Flush Doors as herein specified shall be equivalent to Steelcraft's LF Series.
    a. Mechanical and/or Boiler Room doors shall be provided with the following Steelcraft products if not included with their specified hardware set(s):
        1) Perimeter Seals – Zero #475 applied to the stop of the head and jambs of frame.
        2) Door bottom – Zero #367, surface applied to door.
        3) Threshold – Zero #566 (ADA compliant threshold with gasket).

B. Provide openings in doors for glazing by others, in sizes as shown on the drawings. Provide door reinforcements as required by size of openings. Glazing moldings shall be cold drawn steel with mitered welded corners. Moldings shall be fastened with removable, countersunk oval Phillips head machine screws on roomside of door.

1. Provide type of molding as required by thickness of glass scheduled and/or specified in Section 088000.
    a. For lights/panels up to 1/2" thick: Provide recessed steel trim.
    b. For lights/panels greater than 1/2" thick provide flush mounted steel trim.

2.06 LABEL DOORS AND FRAMES

A. Provide for locations as shown on working drawings, Underwriters' Labeled doors and frames for ratings as indicated. Doors, frames and components shall meet requirements of NFPA 80. Doors shall be tested in accordance with NFPA 252 or UL 10C Positive Pressure Fire Tests of Door Assemblies.

2.07 WORKMANSHIP

A. General: Insofar as possible, execute fitting, constructing and fabricating at shop, ready for delivery and erection at buildings.

PART 3 EXECUTION

3.01 INSPECTION

A. Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.02 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings and manufacturer's data, and as herein specified.

B. Fully flash all exterior door openings, including sills: As specified in Section 072500.

C. Placing Frames:
1. Comply with provisions of ANSI A250.11 (formerly SDI-105) "Recommended Erection Instructions for Steel Frames", unless otherwise indicated.
2. Except for frames located at in-place concrete or masonry, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged. Frames in metal stud partitions shall be packed with batt insulation as specified in Section 072100. Frames in masonry walls shall be grouted solid.
3. In masonry walls, install at least 4 wire masonry anchors per jamb, as wall is constructed.
4. In metal stud partitions, install at least 4 wall anchors per jamb. In open steel stud partitions, place studs in wall anchor notches and wire tie. In closed steel stud partitions, attach wall anchors to studs with tapping screws.
5. Install fire-rated frames in accordance with NFPA Standard No. 80.
6. Frames shall be set tight to flooring substrate. Maximum allowable gap between flooring and frame shall not exceed 1/8” and gap shall be caulked as specified in Section 079200.

D. Door Installation:
1. Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI A250.8 – SDI 100.
   a. Exterior Door Clearances: Perimeter and sill gaps shall be weathertight after installation of weatherstripping specified in Section 087100.
2. Place fire-rated doors with clearances as specified in NFPA Standard No. 80. Maximum allowable door clearance limits include, but are not limited to, the following:
   a. Maximum clearance between bottom of fire door and top of finished floor or threshold is 3/4″. When bottom of door is more than 38″ above finished floor (ex: counter shutter or dutch door), maximum clearance at bottom is 3/8″ or as specified by manufacturer’s label service procedure.
   b. Clearances at perimeter and between meeting stiles of pairs are measured on pull side face of door. For wood doors, clearance must not exceed 1/8″. For hollow metal doors, clearance must be between 1/16″ and 3/16″.

3.03 EXISTING FRAMES

A. Existing frames in locations as shown on drawings shall be patched. All defective portions of frames shall be cut out and new sections of similar gauge galvanized steel welded in place and ground smooth. No evidence of patching shall be apparent after completion of work.

1. Where existing doors and hardware are removed and new installed, cut and patch frames as required to accommodate new hardware.

3.04 CLEANING

A. The Contractor shall be responsible for removal of protective materials and cleaning of all metal surfaces in accordance with the door manufacturer's recommendations. Metal shall be prepared to receive finish painting.

END OF SECTION 081100

SECTION 081400 - WOOD DOORS

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the wood door work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Metal Doors and Frames - Section 081100.

C. Door Hardware - Section 087100.

D. Glazing - Section 088000.

1.03 STANDARDS

A. Labor and materials shall meet or exceed requirements and recommendations of applicable portions of standards listed.

1. Hardwood Plywood & Veneer Association, HPVA
2. Window and Door Manufacturers Association, WDMA I.S. 1-A Latest Edition, Industry Specification for Architectural Wood Flush Doors.
3. Window and Door Manufacturers Association, WDMA I.S. 6-A Latest Edition, Industry Specification for Architectural Stile and Rail Doors.
4. Architectural Woodwork Standards (AWS), Latest Edition, published jointly by the Architectural Woodwork Institute (AWI), the Architectural Woodwork Manufacturer Association of Canada, and the Woodwork Institute.
5. America Society for Testing and Materials, ASTM.
    a. ASTM E90, Latest Edition, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
    b. ASTM E413, Latest Edition, Classification for Rating Sound Insulation
6. American National Standards Institute, Inc. - ANSI A208.1, Latest Edition, Particleboard

1.04 QUALITY ASSURANCE

A. Flush doors, except as modified by these specifications, shall meet or exceed the latest edition of the following standards:

1. Aesthetic Grade: Premium Grade - WDMA I.S.1-A Premium Grade or AWS Quality Standards Premium Grade.
2. Performance Duty Level:
    a. Solid Core Doors and/or Stile and Rail Doors: WDMA I.S.1-A Performance Grade - Extra Heavy Duty
        1) All doors must meet specified WDMA Performance Duty level, with the exception of face screw holding requirement for doors scheduled with surface applied hardware installed with through bolts.

b. Hollow Core Doors: WDMA I.S.1-A Performance Grade - Heavy Duty

B. Tolerances for warp, squareness, and pre-fitting dimensions as per the latest edition of WDMA 1.S.1-A.

C. Each door shall bear an identifying mark indicating the manufacturer and fire rating where applicable.

D. Where fire rated doors are required, provide doors with a label permanently attached to either the hinge stile or to the top rail, labeled by Intertek Testing Services - Warnock Hersey International or Underwriters Laboratories. Construction details and hardware application shall be approved by the labeling authority.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, completely describing door construction, AWI classification and finish system, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified.

B. Shop drawings shall meet requirements of applicable portion of General Conditions.

C. Shop drawings shall indicate species, hardware set, size of openings, size and location of louvers and glazing required.
1. Coordinate door/frame hardware reinforcement, as well as, wiring requirements with door hardware provided in Section 087100.

D. Door finish samples shall accompany submittals. The samples will show the range of color variation.

E. Warranty statement shall accompany the submittal.

1.06 MANUFACTURER'S WARRANTY

A. Doors shall be warranted from date of final payment of the project to General Contractor against delamination, warping, twisting or manufacturing defects not caused because of Owner's negligence in maintenance.

B. Any defects noted during the warranty period shall be corrected at no cost to the building Owner. Such corrective work shall include all labor and material for repair, replacement, refinishing and rehandling as required.

C. Periods of warranty:
1. Interior solid core and mineral core - Life of original installation.

1.07 CARE AND HANDLING

A. Deliver, store, protect, and handle products under provisions of WDMA, AWI, WIC and manufacturer’s care and handling instructions.

B. Store flat on a level surface in a clean, dry, well ventilated area protected from sunlight.

C. Doors should not be subjected to extremes of heat and/or humidity conditions. Relative humidity should not be less than 30% or more than 55%. HVAC systems shall be operating and balanced.

D. Cover to keep clean, but permit air circulation. Protect from exposure to natural and artificial light.

E. Allow doors to become acclimated to finished building heat and humidity before hanging.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Doors, conforming to these specifications, as manufactured by Eggers Industries, Two Rivers, Wisconsin; Marshfield DoorSystems, Inc., Marshfield, Wisconsin; Mohawk Flush Doors, Inc.; Graham, Mason City, IA; VT Industries, Holstein, IA; Algoma, Algoma, Wisconsin; and Ideal Wood Products, Inc., New Albany, Indiana, are approved for bidding.

2.02 GENERAL

A. Flush, solid core wood doors as hereafter specified are generally 5 ply architectural grade construction wood doors. At the Contractor's option, 7 ply architectural grade wood doors modified to comply with bonded core/rails/stiles and laminated with Type I waterproof glue are acceptable.

2.03 FLUSH, SOLID CORE DOOR MATERIALS (EXCEPT DOORS REQUIRED TO HAVE AN STC RATING GREATER THAN 30) - NON FIRE RATED DOORS

A. Flush, solid core doors, not required to have an STC Rating greater than 30, shall have particleboard cores and comply with the following.

B. Cores: Particleboard Cores - a formed flat panel consisting of wood particles bonded together with synthetic resins or other added binder, with a density* of 28-32 lbs. per cubic foot. The material shall meet or exceed the requirements of Grade 1-LD-1 or 1-LD-2 Particleboard as described in the latest edition of ANSI A208.1, "Mat Formed Wood Particleboard."

1. *Minimum density shall be as required to meet WDMA Extra Heavy Duty Performance Level without added blocking.

C. Stiles and Rails:

1. Stiles to be 1 3/8" wide (before prefitting) one or two piece hardwood with the outer edge to be the same species as the face veneer with the exception of birch doors which will have hard maple or beech stiles. Outer piece of double banded stiles shall be a minimum of 1/2" wide. No finger joints are permitted in the outer piece. Exposed stile edges of minimum 1/4" matching hardwood to be applied with crossbands. Exposed crossbands not acceptable.
2. Top and bottom rails are to be mill option hardwood, minimum 1-3/8" wide before prefitting. Bottom rails on doors exceeding 8'-0" in height shall be 2-3/4" wide to facilitate trimming.
3. Stiles and rails are to be securely glued to the core, and the entire assembly sanded flat as a unit to insure minimal telegraphing of core components through face veneers.

D. Face Construction: 2ply architectural grade consisting of 1/8" thick hardwood veneer cross banding (door skin) hot pressed to minimum 1/50" thick face veneer of plain sliced hardwood to match existing species (field verify Red Oak or White Birch) - Premium Grade A.

1. Cross bandings shall be thoroughly dried hardwood veneer, laid with the grain at right angles to that of the core and glued to both sides of the core. Cross bandings shall run to the four (4) edges of the door.
2. Face veneer shall be book matched and the individual pieces of veneer forming the face must be edge glued together. Assembly of veneer on door face shall be balance match.
3. When pairs of doors are scheduled for transparent finish, doors shall be pair matched with a continuous grain pattern.
4. Cross bandings and faces shall be laminated to core with Type I 100% waterproof glue, by hot

press process.

F. Provide wood stops for holding glass in place for non-fire-rated doors. Wood shall be of same species as face veneer. Glazing stops shall be similar to Eggers No. 101 bead.

1. Glass and glazing provided under Section 088000.

2.04 FLUSH, SOLID CORE DOOR MATERIALS - NON FIRE RATED / SOUND RETARDANT DOORS

A. Flush, solid core doors required to have an STC Rating greater than 30 shall comply with the following. Doors include, but may not be limited to:

1. Choir Room Door (C003/01) – minimum STC Rating of 40
2. Band Room Door (C001/01) – minimum STC Rating of 40
3. Corridor Door B113/01 – minimum STC Rating of 40
4. Acceptable Acoustic Door Series/Manufacturers include, but not limited to:
   a. Marshfield SonaShield Acoustic Rated doors, Standard Models: DSR, Signature Series.
   b. Eggers Industries E Series (E-STC 40).

B. Core: Manufacturer's special construction core as required to meet STC Rating specified. STC ratings must be tested as "operable".

1. The Sound Transmission Class (STC) specified shall be certified by the manufacturer to be based on tests conducted at an independent testing agency in accordance with ASTM E90-90 and E413-87.

C. Stiles and Rails:

1. Vertical Edges - Manufacturer's standard construction with veneer edge band.
2. Horizontal Edges - Manufacturer's standard construction, except where wider bottom rails may be required to receive bottom seal as scheduled.
3. Stiles and rails are to be securely glued to the core, and the entire assembly sanded flat as a unit to insure minimal telegraphing of core components through face veneers.

D. Face Construction: As specified in Paragraph 2.03.D, except crossbands may be manufacturers standard as required to meet STC Rating specified.

E. Seals: To meet the specified STC Rating, door/frame assemblies shall be provided with seals as follows, if not included in the applicable Door Hardware Set as scheduled in Section 087100:

1. Two (2) rows of gasketing applied to the head and jambs of the frame and bottom drop seal or door shoe applied to the door, as required to meet manufacturers tested acoustic rating.

F. Door Lites: Size shall be as scheduled on drawings and in compliance with Maximum Allowable Door Lite Size for specified STC Rating of door;

1. STC 36 – 44: Maximum 300 sq. in.

2.05 FINISHING

A. AWI Quality Grade premium, System #TR - 6.

B. Stain color to be in custom color as selected by Architect.

C. AWI System #TR - 6 is a Catalyzed Polyurethane. There shall be a stain coat, 3 coats of sealer, followed by sanding with a 220 grit paper, followed by two top coats. The polyurethane shall be cured to produce a finish per AWI section 1500, System #5. AWI finish types TR - 2 & TR - 4 are not acceptable.

PART 3 EXECUTION

3.01 FABRICATION

A. Fabricate all wood doors in strict accordance with the referenced standards specified herein.

3.02 MACHINING AND FITTING

A. All wood doors shall be machined by the manufacturer for cutouts, hinges, locks and all hardware requiring routing and mortising. Any required rabbeting to properly hang doors shall be performed by the manufacturer prior to finishing. Doors shall be factory pre-fit and beveled to net opening size and machined to satisfy entire hardware schedule. Doors shall be one-fourth (1/4) inch less than specified width and five-eighths (5/8) inch less than specified length. Bevel lock and hinge stiles one-eighth (1/8") inch in two (2) inches. Provide under cut for locations as shown on working drawings. Factory predrilling shall not be performed for surface-applied hardware except hinge screws on all fire rated doors carrying a "B" or "C" label.

3.03 INSTALLATION OF HARDWARE

A. Contractor shall install hardware according to approved hardware schedule for proper locations.

B. Install with full-threaded wood screws furnished by hardware manufacturer.

C. Drill proper size pilot hole for all screws. (Full mortise hinges required 5/32" pilot holes.)

D. Securely anchor hardware in correct position and alignment.

E. Adjust hardware and door for proper function and smooth operation, proper latching, without force or excessive clearance.

END OF SECTION 081400

SECTION 083300 - COILING DOORS

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the coiling doors and grilles work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

B. Work includes, but is not necessarily limited to the following:
1. Rolling/Coiling Counter Doors (Dish Wash Rm).
2. Rolling/Coiling Service Doors (Serving Line).

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Door Hardware - Section 087100.

1.03 STANDARDS

A. Workmanship and materials shall meet requirements and recommendations of applicable portions of Standards listed:
1. American Society for Testing and Materials, ASTM
2. American Welding Society, AWS
3. American Architectural Manufacturer's Association, AAMA

B. Coiling doors shall be designed for normal use of up to 20 cycles per day.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified.

B. Shop Drawings: Shop drawings shall meet requirements of applicable portions of General Conditions.

C. Operation and Maintenance Manual.

1.05 WARRANTY

A. Products shall be warranted by the manufacturer for two years against defects in material and workmanship.

1.06 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer Qualifications: ISO 9001:2008 registered and minimum of five years experience in producing doors of type specified.
2. Installer Qualifications: Manufacturer's approval.

B. Pre-installation Conference: Conduct conference at Project site, after submittals have been reviewed and prior to installation of work. In addition to the Project Architect, the General Contractor, and his overhead door installer shall attend the Pre-Installation Conference along with the building Owner's Representative.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Metal Products as hereinafter specified are as manufactured by Cornell Iron Works, Inc., Mountaintop, PA. Doors shall be sized as indicated on drawings.

1. Products complying with specifications herein as manufactured by Cookson Company, Phoenix, AZ; and Overhead Door Corporation, Dallas, TX, are approved for bidding this Project.

2.02 METAL MODELS

A. Rolling Service and/or Counter Doors: Shall be Model ESC20, face of wall mounted, manual, push-up operation. Doors shall have the following features:

1. Curtain:
   a. Slats: Interlocked flat-faced, 1-1/2" high, 1/2" deep, #1F slats, fabricated of minimum 0.040" aluminum, clear anodized with extruded aluminum tubular bottom bar.
   b. Endlocks: Molded high-strength nylon riveted to ends of alternate slats.
   c. Bottom Bar: Extruded aluminum tube, minimum 1-3/4" x 1-3/4", with continuous lift handle and vinyl astragal. Furnish standard cylinder lock in bottom bar which can be replaced in field with masterkeyed cylinder specified in Section 087100. Locking cylinder to be operated from coil side.
2. Guides: Shall be heavy duty extruded aluminum sections with snap-on trim to conceal fasteners, equipped with polypropylene pile runners on both sides of curtain to eliminate metal to metal contact between guides and curtain. Provide all related jamb angles, finished same as guides, for mounting of guide angles as detailed on drawings. Anchor all angles with fasteners/spacing as recommended by door manufacturer.
3. Counterbalance Shaft Assembly:
   a. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.
   b. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.
4. Brackets (End Plates): Fabricate from minimum 3/16 inch steel* plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures. *Note: Counter hood brackets shall be stainless steel.
5. Hood/Frame:
   a. Counter Door shall be provided with the following:
      1) Integral welded wrap around frame of 16 gauge 300 Series stainless steel at head and jambs, with #4 finish, as detailed on drawings. Stainless steel counter (sill) by Food Service Equipment Contractor.
      2) Hood fabricated of #16 gauge, #4 finish, 300 Series stainless steel, with reinforced top and bottom edges. Provide minimum 1/4 inch stainless steel intermediate support brackets as required to prevent excessive sag.
   b. Service/Serving Line Doors shall be provided with custom fabricated aluminum hoods (clear, anodized 0.040 inch aluminum) featuring bottom, removable panels to access shaft assembly and coiled door. Provide additional access panels in size necessary to service

overhead coiling doors to be installed in bulkheads above doors.

6. Finishes:
   a. Steel: ASTM A123, Grade 85 zinc coating, hot-dip galvanized after fabrication. All exposed steel surfaces shall receive finish painting in the field as specified in Section 099000.
   b. Aluminum: Clear anodized.
   c. Stainless steel: #4 finish
7. Operation: Manual, Push-up. Provide one (1) pole with hook.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install doors as per manufacturer's recommendations, reviewed shop drawings and as detailed on the drawings.

B. Install doors with necessary hardware, anchors, inserts, hangers and supports.

C. Following completion of installation, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

D. Clean surfaces soiled by work as recommended by manufacturer.

E. Demonstrate proper operation to Owner's Representative.

F. Instruct Owner's Representative in maintenance procedures.

END OF SECTION 083300

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the aluminum-framed entrances and storefronts work, including doors, perimeter trims, accessories, shims and anchors, and perimeter sealing of units as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Door Hardware - Section 087100.

C. Glazing - Section 088000.

1.03 STANDARDS

A. Labor and materials shall meet requirements and recommendations of applicable portions of standards listed.

1. American Architectural Manufacturer's Association, AAMA
2. American National Standards Institute, ANSI
3. American Society for Testing Materials, ASTM

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified.

B. Shop Drawings: Shop drawings shall meet requirements of applicable portions of General Conditions.

C. Shop drawings shall indicate: Elevations of each door type, details of each frame type, location in building for each item, conditions at openings with various wall thickness and materials, size, shape, and thickness of materials, joints and connections (attachment/anchorage to wall construction).

1. Verify actual measurements/openings by field measurements and show recorded measurements on shop drawings.
2. Coordinate door/frame hardware reinforcement, as well as, wiring, requirements with door hardware provided in Section 087100.
3. Submit details (fastening, sizes, watertight seal, etc.) for all aluminum trim/covers.

D. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

E. Warranty(s).

1.05 WARRANTY

A. Manufacturer shall furnish a written 10 year painted finish warranty, providing for non-prorated material and replacement cost. Finish shall be warranted by the manufacturer for 10 years against crazing, chipping, cracking, checking or peeling.

B. Manufacturer shall provide written warranty for specified products against defects for a period of two (2) years from the date of Final Payment of the Project; in addition, welded door corner construction shall be supported with a limited lifetime warranty.

1. Exterior Thermally Broken Framing shall also be provided with 10 year warranty against failure of the thermal barrier polymer due to dry shrinkage and fracturing.

1.06 QUALITY ASSURANCE

A. Provide aluminum storefronts and entrances specified herein from a single source manufacturer.

B. Qualifications:

1. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.
3. The architectural aluminum supplier shall have a quality system registered to one of the ISO 9000 series of standards. The quality system shall be certified by a Registrar approved by the Accreditation Board (RAB) or another, international approval authority.
    a. The certificate shall be current and in good standing with the Registrar which issued it.
    b. The supplier shall furnish, upon request, a copy or copies of the current certificate.

C. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements, as well as, hardware coordination.

D. Pre-installation Door Hardware Conference: As specified in Section 087100.

E. Aluminum Framing System Manufacturer's representative shall inspect the work before, during, and after it's installation to determine if doors/frames as herein specified have been installed in accordance with manufacturer's recommendations and approved shop drawings. Inspections shall be scheduled as required by the manufacturer of aluminum doors/frames. Required minimum inspections include the following (costs associated with inspections shall be included in the Contractor's bid):

1. Inspection of substrate prior to installer proceeding with the installation.
2. Progress inspections: minimum of one inspection every two weeks. The Contractor shall provide the Architect with a copy of the aluminum framing manufacturer's In-Progress Inspection Reports.
3. Final inspection upon completion of the entrance doors and aluminum framing systems installation. Upon final inspection a report will be issued to the installer of any discrepancies and requirements for additional work; report shall be copied to the Architect. If additional work required, the manufacturer will provide another final inspection to verify acceptance of completed work.

1.07 PERFORMANCE REQUIREMENTS

A. Performance Requirements of Framing Systems:

1. Air infiltration/exfiltration for all framing shall be tested in accordance with ASTM E 283.

a. Infiltration shall not exceed .06 CFM per square foot at a static air pressure differential of 6.24 psf with interior seal.
b. Exfiltration shall not exceed .045 CFM per foot of crack at a static air pressure differential of 1.57 psf.

2. Water infiltration/resistance: Framing Systems shall be tested in accordance with ASTM E331 for static resistance, demonstrating no water penetration at test pressures as follows, as defined in AAMA 501:
   a. For TriFab VG 451 Framing: test pressure of 8 psf.
3. Uniform Load: A static air design load, as hereafter specified, shall be applied in the positive and negative direction in accordance with ASTM E330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
   a. static air design load of 20 psf for TriFab VG 451 Framing.
4. Additional Performance Requirements for vertical thermally broke framing:
   a. When tested in accordance with AAMA 1503, the thermal transmission (U-value) shall not be more than:
      1) 0.47 (low-e, glass to exterior) or 0.61 (clear) BTU/hr/ft ^{2}/^{o}F for TriFab VG 451T Framing.
      1) 0.44 (low-e, glass to center) or 0.61 (clear) BTU/hr/ft ^{2}/^{o}F for TriFab VG 451T Framing.
   b. When tested in accordance with AAMA 1503, the condensation resistance factor (CRF) shall not be less than:
      1) 70 $_{frame}$ and 69 $_{glass}$ (low-e, glass to exterior) or 69 $_{frame}$ and 58 $_{glass}$ (clear) for TriFab VG 451T Framing.
      1) 62 $_{frame}$ and 68 $_{glass}$ (low-e, glass to center) or 63 $_{frame}$ and 56 $_{glass}$ (clear) for TriFab VG 451T Framing.
   c. When tested in accordance with AAMA 1801 and ASTM E1425, the Sound Transmission Class (STC) Rating shall not be less than:
      1) For TriFab VG 451T: STC 38 (glass to exterior).
      1) For TriFab VG 451T: STC 37 (glass to center).
5. Wind loads: Provide systems, including anchorage, capable of withstanding wind load design pressures of minimum 20 psf (90 mph wind loads) to comply with the IBC 2009 Building Code.

D. Performance Requirements of Doors:
   1. Structural: Resistant to corner racking shall be tested by the Dual Moment Load test as follows:
      a. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24" long and top rail section shall be 12" long.
      b. Anchor "top rail" positively to test bench so that corner protrudes 3" beyond bench edge.
      c. Anchor a lever arm positively to "side rail" at a point 19" from inside edge of "top rail." Attach weight support pad at a point 19" from inner edge of "side rail."
      d. Test section shall withstand a load, as follows, on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45^o.
         1) Stile and Rail Doors: load of 245 pounds.
   2. Air Infiltration (Stile and Rail Doors): Shall be tested in accordance with ASTM E 283, at a pressure differential of 1.567 PSF for pairs of doors and 6.24 PSF for single doors. A single 3'-0" x 7'-0" entrance door and frame shall not exceed .50 CFM per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 CFM per linear foot of perimeter crack.

1.07 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Products as hereafter specified are as manufactured by Kawneer Company, Inc, Norcross, GA. Products shall include the following:

1. Exterior Entrance Framing –
   a. Kawneer TriFab VG 451T System, 2" x 4 1/2", Thermal Break; Front or Center Glazed (as selected by Architect).
2. Interior Entrance Framing -Kawneer TriFab VG 450 System, 1 3/4" x 4 ½" Center Glazed.
3. Aluminum Entrances, rail and stile design - Kawneer 500 Swing Door, Wide Stile.

B. Products, conforming to these specifications and drawing details, as manufactured by Tubelite Inc., Walker, MI; Special-Lite, Inc., Decatur, Michigan; YKK AP America Inc., Austell, GA; and EFCO, a Pella Company, are approved for bidding this project, subject to Architect's review of complete submittals in conformance with these specifications and drawing details.

2.02 MATERIALS

A. Aluminum:

1. All entrance and storefront framing members, doors and sub-frames, operator members, and trim molding extrusions shall be 6063-T5 and/or 6063-T6 alloy and temper (ASTM B 221 alloy G.S. 10A-T5).
2. Finish: All exposed aluminum surfaces of framing, doors, and trim shall be free of scratches and other serious blemishes and shall receive a Fluoropolymer Paint Coating that meets or exceeds American Architectural Manufacturer's Association Standard AAMA 2605, that include "Interpon", "Permafluor", and "Permadize" finishes. Coating shall be minimum 1.2 mils thick. Custom Color to match other building materials as selected by Architect; note – some manufacturers may require an additional clear top coat to prevent certain colors from fading, if color as selected by Architect requires such, Contractor shall provide same at no additional cost.
   a. Provide Owner with touch up paint to match painted aluminum finish(es).

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive, nonstaining, nonbleeding, and compatible with aluminum framing members, trim hardware, anchors, and other components. Where exposed, fasteners shall be stainless steel.

C. Perimeter Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated. When steel or iron anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Glazing Gaskets:
1. Glazing gaskets for doors shall be EPDM elastomeric extrusions or thermoplastic elastomer.
2. Glazing gaskets for TriFab VG 450 and 451T System framing shall be extruded EPDM rubber.

E. Thermal Barriers:
1. For TriFab VG 451T System shall be Kawneer Isolock Thermal Break with a 1/4" separation consisting of a two-part, chemically curing, high density polyurethane which is mechanically and adhesively joined to aluminum storefront sections.

F. Glass: As specified in Section 088000. All doors and frames hereinafter specified shall have glass field installed.

G. Joint Sealants: For installation at perimeter of aluminum-framed systems, see Section 079200.

H. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.03 ENTRANCE DOORS - SERIES 500 STILE AND RAIL

A. Fabrication
1. Door style shall be "Mid-Panel Type". Mid-Panel shall be flush aluminum, with required backing.
2. The door stile and the rail face dimensions of the entrance door will be as follows:

Door	Vertical Stile	Top Rail	Bottom Rail	Depth of Door
500	5"	5"	10”	1 3/4"

3. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1 1/8" long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
a. Accurately fit and secure joints and corners. Make joints hairline in appearance.
b. Prepare components with internal reinforcement for door hardware.
c. Arrange fasteners and attachments to conceal from view.
4. Major portions of the door stiles shall be nominal .125" in thickness and glazing molding shall be .050" thick.

B. Weatherstripping: Provide weather stripping locked into extruded grooves in door panels or frames as indicated on manufactures drawings and details.
1. Meeting stiles on pairs of doors shall be equipped with adjustable astragal utilizing wool pile with polymeric fin.
a. Meeting stiles between pairs of doors shall be sealed weathertight, whether doors are interior doors and/or exterior doors. Gaskets that leak air and/or water are not acceptable.
2. The door weathering on single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair weathering, comprised of thermoplastic elastomer weathering on tubular shape with semi-rigid polymeric backing.
3. Sill Sweep Strips: EPDM blade gasket sweep strip in aluminum extrusion applied to interior exposed surface of bottom rail with concealed fasteners.

C. Premachine doors in accordance with templates from the hardware manufacturers and approved hardware submittal (Section 087100). Provide all cutouts and reinforcement to comply with hardware requirements.
1. Architectural hardware supplier of Section 087100 shall ship all items of architectural hardware necessary for installation in aluminum doors/frames to Aluminum door/frame manufacturer for installation in the factory. All items shall be labeled with their proper identification mark of item numbers and door numbers for easy coordination with the hardware schedule furnished by the

hardware supplier of Section 087100.

2. Aluminum door manufacturer shall warrant the installation of the hardware with the doors, as well as, said installation shall not affect any extended warranties of said hardware as specified in Section 087100.

2.04 ENTRANCE FRAMING

A. Fabrication of Frames - General:
   1. Provide all reinforcement to comply with door hardware requirements furnished by the hardware supplier of Section 087100.
   2. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
      a. Profiles that are sharp, straight, and free of defects or deformations.
      b. Accurately fit and secure joints and corners; make joints flush, hairline and weatherproof.
      c. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
      d. Physical and thermal isolation of glazing from framing members.
      e. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
      f. Provisions for field replacement of glazing.
      g. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Fabrication - TriFab VG 450 System: The framing system shall provide for flush glazing on all sides with no projecting stops. Vertical and horizontal framing members shall have a nominal face dimension of 1-3/4". Overall depth shall be 4-1/2" with a 5/8" pocket width. All joints shall be flush, hairline, and weatherproof. Entrance framing members shall be compatible with glass framing in appearance. All single acting entrance frames shall include the Sealair positive barrier weathering.

C. Fabrication - TriFab VG 451T (Thermal Break)
   1. The framing system shall provide for flush glazing on all sides with no projecting stops.
   2. Vertical and horizontal framing members shall have a nominal face dimension of 2".
      a. TriFab VG 451T: Overall depth shall be 4-1/2".
   3. Entrance framing members shall be compatible with glass framing in appearance. All single acting entrance frames shall include the Sealair positive barrier weathering.
   4. All framing members shall incorporate a thermal barrier which eliminates all direct contact between interior and exterior aluminum sections.

D. Trim
   1. All related trim items such as closures, covers for corners/intersections of frames, jamb extenders, sills, etc., shall be fabricated of aluminum and provided by the manufacturer so as to form a complete packaged unit for installation. Exposed trim to have same finish as specified above. Where brake metal is used, it shall be approved by the Architect and shall be a minimum thickness of 1/16" (.0625) inch. Fastening shall be concealed. Seal exterior joints with sealant as recommended by manufacturer to assure water-tight joints.
      a. Sills shall include continuous concealed cleats.
      b. Submit shop drawing details for all aluminum covers illustrating fastening, lengths of members, and watertight seal between members.

E. Accessories
   1. Provide all required accessories for a complete installation as shown on working drawings or as required for a complete job.

2. Accessories shall include any necessary clip angles and structural mullion reinforcements that may be required for a complete installation.
3. All frames shall be installed in compliance with IBC 2009 wind loading requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive framing systems and sill plate is level in accordance with manufacturer's acceptable tolerances.

1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 INSTALLATION

A. General: Install aluminum storefront system and entrance doors, plumb, level, square and true to line, without warp or rack of frames by experienced workmen in accordance with manufacturer's prescribed tolerances and installation instructions and/or approved shop drawings. Maintain assembly dimensional tolerances aligning with adjacent work. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities. Provide alignment attachments and shims to permanently fasten system to building structure. Secure all doors, trim and related items in a neat workmanlike manner. All fastenings shall be concealed insofar as possible. Provide support and anchor in place. Where moldings are jointed, they shall be accurately cut and fitted to result in a tightly closed joint.

1. Installation of systems, including anchorage, shall be capable of withstanding wind load design pressures of minimum 20 psf (90 mph wind loads) to comply with the IBC 2009 Building Code.
2. Fully flash all exterior door/frame and/or window openings, including sills: As specified in Section 072500.

B. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points. All aluminum materials adjoining and coming in contact with mortar, concrete, plaster or other masonry materials shall be given one heavy brush coat of alkali resistant bituminous paint or zinc chromate.

C. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.

D. Fill completely all voids between framing and building structure and voids behind trim, covers, etc. with foam-in insulation specified in Section 072100.

E. All joints between framing and the building structure shall be sealed.

F. Set thresholds in bed of sealant.

G. Install door hardware in accordance with best trade practice, exercising care not to damage adjacent work, see Section 087100 for mounting locations. Inspect and adjust door closers and locks and other items requiring close adjustment for proper performance. All keying shall be checked for proper operation. Repair or replace damaged work to satisfaction of Architect.

3.03 PROTECTION AND CLEANING

A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system and entrance doors from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants during the course of construction. Remove and replace damaged aluminum storefront system and entrance door at no extra cost.

B. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. After glazing and sealing is completed, all aluminum, hardware, and glass shall be clean and free of temporary labels, any visible markings, and dirt. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

C. Clean up all debris resulting from this work. Clean off all marks and smudges and repair/replace all damage to adjacent materials. Remove all debris from the job site.

END OF SECTION 084113

SECTION 085113 – ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the Aluminum Window work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

B. Work includes, but is not necessarily limited to the following:
1. Field observations and measurements of all openings and conditions.
2. Provide factory glazed, thermally broken, aluminum windows, types as specified herein, together with necessary mullions, trim, expanders, installation hardware and all other accessories as required.
3. Sealing of all joints within each window assembly.
4. Sealing of entire exterior/interior perimeter of window units after installation. See Section 079200.
5. Treated wood blocking, fillers and nailers as required for secure installation. Bidders shall survey conditions of existing sills and jambs prior to bidding. Contractor shall be responsible for providing new blocking for portions of same that are deteriorated.
6. Insulation between window frames and adjacent construction.

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Joint Sealers - Section 079200.

1.03 STANDARDS/REFERENCES

A. Workmanship and materials shall meet requirements and recommendations of applicable portions of standards listed:
1. AAMA - American Architectural Manufacturer's Association
2. ANSI - American National Standards Institute
3. ASTM - American Society for Testing Materials
4. Glass and Glazing
    a. Federal Specifications, FS
    b. Insulating Glass Certification Council, IGCC
    c. Sealed Insulating Glass Manufacturers Association, SIGMA
    d. Flat Glass Marketing Association, FGMA
    e. Safety Glazing Certification Council, SGCC

B. General: In addition to requirements shown or specified comply with applicable provisions of AAMA/WDMA/CSA 101/I.S.2/A440-2011 (North American Fenestration Standard, NAFS-2011) for design, materials, fabrication and installation of component parts.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, recommendations and standard details for aluminum window units, including certified test laboratory reports as necessary to show compliance with

specified requirements.

B. Insulating Glass Certification: Provide insulating glass units permanently marked either on spacers or on at least one component pane of units with appropriate certification label of The Insulating Glass Certification Council (IGCC), include certification number, date, and manufacturer's identification mark.
   1. Submit IGCC certification number and related data for insulated glass.

C. Shop Drawings:
   1. Shop drawings shall meet requirements of applicable portions of General Conditions.
   2. Shop drawings shall show full size sections of all materials, the thickness of metal, details of construction, hardware and method of anchoring and attachment. Show the assemblage of windows with connecting work. Include glazing details and standards for factory glazed units.

D. Window Test Reports: Submit one copy of a certified test report, upon the Architect's request, for window type of subject project. Tests must have been conducted by an independent testing laboratory in accordance with current ANSI and ASTM procedures for air infiltration, water resistance, deflection and structural failure.

E. Maintenance Manual and Warranty(s): Submit one copy of manufacturer's maintenance manual describing proper job site storage, handling, post-installation cleaning and care of aluminum windows and hardware. Submit in same binder with specified warranty(s) at completion of Project.

F. Samples:
   1. Submit one sample of each required aluminum finish, on 3 x 3 inch long sections of extrusion shapes or aluminum sheets as required for window units.
   2. Submit additional samples, if and as directed by Architect, to show fabrication techniques, workmanship of component parts, and design of hardware and other exposed auxiliary items.
   3. Submit spandrel panel samples
   4. Submit insulated glass samples of each type of assembly

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer shall be experienced in the proper installation of aluminum windows and familiar with the product to be installed. The qualified bidder must verify that the bidder has been involved with the installation of this type of product in a minimum of 5 projects of similar scope and quality.
   2. Window manufacturer shall verify the competence of the installer and that the installer is an authorized agent of the window manufacturer.
   3. The manufacturer must verify that it has been engaged in the manufacturing of the product in their production facility for a period of five (5) years minimum.

B. Manufacturer's Representation: A representative of the window manufacturer shall inspect the final installation to determine if windows have been installed in accordance with manufacturer's recommendations and approved shop drawings. Window manufacturer shall review window installation with the installer prior to installer proceeding with the installation, and during the installation, in order to ensure compliance with manufacturer's installation requirements. Upon final inspection a report will be issued to the installer of any discrepancies and requirements for additional work; report shall be copied to the Architect. If additional work required, the manufacturer will provide another final inspection to verify acceptance of completed work.

C. Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.06 PRODUCT PERFORMANCE

A. Window Design Requirements:
   1. Manufacturer is responsible for designing system, including installation instructions and necessary modifications to meet specified requirements and maintain visual design concepts.
   2. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.
   3. Provide assemblies free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.
   4. Installation instructions are to take into account specified site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
   5. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
   6. Evacuate water without infiltration to interior from exterior face of wall, water entering joints, and condensation occurring within windows, by drain holes and gutters of adequate size or other acceptable method.
   7. Provide concealed fastening wherever possible.

B. Performance Requirements:
   1. Design Wind Loads - Allowable Stress Design (ASD)
      a. The design wind pressure for the project will be: 20 psf positive and negative; 25 psf negative at corner zones
      b. All structural components, including meeting rails, mullions and anchors shall be designed accordingly, complying with deflection and stress requirements as herein specified.
   2. Air, Water and Structural Performance Requirements
      a. When tested in accordance with cited test procedures, windows shall meet or exceed the following performance criteria, as well as those indicated in NAFS-2011 for Architectural AW Performance Class windows, Performance Grade 100 (AW100) unless otherwise noted herein.
         1) Test units shall not be smaller in either width or height than the “Gateway Test Size” specified in NAFS-2011 for AW Performance Class.
         2) “Downsize” testing to meet Optional Performance Class requirements specified herein shall not be permitted.
         3) Testing to previous, less stringent versions of NAFS shall not be acceptable.
         4) Test units shall employ manufacturer’s standard sealing, lock spacing and anchorage.
      b. Air Test Performance Requirements
         1) Air infiltration maximum 0.1 cfm per square foot at 6.24 psf pressure differential when tested in accord with ASTM E283.
      c. Water Test Performance Requirements
         1) No uncontrolled water leakage at 15.00 psf static pressure differential, with water application rate of 5 gallons/hr/sq ft when tested in accord with both ASTM E331 and ASTM E547. Static water test shall be repeated after application of design test pressures.
      d. Structural Test Performance Requirements
         1) Uniform Load Deflection Test
            i. No deflection of any unsupported span L of test unit (framing rails, muntins, mullions, etc.) in excess of L/175 at both a positive and negative load of 100 psf (design test pressure) when tested in accord with ASTM E330.
         2) Uniform Load Structural Test
            i. Unit to be tested at 1.5 x design test pressure, both positive and negative, acting normal to plane of wall in accord with ASTM E330.

ii. No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make windows inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2% of its clear span.

3. Life Cycle Testing: When tested in accordance with AAMA 910-10, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage that would cause the window to be inoperable at the conclusion of testing.
   a. Air infiltration and water resistance tests shall meet the primary performance requirements specified after completion of 4000 operational cycles plus thermal cycling.
   b. Testing to previous, less stringent versions of AAMA 910 shall not be acceptable.
4. Condensation Resistance and Thermal Transmittance Performance Requirements: Perform thermal tests in accordance with NFRC 102 and/or AAMA 1503, or provide finite element computer thermal modeling and calculations per NFRC 100, NFRC 705 or AAMA 507, using DOE/LBL THERM, WINDOW, and/or CMAST software.
   a. Thermal Transmittance (U-Factor) for the overall window area shall be less than or equal to the following BTU/hr-ft^2-°F for a fixed area and .50 for a project out area:
      1) 2250i Series: .35 BTU/hr-ft^2-°F for a fixed area
      2) 3250i Series: .36 BTU/hr-ft^2-°F for a fixed area
      3) 4250i Series: .38 BTU/hr-ft^2-°F for a fixed area
   b. Solar Heat Gain Coefficient (SHGC) for the overall window area shall not exceed .37.
   c. Condensation Resistance Factor (CRF) requirements: CRF minimum 61 (Frame) and CRF minimum 71 (Glass).
5. Acoustic Performance Requirements
   a. Perform acoustical tests in accordance with ASTM E90 and ASTM E1425 on the glass type(s) specified in 08 80 00, rigidly supported in aluminum framing of the same product type.
   b. “Glass-only” test results shall not be acceptable.
   c. Sound Transmission Class (STC) shall not be less than 31.
   d. Outdoor-Indoor Transmission Class (OITC) shall not be less than 25.

C. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards. Glass shall be graded in accordance with ASTM 1036 Standard Specification for Flat (Annealed) Glass and ASTM C1048 Standard Specification for Heat Treated Flat Glass for Heat Strengthened, Fully Tempered, Glass. Tempered glass must meet Safety Glazing Standards and be certified when installed in doors and/or enclosures, as well as meeting ASTM C1048. All glass shall bear the manufacturer's label, giving manufacturer's name, quality, weight and thickness.

1.07 WARRANTIES

A. Furnish Manufacturers warranties as follows. All warranties shall start on the date of final payment of the Project:

1. Windows: Shall be fully warranted against any defects in material or workmanship under normal use and service for a period of ten (10) years. The warranty shall include window extrusions, weatherstripping, panning, trim, and all hardware.
2. Finish: The pigmented organic finishes on exposed surfaces of windows and component parts (such as panning, trim, mullions and the like) shall be certified as complying fully with requirements of AAMA designations for pigmented organic coating and fully warranted against chipping, peeling, cracking or blistering for length of years as follows:
   a. Exterior Finish per AAMA 2605 – Twenty (20) years.
   b. Interior Finish per AAMA 2603 – Five (5) years.

3. Insulated Glass and Spandrel Panels: Warranted from visual obstruction due to internal moisture for a period of ten (10) years. Cover premature failure of glass or permanent material obstruction of vision due to failure of the glass seal. Failure of glass seal is defined as evidenced by intrusion of dirt or moisture, internal condensation or fogging at temperature above -20°F. (-28°C), deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance.

1.08 DELIVERY, STORAGE AND HANDLING

A. Packing, Shipping, Handling and Unloading: All aluminum windows shall be packed, loaded, shipped, unloaded, stored and protected in a manner which will avoid abuse, damage and defacement in accordance with AAMA CW-10. All miscellaneous aluminum trim, hardware and accessories shall be individually wrapped and crated.

B. Storage and Protection:
1. Store in a clean, well drained area free of dust and corrosive fumes.
2. Stack vertically or on edge so that water cannot accumulate on or within materials. Use nonstaining wood or plastic shims between components to provide water drainage and air circulation.
3. Cover materials with tarpaulins or plastic hung on frames to provide air circulation and prevent contaminants and condensation from contacting aluminum.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Aluminum windows and related materials, as hereafter specified, are INvent™ Series Thermal Barrier Fixed and Projected Windows as manufactured by Wausau Window and Wall Systems. Series as follows, refer to drawings for locations of frame depths:
1. Series 2250i, 2 1/2” Frame Depth.
2. Series 3250i, 3 1/2” Frame Depth.
2. Series 4250i, 4 1/2” Frame Depth.

B. Additional Manufacturers desiring approval of products of equal design/performance specifications must submit the “Substitution Request Form” from Section 012513.25 according to requirements of Section 012513, along with window and spandrel panel samples, to be considered for approval by the Architect during bidding. If construction details will vary from those as shown on drawings, complete details must be submitted with the “Substitution Request Form” for review.

2.02 WINDOW MATERIALS

A. Aluminum Framing Members
1. Extruded aluminum billet, 6063-T5 or T6 alloy for primary non-radius components; 6063-T5 or T6, 6005-T5, 6105-T5 or 6061-T6 for anchor components; all meeting the requirements of ASTM B221.
2. Aluminum sheet alloy 5005-H32 (for anodic finishing), or alloy 3003-H14 (for painted or unfinished sheet) meeting the requirements of ASTM B209.
3. Principal window frame and sash ventilator members will be a minimum 0.125" in thickness at hardware mounting locations.
4. Extruded or formed trim components will be a minimum 0.060" in thickness.
5. Frame depth as detailed.
   a. Head, jamb and sill receptors as specified below.

6. Sash ventilator sections must be tubular, and close flush with adjoining frame surfaces at interior and exterior.
    a. Overlap sash ventilators will not be accepted.
7. Aluminum Finish: All exposed aluminum surfaces shall be free of scratches and other serious blemishes and shall receive a Fluoropolymer baked enamel finish as follows. Colors as selected by Architect from manufacturer's standard and/or custom colors as required to match other building materials; note – some manufacturers may require an additional clear top coat to prevent certain colors from fading, if color as selected by Architect requires such, Contractor shall provide same at no additional cost.
    a. Provide Owner with touch up paints to match painted aluminum finish(es).
    b. Fluoropolymer finishes:

Designation	Description	Standard
Interior Paint Non Metallic, non-bright	50% PVDF, Enamel, Acrylic or Polyester	AAMA 2603
Exterior Paint Non Metallic, non-bright	70% PVDF	AAMA 2605

B. Fasteners: Aluminum, stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
1. Do not use exposed fasteners on exterior except where unavoidable for application of hardware. Match finish of adjoining metal.
2. Provide non-magnetic stainless steel, tamper-proof screws for exposed fasteners, where required, or special tamper-proof fasteners.
3. Locate fasteners so as not to disturb the thermal barrier construction of windows.

C. Anchors, Clips and Window Accessories: Depending on strength and corrosion-inhibiting requirements, fabricate units of aluminum, non-magnetic stainless steel or hot-dip zinc coated steel or iron complying with ASTM A123.
1. All necessary accessories such as anchors, screws, rawl plugs, etc., to install any and all materials shall be furnished by the window manufacturer.
2. Anchoring: Material shall be of adequate strength required to meet the uniform load deflection and structural testing specified above.
3. Concealed steel anchors and reinforcing shall be factory painted after fabrication with TGIC powder coating, or rust-inhibitive primer complying with Federal Specification TT-P-645B.

D. Sealant:
1. All sealants shall comply with applicable provisions of AAMA 800 and/or Federal Specifications FS-TT-001 and 002 Series.
2. Frame joinery sealants shall be suitable for application specified and as tested and approved by window manufacturer.
3. Refer to Section 079200 for perimeter sealants between window units and surrounding construction.

E. Insect Screens: All operators shall be provided with screens.
1. Fabric: 18 x 16 aluminum bright mesh retained in tubular aluminum frames with vinyl splines that permit easy replacement.
2. Frames: Extruded aluminum sections with corners mitered and crimped with corner gussets. Finish to match exterior aluminum window finish.
3. Screens with wickets to cover operating portion of windows.

F. Hardware
1. All steel components including attachment fasteners to be stainless steel except as noted.
2. Extruded aluminum components 6063-T5 or -T6.
3. Locking handles, bases and strikes to be die cast, white bronze or stainless steel in manufacturer's standard surface finish.
4. Thermo-plastic or thermo-set plastic caps, housings and other components to be injection-molded nylon, extruded PVC, or other suitable compound.
5. Hardware to be occupant-operated and include: stainless steel four-bar hinges, locking cam handles, concealed friction adjusters, concealed limited opening devices.)

G. Glazing Materials
1. Setting Blocks/Edge Blocking: Provide in sizes and locations recommended by GANA Glazing Manual. Setting blocks used in conjunction with soft-coat low-e glass shall be silicone.
2. Back-bedding tapes, expanded cellular glazing tapes, toe beads, heel beads and cap beads shall meet the requirements of applicable specifications cited in AAMA 800.
3. Glazing gaskets shall be non-shrinking, weather-resistant, and compatible with all materials in contact.
4. Structural silicone sealant where used shall meet the requirements of ASTM C1184.
5. Spacer tape in continuous contact with structural silicone shall be tested for compatibility and approved by the sealant manufacturer for the intended application.
6. Gaskets in continuous contact with structural silicone shall be extruded silicone or compatible material.

2.03 WINDOW FABRICATION AND ACCESSORIES

A. General: Provide manufacturer's standard fabrication and accessories which comply with specifications. Include complete system for assembly of components and anchorage of window units and provide complete pre-glazing at the factory.
1. Finish, fabricate and shop assemble frame and sash ventilator members into complete windows under the responsibility of one manufacturer.
2. No bolts, screws or fastenings shall impair independent frame movement, or bridge the thermal barrier, unless such bridging was also present in thermal test units and thermal models.
3. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -30 °F to +180 °F.

B. Frames:
1. Cope and mechanically fasten each corner, or miter and weld, or corner block each corner; then seal weather tight.
2. Make provisions for continuity of frame joinery seals at extrusion webs.

C. Main Sash Ventilator
1. Miter all corners and mechanically stake over a solid extruded aluminum corner block, set and sealed in epoxy, leaving hairline joinery, then sealed weather tight.
2. Make provisions for continuity of sash ventilator joinery seals at extrusion webs.

D. Thermal Break Construction:
1. Continuous extruded polyamide with 25% glass fiber reinforcing, mechanically crimped into cross-knurled cavities.
2. Minimum thermal barrier width 24 mm.
3. Quality assurance records must be maintained and available as requested.

E. Weather-stripping:
   1. Bulb- or fin-type neoprene, EPDM, dual-durometer PVC, polypropylene, TPE, or other suitable material as tested and approved by the window manufacturer.
   2. Miter, crowd, stake or join at corners. Provide drainage to exterior as necessary.
   3. Weather-stripping shall provide an effective pressure-equalization seal at the interior face of the sash ventilator.

F. Hardware:
   1. Concealed Hinges: Provide two stainless steel concealed four-bar adjustable friction hinges per vent meeting AAMA 904.1.
   2. Locks
      a. Die cast, lacquered or e-coated white bronze, or stainless steel cam locks, strikes and/or keepers for manual operation shall secure sash in closed position.
      b. Provide locks for ventilators at maximum 40" spacing; 50” for single operator multi-lock hardware.
      c. Provide double grip hardware activated by a lower device for locks exceeding 6'-0" from floor.
   3. Limited Opening Device*:* Provide concealed device to limit initial sash operation to 4".

G. Insulated Glass Units: Windows (fixed and operators) shall be factory glazed with sealed insulating glass units, except where indicated to receive Spandrel Panels as specified below.
   1. General:
      a. Insulated Glass shall consist of outer and inner panes of 1/4" thick annealed glass, sealed with argon filled air space. Outer pane shall be tinted as selected by the Architect and assembly shall include Low-E coating. Overall thickness of assembly shall be 1”. Glazing manufacturer has the option of substituting tempered glass panes in lieu of annealed, in order to maintain integrity of glazing under varying thermal conditions and to maintain the manufacturer’s warranty.
      b. Exterior insulating glass edge seal shall be equal to “Super Spacer Premium Plus” as manufactured by Edgetech, a division of Lauren International, Inc. Material shall be thermal resistant, flexible tape of all silicone foam and include dual-seal adhesives.
      c. Where “obscure glass” is indicated, inner pane shall be patterned glass with Low-E coating (0.200” (7/32”) thick is acceptable). Submit patterns for Architect selection, product selections shall include
         1) "Pattern 62", "Textured Flutex" and/or “Krystal Flutes“ as manufactured by AFG Industries; and “Skytex” and/or “English Reeded” available through TGC (Torstenson Glass Company).
         2) Fluted Glass Patterns and/or Decorative Architectural Art Glass Patterns as manufactured by Rudy Art Glass Studio, York, PA.
   2. Performance features of insulated glass assembly shall be equivalent to the following:
      a. PPG Solarban 60 Solar Control Low-E - Solarban 60 (3) Bronze* (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.32), or
      b. Pilkington’s Series of Uncoated Float Glass Outer Lite and Energy Advantage Low-E Inner Lite (#3 Surface) - Optifloat Bronze* Tint (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.45); or
      c. Guardian’s SunGuard Low-E Product SuperNeutral 68 (SN 68) (3) with Bronze* Outboard (Versalux) (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.31).
      d. *Actual tint shall be as selected by Architect upon review of submitted samples.
      e. Other manufacturers’ products, conforming to these specifications and above product performance features, will be considered upon review of submittals of representative samples and corresponding data.
   3. Submit samples of glass insulating assemblies for Architect review/approval.

4. Sealed insulated glass shall be tested and certified in accord with ASTM E2190.
5. Glazing method shall be in general accordance with the GANA Glazing Manual for specified glass type, or as approved by the glass fabricator.

H. Spandrel Panels shall be Customized Laminated MapeShield Panels as manufactured by Mapes Industries, Inc., Lincoln, NE. 2" thick laminated panels shall consist of the following:

1. Outer pane of 3/16" - 1/4" thick fully tempered float glass with fused on inorganic ceramic enameled frit coating on interior surface in color to match Tinted Glass Panels specified above.
2. Galvanized Steel Impact Resistant Layer
3. Rigid Insulation to be adhered to interior surface of glass panel shall be thickness as required to achieve overall 2" thick laminated panel: 1.7-lb density Isocyanurate.
4. Inside face shall be smooth mill finish aluminum on 1/8" tempered board.
5. Panels shall be factory fabricated with adhesives compatible with all components and as approved by component manufacturers.
   a. Approx. Total R-Value = 13.53
   b. Approx. Total U-Value = 0.07
6. Fixed window units where indicated shall be factory glazed with Spandrel Panels as specified herein.

I. Trim: All related trim items such as head, jamb, sill, receptors, etc., interior and/or exterior, shall be furnished by the window manufacturer so as to form a complete packaged unit for installation. Trim to be aluminum 6063-T5 alloy; all exposed trim to have same finish as windows, minimum 0.0625 inch wall thickness. All joints shall be sealed with quality grade sealant to ensure water tight joints. Fastening shall be concealed.

2.04 MISCELLANEOUS ACCESSORIES

A. Treated Wood Blocking and/or Shims: As specified in Section 061000.

B. Batt and/or Foam Insulation: As specified in Section 079200.

C. Flashings for Wall Openings: As specified in Section 072500.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive units.

B. Perform operations as necessary to prepare openings for proper installation and operation of new construction units.

C. Existing Construction:

1. Do not remove existing windows until new replacements are available and ready for immediate installation. Do not leave any openings uncovered at end of working day, during wind-driven precipitation or during excessively cold weather.
2. Remove existing work carefully; avoid damage to existing work to remain.

3.02 INSTALLATION AND PROTECTION

A. Fully flash all window openings, including sills: As specified in Section 072500.

B. Erection:

1. Install windows with skilled tradesmen in exact accordance with approved shop drawings, specifications, manufacturer's recommendations, and the AAMA Commercial Window and Door Installation Manual for installation of window units, hardware, operators and other components of work.
2. In no case shall attachment to structure or to components of the window system be through or affect the thermal barriers of the window units.
3. All units to be set plumb, level, square and true to line, without warp or rack of frames or sash, in accordance with manufacturer's prescribed tolerances and installation instructions and/or approved shop drawings.
4. Anchor securely in place. Secure all frames, window mullions, trim and related items in a neat workmanlike manner. All fastenings to be concealed insofar as possible.
   a. Installation of windows, including anchorage, shall be capable of withstanding wind load design pressures of minimum 20 psf (90 mph wind loads) to comply with the IBC 2009 Building Code.
5. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action. Aluminum that is not organically coated shall be insulated from direct contact with steel, masonry, concrete or noncompatible materials by bituminous paint, zinc chromate primer, non-conductive shims, or other suitable insulating material.
6. Wedge fiberglass insulation between frames of new windows and construction to remain, or between frames and new receptor as applicable. Compress fiberglass to no less than 50 percent of original thickness. Fill completely all voids between framing and building structure and voids behind trim, covers, etc. with batt insulation.
7. Set sill members and other members in bed of compound as shown, or with joint fillers or gaskets as shown, to provide weathertight construction. Seal units following installation and as required to provide weathertight system.

C. The Contractor shall be responsible for the protection of the windows during the course of construction.

D. Back-up For Caulking: Provide expanded, extruded polystyrene filler for back-up at locations receiving exterior caulking sealant at head, sill and jamb.

E. All butt joints of trim and windows which occur at job site, as well as interior and exterior perimeters of units, are to be sealed by the erector. Prepare surfaces and apply sealants as recommended by manufacturer and in accordance with Section 079200.

3.03 CLEANING

A. After installation, windows and glazing shall be inspected, adjusted, and left clean and free of temporary labels, any visible markings, and dirt. Protect finished installation from damage.

1. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and moving parts.
2. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.
3. Adjust operating vent and hardware to provide tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.

B. Clean up all debris resulting from this work and clean off all marks and smudges, repair all damage, replace damaged materials and remove all debris from the job site.

C. Leave window units closed and locked.

END OF SECTION 085113

SECTION 086200 - UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the unit skylight work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

B. The work includes, but is not limited to, the following:
1. Double dome standard acrylic skylights
2. All skylights shall include curbs, gaskets, fasteners/ hardware, perimeter flashing, sealants and glazing materials as required for complete weathertight installation.

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

1.03 STANDARDS

A. Skylight unit workmanship and materials shall meet requirements and recommendations of applicable portions of standards listed.
1. American Society for Testing and Materials, ASTM.
2. American National Standards Institute, ANSI.
3. American Architectural Manufacturer's Association, AAMA, including but not limited to AAMA/WDMA 101/I.S.2.
4. Aluminum Association, AA; including Specifications for Aluminum Structures SAS-30

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, product specifications, installation instructions, and other pertinent information as applicable for each product or material specified.

B. Furnish manufacturer's written certification that the skylight units are manufactured in accordance with requirements stated herein.
1. Submit certified test reports, made by an independent testing organization for each type of skylight system, verifying that the material will meet all performance requirements of this specification. Previously completed test reports will be acceptable if current and indicative of products used on this project. Test reports shall not be over two (2) years of age.

C. Shop Drawings: Shop drawings shall meet requirements of applicable portions of General Conditions. Shop drawings shall show gages, profiles, sections of materials, details of construction, methods of attachment and/or anchoring, all as applicable for specified materials.
1. Include dimensional requirements of structural steel supports for manufacturer’s nominal size skylight.

D. Samples: Submit the following samples.
1. Aluminum Finish: Submit color charts or range samples for initial color selection. Submit finished sample of color selected for use on 4" piece of metal.

2. Glazing Materials:
    a. Submit 4" long bead of sealant color.
    b. Submit 4" by 4" actual Acrylic color samples.

E. Submit Manufacturer's written certification that the Skylight is warranted per Paragraph 1.07 of this Section.

1.05 DESIGN CRITERIA

A. Provide unit skylights capable of complying with design criteria indicated, based on testing manufacturer's unit skylights that are representative of those specified.

B. Thermal Expansion: System to provide for expansion and contraction within the system components caused by a cycling temperature range of +/- 60 degrees F from ambient temperature without causing any detrimental effects to the system or components, i.e., buckling, stresses on glass, failure of seals, undue stress on structural elements, reduction of performance, etc.

C. Design Load Criteria: The skylight systems shall be designed to support loads as prescribed by governing codes, the structural drawings, and/or as specified herein:

1. Wind: 90 mph.
2. Negative Wind Load 30 PSF
3. Positive Wind Load 30 PSF
4. Snow Load 30 PSF
5. Concentrated Load 250 lbs.

D. Moisture Control/Water Resistance: The skylight framing/flashing shall have integral condensation gutters that collect and control all condensation and/or infiltrated water.

E. Plastic (acrylic) skylights shall meet the requirements of American Architectural Manufacturer's Association (AAMA) publication "Voluntary Uniform Load Structural Standard for Plastic Domed Skylights" (Latest Edition) which requires acrylic thickness adequate to withstand a positive and negative test pressure of 60 PSF, minimum. Skylights shall have been tested by an independent certified test laboratory per AAMA "Voluntary Test Method for Thermal Transmittance of Skylights".

F. Performance Requirements:

1. Allowable air infiltration shall not exceed 0.06 CFM of the total glazed surface area when tested in accordance with ASTM E283 at static pressure of 6.24 PSF.
2. No uncontrolled water leakage shall occur when the system is tested in accordance with ASTM E331 at a static pressure of 6.24 PSF.
3. Uniform load structural according to ASTM E330 +60/-60 PSF.

1.06 QUALITY ASSURANCE

A. Work of this Section, including design, engineering, fabrication, finishing, preparation at the job site, erection and glazing of the skylight system shall be the responsibility of the skylight manufacturer. The manufacturer shall be regularly engaged in the preceding phases of construction of skylights and be able to demonstrate that he has successfully performed on comparable projects over the prior 5 years.

1.07 WARRANTY

A. All Skylights: Skylight Manufacturer/Installer shall guarantee that the installation will remain weathertight for a period of five (5) years from the date of final payment of the project. Skylight

manufacturer further agrees to repair or replace work that exhibits defects in materials or workmanship during the guarantee period at no cost to the Owner. Warranty shall include, but not be limited to the following:

1. Framing system will be free of defects in materials and workmanship for a period of five (5) years from the date of final payment.
2. Glazing materials will be free of defects in materials, delamination, seal failure, and manufacture for a period of five (5) years from the date of final payment.
3. Aluminum finish guarantee not less than five (5) years from date of final payment, providing for non-prorated material and replacement cost. Aluminum finish shall be guaranteed by the manufacturer against crazing, chipping, cracking, checking or peeling.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect skylight units during delivery, storage and handling to comply with manufacturer's directions and as required to prevent damage to glazing and framing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

PART 2 PRODUCTS

2.01 UNIT SKYLIGHTS

A. Unit Skylights: Shall be Double Dome Standard Acrylic Skylights (Curb Mounted) as manufactured by Fiore Skylights, Inc., Somerdale, NJ. Nominal size of acrylic skylights shall be as indicated on drawings and as required to suit existing openings, field verify.

1. Products, conforming to these specifications, manufactured by the following manufacturers are approved for bidding this project:
   American Skylights
   Carlisle's and/or Versico's SunWeld Aluminum-welded commercial skylights
   Firestone SunWave Daylighting System

B. Acrylic Skylights shall be factory assembled units consisting of 100% sealed acrylic double domes, with condensation wicks, held in place by fully welded extruded aluminum retaining frame and extruded aluminum thermal break curb frame with weep holes. All aluminum components to be fabricated from 6063-T5 or T6 aluminum extrusion having a minimum thickness of .060" with an integral condensation gutter and sanoprene gaskets and butyl seals between retainer and dome. Corners shall be welded by the heliarc process to insure a leakproof quality.

1. Aluminum Finish: All exposed surfaces shall be free of scratches and other serious blemishes and shall receive a Fluoropolymer Paint Coating that meets or exceeds American Architectural Manufacturer's Association Standard AAMA 2604 or 2605. Coating shall be 1.2 mils thick. Color as selected by Architect, including "custom" colors as required to match other building materials. Custom colors shall not be limited to a manufacturer's standard "custom" colors.
2. Acrylic (Plastic) Sheets: Shall be monolithic, formable, transparent, tinted, and/or translucent sheets with good weather and impact resistant, conforming to ASTM D 4802, thermoformable, acrylic (methacrylate), Category C-2 or CC-2, Type UVA (formulated with ultraviolet absorber), with Finish 1 (smooth or polished). At manufacturers option, polycarbonate may be provided in lieu of acrylic.
   a. Colors of inner and outer domes as selected by Architect from Clear, white, and/or bronze. Outer/Inner: White (translucent)/clear (Solar Heat gain Coefficient 0.30)
   b. Profile: Dome, 25 percent rise
   c. Thickness of acrylic shall be as required to meet design criteria specified in Paragraph 1.05. Manufacturer shall submit certification showing submitted acrylic thickness meets design criteria.

d. U-Value for double dome shall be 0.7 Btu/ft² .h .°F.

3. Fasteners: Aluminum or stainless steel of a type which will not cause electrolytic action or corrosion. All exposed fasteners to be finished to match aluminum frame.
4. Glazing Continuous extruded black E.P.D.M. or silicone compatible gasket.
5. Integral Curbs: Fabricate from minimum 0.090 inch thick sheet aluminum, insulated with minimum 1/2 inch polyisocyanurate insulation. Provide a 1 by 4 inch nominal treated wood nailer at the top. Height of curb as detailed on drawings.

PART 3 EXECUTION

3.01 INSPECTION

A. Prior to starting installation, the skylight installer shall inspect the support and adjacent construction to verify that it is properly prepared to receive the work. Report, in writing, any deficiencies in the substrate. Work shall not proceed until all deficiencies are corrected.

3.02 PREPARATION

A. Surface contact between aluminum and dissimilar materials shall receive a protective coating or isolator to prevent electrolytic action.

3.03 INSTALLATION

A. The skylight shall be glazed and installed by the skylight manufacturer.

B. Installation shall be in strict accordance with these specifications and the manufacturer's shop drawings and installation instructions. Ensure that weep and condensation control system operates properly. Do not perform structural silicone sealant work when the air temperature is below 32 degrees F.

C. The skylight installation shall be complete, including all related flashings, fasteners, hardware, sealants and glazing materials, required for a complete, weatherproof installation.

D. Tops of curbs shall receive coating of mastic, provided by installer, to form watertight seal between skylight curb frame and curbing.

3.04 PROTECTION AND CLEANING

A. Aluminum surfaces shall be protected from any alkaline substances which may wash from the building during construction.

B. All glazing materials shall be cleaned before final acceptance using the recommended procedures.

END OF SECTION 086200

SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the hardware work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

B. The Base Bid shall include additional hardware sets as specified in Section 004116.1 “Bid Form”. The Contract amount shall include price for installation of said hardware in locations as directed by the Owner and/or turning said hardware over to the Owner.

C. Regarding hardware herein specified with electrical features and/or requiring electrical interface: This Contractor shall be familiar with the installation requirements of the hardware and shall have reviewed the extent of interface work shown on electrical drawings and/or the sufficiency of the work if shown as “by others”; any additional work required to complete the installation, even if not shown, as well as, any change from that shown, shall be the responsibility of this Contractor. All accessories required for a fully functioning system shall be provided whether all part numbers for same are listed or not.

1. This Contractor shall run all wiring and make all final connections to complete the installation for all electrical items not shown to be wired/connected under the Electrical Contract. All electrical wiring shall be concealed.
    a. All wiring and connections of electric strike, frame harness, and power supply between each other and back to termination point at the door jamb shall be by the hardware installer. All electrical wiring shall be concealed. Continuation of wiring to a card reader and all connections shall be by the Electrical Contractor.

1.02 RELATED WORK IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Metal Doors and Frames - Section 081100.

C. Wood Doors - Section 081400.

D. Coiling Doors - Section 083300.

E. Aluminum Framed Entrances and Storefronts - Section 084113.

1.03 CODES AND REGULATIONS

A. Hardware listed or furnished shall meet requirements of federal, state, local and other code authorities having jurisdiction (AHJ), including but not limited to:

1. NFPA (National Fire Protection Association), including but not limited to NFPA 70 (National Electric Code), NFPA 80 (Standard for Fire Doors) & 252, NFPA 101 Life Safety Code (Means of Egress Door Hardware), and NFPA 105 (Smoke and Draft Control Door Assemblies)
2. IBC 2009 Section 1008
3. ANSI A117.1.

B. Remove any item furnished or installed that does not meet code requirements and substitute proper item at no additional cost to Owner.

C. Hardware supplier shall furnish all hardware necessary to meet applicable codes whether indicated on listing or not.

D. All electrical work shall be in accordance with the National Electric Code, NEC.

E. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibilities Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, FED-STD-795, "Uniform Federal Accessibility Standards."

1. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
2. Door Closers: Comply with the following maximum opening-force requirements indicated:
   a. Interior Hinged Doors: 5 lbf applied perpendicular to door.
   b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
3. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches from latch, measured to leading edge of door.

F. NFPA 101: Comply with the following for means of egress doors:

1. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
2. Thresholds: Not more than 1/2 inch high.

G. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.

1. Test Pressure: Positive pressure labeling.
2. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

H. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at tested pressure differential of 0.3-inch wg of water.

1.04 STANDARDS OF MATERIALS

A. The architectural hardware specified indicates a minimum in types, sizes and quality that is to be furnished. Architectural hardware of other manufacturers acceptable by the Architect and the Owner may be considered as an equal providing gauges and type of metal, sizes of items specified are equal to those specified.

B. The Architectural hardware specified indicates an exactness in quality of material, types, article of assembly that is to be furnished. Deviations from the products listed will be basis for the rejection of the material submitted.

C. Hardware bids shall be based upon the materials specified. Substitutions will not be allowed unless submitted in writing, with samples of the items to be substituted, ten (10) days prior to bid opening. Only by

written addendum shall any items be approved for substitution.

D. Standards: All hardware specified herein shall comply with the following industry standards:
   1. ANSI/BHMA (Builders Hardware Manufacturers Association) A156 Standards and Directories for Hardware
   2. Fire Rated Hardware shall be listed by UL (Underwriters Laboratories Inc.)
      a. UL10C – Positive Pressure Fire Tests of Door Assemblies

E. DHI - Door and Hardware Institute

1.05 COORDINATION

A. The General Contractor and architectural hardware supplier shall coordinate with Owner and Architect to verify function of hardware to suit flow of traffic, purpose of each area, and degree of security required, prior to submittal of shop drawings.

B. The General Contractor shall supply the architectural hardware supplier with shop drawings for doors and frames to enable the hardware supplier to verify the dimensions of materials to be furnished and notify the supplier of any changes in the shop drawings which will affect the hardware.

C. Templates shall be issued to the door and frame suppliers for use in preparing doors and frames for hardware items.

D. The architectural hardware supplier shall coordinate his work with the suppliers of wood, hollow metal, and aluminum doors and frames in order that all work may progress at all possible speed.

E. Door hardware shall be shipped by hardware supplier to aluminum door/frame manufacturer for installation into aluminum doors and aluminum frames. All items of architectural hardware necessary for installation in these doors and frames shall be labeled with their proper identification mark of item numbers and door numbers for easy coordination with the hardware schedule furnished by this supplier.

F. The architectural hardware supplier shall coordinate installation of all electrically operated hardware with the Electrical Contractor. Electrically operated hardware herein specified shall be fully wired and connected by this Contractor/hardware supplier/installer, unless otherwise noted.
   1. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

1.06 SUBMITTALS

A. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.

B. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in “QUALITY ASSURANCE” article, herein.

C. Product Data: Submit manufacturer's catalog cuts, technical data, product specifications, installation instructions, operational descriptions, finishes, and other pertinent information as applicable for each product or material specified.
   1. Product Certificates for electrified door hardware, signed by manufacturer: Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

2. Certificates of Compliance:
    a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
    b. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference.
3. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.

D. Shop Drawings: Shop drawings shall meet requirements of applicable portions of General Conditions.

E. Samples:
1. Physical and operating samples of hardware shall be submitted if requested by the Architect.
2. Include one representative piece of each item requested, properly tagged for intended use.
3. Samples will be retained by architect until work is nearly completed and then be fully incorporated in the project.

F. 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, as well as, coordinate function of hardware with Owner as specified in Paragraph 1.05.A. Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
1. Door Index; include door number, heading number, and Architects hardware set number.
2. Opening Lock Function Spreadsheet: List locking device and function for each opening.
3. Type, style, function, size, and finish of each hardware item.
4. Name, catalog number, and manufacturer of each item.
5. Fastenings and other pertinent information.
6. Location of each hardware set cross-referenced to indications on Drawings.
7. Explanation of all abbreviations, symbols, and codes contained in schedule.
8. Mounting locations for hardware.
9. Door and frame sizes and materials.
10. Name and phone number for local manufacturer's representative for each product.
11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include how door will operate on egress, ingress, and fire and smoke alarm connection.
12. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

G. The architectural hardware supplier shall submit wiring diagrams for all hardware with electrical features, illustrating a point-to-point diagram of all components. Wiring diagrams shall be coordinated with the Electrical Contractor where hardware of this Section is interconnected with access/security systems provided by the Electrical Contractor. Include:
1. Wiring Diagrams for power, signaling, monitoring, communication, and control of electrified hardware. Differentiate between manufacturer-installed and field-installed wiring.
2. Details of interface of electrified door hardware and building safety and security systems.
3. Schematic diagram of systems that interface with electrified door hardware.
4. Point-to-point wiring.

5. Risers.

H. Key Schedule: After Keying Conference, provide keying schedule listing levels of keying.
1. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks and cylinders.
2. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
3. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
4. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
5. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
6. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
7. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.

I. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.

J. Contractor shall submit Verification of Final Adjustment of Door Hardware (as specified in Paragraph 3.02.E) with the Contractor's Closeout Submittals as specified in Section 017700. Also, at completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

K. Operation and maintenance manuals for all hardware: Submit as specified in Section 017700 and include the following:
1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
2. Catalog pages for each product.
3. Name, address, and phone number of local representative for each manufacturer.
4. Parts list for each product.
5. Final approved hardware schedule, edited to reflect conditions as-installed.
6. Final keying schedule
7. Copies of floor plans with keying nomenclature
8. As-installed wiring diagrams ('as-built' point-to-point wiring schematics, door elevation/riser diagrams) for each opening connected to power, both low voltage and 110 volts.
9. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.07 QUALITY ASSURANCE

A. Standards of Architectural Hardware Suppliers: It is a requirement of the firm submitting proposal for this work to have been an established firm for a minimum of five (5) years. This firm must have a qualified member in good standing with Door and Hardware Institute (DHI) and certified as an Architectural Hardware Consultant (AHC) in his employ to handle the details of scheduling and delivery, and to assist with the proper installation of the hardware.
1. Supplier shall also be a recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced architectural hardware consultant who is available, at

reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

2. Architectural Hardware Supplier & Consultant responsibilities include, but are not limited to:
   a. Preparation of door hardware and keying schedules
   b. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
   c. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
   d. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

B. All products of a similar nature shall be the product of a single manufacturer.

C. Any description or schedule shown in this section is intended to indicate general quality and type of hardware required for particular opening listed but such description or schedule shall not be construed to denote that no other items or hardware will be required for the project.

1. Intent of Hardware Sets:
   a. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
   b. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, submit written statement of such omission, error, or other discrepancy to Architect during the bidding period for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

D. Should it be determined that hardware as specified in certain locations, due to detail or size of members to which hardware is to be applied, is unsuitable, provide in lieu thereof proper hardware, similar in operation, equivalent to type specified, sizes specified being considered minimum.

E. Sizes and Weight: Size, weight and quality specified for all hardware is to be considered minimum acceptable.

F. Pre-installation Conference: Conduct conference at Project site, after hardware submittals have been reviewed and prior to installation of any hardware, to insure proper installation and provide for any adjustments or replacements of hardware as required. In addition to the Project Architect, the General Contractor, his hardware supplier, and his aluminum door suppliers shall attend the Pre-Installation Conference along with the building Owner's Representative and the Electrical Contractor. Review methods and procedures related to electrified door hardware including, but not limited to, the following:

1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review required testing, inspecting, and certifying procedures.
4. Review sequence of operation of each type of electrified door hardware.
5. Coordinate with Owner to establish "Keying Conference". Keying Conference to incorporate the following criteria into the final keying schedule document:
   a. Function of building, flow of traffic, purpose of each area and degree of security required.
   b. Plans for existing and future key system expansion.
   c. Requirements for key control storage and software.
   d. Installation of permanent keys, cylinder cores and software.

e. Address and requirements for delivery of keys.

G. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified 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.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

1.08 PRODUCT DELIVERY, HANDLING AND STORAGE

A. Packing and Marking:

1. Pack items of hardware in boxes, each box plainly marked, listing items enclosed and opening for which intended.
2. Provide proper type and number of screws for each item of hardware.

B. Protection: Provide necessary protection of all items of architectural hardware to insure that knobs, handles, pulls, push plates, panic bolts, and all other hardware are properly covered so as to protect finish until completion of building.

1.09 ADJUSTMENT OF HARDWARE

A. Prior to final inspection, the hardware supplier shall inspect and adjust door closers and locks and other items requiring close adjustment for proper performance. All keying shall be checked for proper operation. All cost shall be included in Hardware Supplier's bid.

1.10 WARRANTIES

A. Contractor/Manufacturers shall furnish the Owner through the Architect the following extended warranties (beyond the minimum one-year warranty). Warranties shall begin on the date of final payment. Warranties shall include labor and materials.

1. Seven years for heavy duty cylindrical (bored) locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.
4. Two years for electromechanical door hardware.
5. Lifetime for continuous hinges.
6. Lifetime for key blanks.
7. Note: manufacturers with standard warranties greater than any of the above shall provide their standard product warranty.

B. Warranty 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.

1.11 MAINTENANCE SERVICE

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

B. Continuing Service: For the duration of all warranty period(s), provide full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hardware herein specified and scheduled has been selected from following manufactures as established criteria for type, function, finish and quality. Unless otherwise specified, hardware equal to this criteria will be considered when submitted in conformance with contract documents.

	Item	Manufacturer	Manufacturer's Abbreviation as scheduled in Paragraph 3.03
1.	Continuous hinges	Pemko	(PE)
2.	Butts hinges	McKinney	(MK)
3.	Lock/latches, deadbolts w/temporary cores	Yale	(YA)
4.	Cylinder housings	Yale	(YA)
5.	Construction (temporary) cores	Yale	(YA)
6.	Permanent cores	Medeco	(MC)
7.	Exit devices	Yale	(YA)
8.	Removable mullions	Yale	(YA)
9.	Door closers & accessories	Yale	(YA)
10.	Push plates/pulls	Rockwood	(RO)
11.	Power transfers	Securitron	(SU)
12.	Gasketing	Pemko	(PE)
13.	Thresholds	Pemko	(PE)
14.	Protection plates	Rockwood	(RO)
15.	Door stops	Rockwood	(RO)
16.	Wire harnesses	McKinney	(MK)
17.	Silencers	Rockwood	(RO)
18.	Overhead stop	Rixson	(RF)
19.	Flush bolts & accessories	Rockwood	(RO)
20.	Wiring diagrams	WiringWizard.net	(WW)
21.	Rain guards	Pemko	(PE)
22.	Power supplies	Von Duprin	(VD)
23.	Power Loop	Securitron	(SU)
24.	Software	Sargent	(SA)
25.	Key Management System	Medeco	(MC)
26.	Key Cabinet	Lund	(LU)

B. The Owner requires use of certain products for their unique characteristics and particular project suitability to insure continuity of existing and future performance and maintenance standards.

1. Where “No Substitute” is noted in the following “materials”, submittals and substitution requests for other products will not be considered.
2. Approval of manufacturers and/or products other than those listed as ”Scheduled Manufacturer ” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
    a. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.
3. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
4. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Butt Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
    a. Two Hinges: For doors with heights up to 60 inches.
    b. Three Hinges: For doors with heights 61 to 90 inches.
    c. Four Hinges: For doors with heights 91 to 120 inches.
    d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
    b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
    a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
    b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:
    a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
    a. Scheduled Manufacturer: McKinney Products (MK).
    b. Acceptable Manufacturers: Hager Companies; Bommer Industries.

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:
    a. Scheduled Manufacturer: Pemko Manufacturing (PE).
    b. Acceptable Manufacturers: McKinney Products; Bommer Industries.

C. Power Transfer Devices
   1. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
      a. Manufacturers:
         1) Scheduled Manufacturer: Securitron (SU) - EL-CEPT Series
         2) Acceptable Manufacturers:
            i. Pemko Manufacturing – EL-CEPT Series.
            ii. Von Duprin - EPT-10 Series.
   2. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
      a. Manufacturers:
         1) Scheduled Manufacturer: McKinney Products (MK) – QC-C Series.
      b. Provide one each of the following tools as part of the base bid:
         1) McKinney Products (MK) - Electrical Connecting Kit: QC-R001.
         2) McKinney Products (MK) - Connector Hand Tool: QC-R003.

D. Door Operating Trim
   1. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
      a. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
      b. Furnish dust proof strikes for bottom bolts.
      c. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
      d. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
      e. Manufacturers:
         1) Scheduled Manufacturer: Rockwood Manufacturing (RO).
         2) Acceptable Manufacturers: Burns Manufacturing; Trimco.
   2. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified below or in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
      a. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
      b. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
      c. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
      d. Manufacturers:
         1) Scheduled Manufacturer: Rockwood Manufacturing (RO).
         2) Acceptable Manufacturers: Burns Manufacturing; Trimco.

E. Cylinders and Keying
1. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
2. Source Limitations: Obtain each type of permanent keyed cylinder (core) and keys from the same source manufacturer.
   a. Contract Hardware Distributor to purchase and provide required permanent cylinder cores and keys from the following:
   Oaks Security – Attn: David Seay – Ph. 412-417-1345 – Email dseay@oakssecurity.com
3. Cylinders/Cores: Original manufacturer cylinders complying with the following:
   a. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
   b. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
   c. Bored-Lock Type: Cylinders with tailpieces to suit locks.
   d. 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.
4. Construction Keying: Provide construction cores.
5. Keying System: Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:
   a. Master key and grand master key locks as directed by Owner.
6. Key Quantity: Provide the following minimum number of keys:
   a. As per owners requirements.
7. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
8. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project. Owner will index keys in cabinet.
   a. Manufacturers:
      1) Scheduled Manufacturer: Lund Equipment (LU).
      2) Acceptable Manufacturers: MMF Industries; Telkee.
9. Key Control Software: Provide one network version of "Key Wizard" branded key management software package by Sargent that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into “Key Wizard” software. Provide Owner’s demonstration of software.

F. Mechanical Locks and Latching Devices: Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
1. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
2. Locks are to be non-handed and fully field reversible.
3. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 2 million cycles.
4. Manufacturers:
   a. Scheduled Manufacturer:
      1) Yale Locks and Hardware (YA) 5400LN Series. (New doors as scheduled)
      2) Yale Locks and Hardware (YA) 6400LN Series. (Existing doors as scheduled)
   b. No Substitution.

G. Auxiliary Locks: Cylindrical Deadlocks, ANSI/BHMA A156.36, Grade 1, cylindrical type deadlocks to fit standard ANSI 161 preparation and 1 3/8" to 1 3/4" thickness doors. Provide tapered collars to resist vandalism and 1" throw solid steel bolt with hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other locksets.

1. Manufacturers:
    a. Scheduled Manufacturer: Yale Locks and Hardware (YA) - D100 Series.
    b. No Substitution.

H. Lock and Latch Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
5. Open Back Strikes.
6. Standards: Comply with the following:
    a. Strikes for Mortise Locks and Latches: BHMA A156.13.
    b. Strikes for Bored Locks and Latches: BHMA A156.2.
    c. Strikes for Auxiliary Deadlocks: BHMA A156.36.
    d. Dustproof Strikes: BHMA A156.16.

I. Exit Devices

1. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Fabricate latchbolts from cast stainless steel, Pullman type, incorporating a deadlocking feature.
    a. Manufacturers:
        1) Scheduled Manufacturer: Yale Locks and Hardware (YA) - 6000 Series.
        2) Acceptable Manufacturers: Von Duprin (VD) - 35A/98 XP Series.
2. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
    a. Provide keyed removable feature where specified in the Hardware Sets.
    b. Provide stabilizers and mounting brackets as required.
    c. Provide electrical quick connection wiring options as specified in the hardware sets.
    d. Manufacturers:
        1) Scheduled Manufacturer: Yale Locks and Hardware (YA) - M200 Series.
        2) Acceptable Manufacturers: Von Duprin (VD)

J. Door Closers

1. All door closers specified herein shall meet or exceed the following criteria:
    a. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
    b. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
    c. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

d. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
e. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
f. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
g. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

2. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
   a. Manufacturers:
      1) Scheduled Manufacturer: Yale Locks and Hardware (YA) – 4400 Series.
      2) Acceptable Manufacturers: LCN Closers (LC) - 4040 Series.
3. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 certified surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.
   a. Manufacturers:
      1) Scheduled Manufacturer: Yale Locks and Hardware (YA) – 3500 Series.
      2) Acceptable Manufacturers: LCN Closers (LC) - 1450 Series.

K. Architectural Trim/Door Protective Trim:
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, or mop), beveled on four edges (B4E), fabricated from the following.
   a. Stainless Steel: 300 Series, 050-inch thick, with countersunk screw holes (CSK).
4. Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
5. Manufacturers:
   a. Scheduled Manufacturer: Rockwood Manufacturing (RO).
   b. Acceptable Manufacturers: Burns Manufacturing; Trimco.

L. Door Stops and Holders
1. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
2. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they

will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
    a. Manufacturers:
        1) Scheduled Manufacturer: Rockwood Manufacturing (RO).
        2) Acceptable Manufacturers: Burns Manufacturing; Trimco.
3. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
    a. Manufacturers:
        1) Scheduled Manufacturer: Rixson Door Controls (RF).
        2) Acceptable Manufacturers: Rockwood Manufacturing; Sargent Manufacturing.

M. Architectural Seals
1. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
2. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
    a. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
3. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
    a. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
4. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
5. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
6. Manufacturers:
    a. Scheduled Manufacturer: Pemko Manufacturing (PE).
    b. Acceptable Manufacturers: Reese Enterprises, Inc.; National Guard Products.

N. Electronic Accessories
1. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
    a. Manufacturers:
        1) Scheduled Manufacturer: Von Duprin (VD) - PS.
        2) Acceptable Manufacturers: Yale Locks and Hardware 782; Securitron - BPS Series.
2. General Requirements (All electrified hardware and/or accessories): All wiring and connections of door hardware components between each other and back to junction box provided by Electrical Contractor shall be by the hardware installer. All wiring shall be concealed. All accessories required for fully functioning system shall be provided whether all part numbers for same are listed or not.

O. Provide keepers for all locks and strikes for all catches. Provide all escutcheons and plates required.

2.03 FINISHES

A. Finish: as specified and scheduled, except as follows:
1. Door Closers: Powder Coat to match adjacent hardware and/or finish of door as selected by Architect, including any surface visible through door glass from the opposite side of door.
2. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.
3. Architect shall have option to change finish of specified hardware as required to match selected finish of doors/frames and/or as required to match existing hardware, at no additional cost to the Owner.
4. Designations used in Hardware Group Schedule - Paragraph 3.03 to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products. Abbreviations include, but may not be limited to:

Code/Abbreviation	Description
AL	Aluminum
600	Primed for Painting
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
695	Dark Bronze Painted
GREY	Grey
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

5. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
6. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.04 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine specifications, drawings and job conditions to determine quantities and types of hardware required to complete project.
1. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

B. Except for items of hardware specifically furnished under other sections of specifications, furnish and install all items of hardware required to complete project. Providing such items of type and quality suitable for service required and comparable to adjacent hardware.

C. Assure that all hardware furnished fits part of work for which it is intended. Check details, other drawings and field conditions to assure hardware meetings conditions of work in various locations.

3.02 INSTALLATION

A. Finish hardware shall be fitted and installed in doors and shall be protected from damage. Hardware shall be fitted prior to the application of painter's finish; removed during the finishing operation and reset after the completion of the finish except for the last coat. All hardware shall be protected by wrappers of tough paper or cloth maintained in place until acceptance of the work, and shall be left in perfect working order at the time of acceptance of the work, when all keys shall be delivered to the Owner (or a designated representative of the Owner).

1. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

B. Install hardware in accordance with best trade practice and manufacturer's instructions and recommendations, exercising care not to damage adjacent work. Repair or replace damaged work to satisfaction of Architect. Installation guidelines include, but are not limited to:

1. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
2. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
3. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
4. Wiring: Coordinate with Electrical Contractor
5. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
6. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Section 079200.
7. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
8. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
9. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
10. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

C. Location of Hardware: Unless otherwise indicated, specified or required to conform to handicapped requirements, locate hardware on doors as follows:

1.	Locks, latches, roller latches and double handle sets:	Centerline of lock strike 40-5/16" from finish floor slab.
2.	Cylindrical or mortise deadlocks:	Centerline of strike 48” from floor slab.
3.	Push plates:	Centerline 45" from finished floor slab.
4.	Pulls:	Centerline of grip 42" from finished floor slab.
5.	Combination push bar:	Centerline 42" from finished floor slab.
6.	Hospital arm pull:	Centerline of lower base is 45" from finish floor slab with grip open at bottom.
7.	Panic devices:	Centerline of strike 40-5/16" from finished floor slab.
8.	Hospital latches for push-pull doors:	Centerline of latch front and strike 45-3/4" from finished floor slab.
9.	Top hinge:	Up to 11-3/4" from rabbet section of head of frame to

centerline of hinge.

10. Bottom hinge: Up to 13" from finished floor slab to centerline of hinge.
11. Intermediate hinge(s): Equally spaced between top and bottom hinge.
12. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
    a. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
    b. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
    c. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
13. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Adjust and Clean

1. Check and adjust each operating item of hardware and each door to insure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.
2. Clean adjacent surfaces soiled by hardware installation.
3. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
    a. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
    b. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
    c. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
    d. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
4. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
5. Hardware Supplier’s Architectural Hardware Consultant shall inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.
6. Occupancy Adjustment: Approximately three months after Owner’s regular occupancy of building, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.03 HARDWARE GROUP SCHEDULE

Follow Hardware Group/Set Numbers List Hardware Required Per Door Opening:

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

Quantity/Description	Model Number	Finish	Manufacturer
B. Set: 1.0			
2 Continuous Hinge w/PT	CFM SLF-HD1 PT x Length Required		PE
1 Removable Mullion	KRM200 x Length Required	600	YA
1 Rim Exit Device (nightlatch w/elec. latch retraction)	6200 P S 121NL Temp Core Less Dogging	630	YA
1 Rim Exit Device (exit only w/elec. latch retraction)	6200 P S EO Less Dogging	630	YA
2 Core	SFIC Medeco X4	626	MC
2 Cylinder Housing	As Required		YA
2 Pull	RM3331-36 Mtg-Type 12XHD	US32D	RO
2 Drop Plate	488	689	YA
2 Spacer	293S	689	YA
2 Surface Closer (spring backstop arm)	4430	600 x 689	YA
1 Threshold	273x224AFGT MSES25SS x Length Required		PE
2 Sweep	3452CNB x Length Required		PE
3 Door Wire Harness	QC-C3**** x Length / Type as Required)		MK
2 Frame Wire Harness	QC-C1500P		MK
2 Electric Power Transfer	EL-CEPT		SU
1 Power Supply / Controller	Provided by Electrical Contractor		
1 Wiring Diagram	Elevations and Point to Point		WW

Notes:

Electronic Operation: Free egress at all times. Latches retract via remote signal. Entry also possible via key override. Request to exit switches, incorporated in exit device push pads, signal an authorized egress. Fail Secure.

C. Set: 2.0

2	Continuous Hinge w/PT	CFM SLF-HD1 PT x Length Required		PE
1	Removable Mullion	KRM200 x Length Required	600	YA
1	Rim Exit Device (nightlatch w/elec. latch retraction)	6200 P S 121NL Temp Core Less Dogging	630	YA
1	Rim Exit Device (exit only w/elec. latch retraction)	6200 P S EO Less Dogging	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
2	Pull	RM3331-36 Mtg-Type 12XHD	US32D	RO
2	Drop Plate	488	689	YA
2	Spacer	293S	689	YA
2	Surface Closer (spring backstop arm)	4430	600 x 689	YA
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Rain Guard	346C x Door Width +4"		PE
2	Sweep	3452CNB x Length Required		PE
3	Door Wire Harness	QC-C3**** x Length / Type as Required)		MK
2	Frame Wire Harness	QC-C1500P		MK
1	Card Reader	Provided by Electrical Contractor		
2	Electric Power Transfer	EL-CEPT		SU
1	Power Supply / Controller	Provided by Electrical Contractor		
1	Wiring Diagram	Elevations and Point to Point		WW

Notes:
Electronic Operation: Free egress at all times. Presenting valid credential to card reader or remote signal retracts latch bolts allowing entry. Entry also possible via key override. Request to exit switches, incorporated in exit device push pads, signal an authorized egress. Fail Secure.

D. Set: 3.0

2	Continuous Hinge w/PT	CFM HD1 PT x Length Required		PE
1	Removable Mullion	KRM200 x Length Required	600	YA
1	Rim Exit Device (exit only w/elec. latch retraction)	6100 P S EO Less Dogging	630	YA
1	Rim Exit Device (nightlatch w/elec. latch retraction)	6100 P S 121NL Temp Core Less Dogging	630	YA
4	Core	SFIC Medeco X4	626	MC
4	Cylinder Housing	As Required		YA
2	Pull	RM202 Mtg-Type 12XHD	US32D	RO
2	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
2	Sweep	3452CNB x Length Required		PE
1	Astragal	29324CNB x Door Height		PE
2	Door Wire Harness	QC-C3**** x Length / Type as Required)		MK
2	Frame Wire Harness	QC-C1500P		MK
1	Card Reader	Provided by Electrical Contractor		
2	Electric Power Transfer	EL-CEPT		SU
1	Power Supply / Controller	Provided by Electrical Contractor		
1	Wiring Diagram	Elevations and Point to Point		WW

Notes:
Electronic Operation: Free egress at all times. Presenting valid credential to card reader (provided by security supplier) retracts latch bolts allowing entry. Entry also possible via key override. Request to exit switches, incorporated in exit devices, signal an authorized egress. Fail Secure.

E. Set: 4.0

2	Continuous Hinge	CFM HD1 x Length Required		PE
1	Concealed Vert Rod Exit (nightlatch)	6165 121NL Temp Core	630	YA
1	Concealed Vert Rod Exit (exit only)	6165 EO Temp Core	630	YA
3	Core	SFIC Medeco X4	626	MC
3	Cylinder Housing	As Required		YA
2	Pull	RM202 Mtg-Type 12XHD	US32D	RO
1	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA
1	Surface Closer (top jamb w/hold open)	3511	600 x 689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
2	Sweep	3452CNB x Length Required		PE
1	Astragal	29324CNB x Door Height		PE

F. Set: 5.0

2	Continuous Hinge	CFM HD1 x Length Required		PE
1	Removable Mullion	KRM200 x Length Required	600	YA
2	Rim Exit Device (exit only)	6100 EO Less Dogging	630	YA
1	Core	SFIC Medeco X4	626	MC
1	Cylinder Housing	As Required		YA
2	Surface Closer (spring backstop arm)	4430	600 x 689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
2	Sweep	3452CNB x Length Required		PE
1	Astragal	29324CNB x Door Height		PE

G. Set: 6.0

1	Continuous Hinge	CFM HD1 x Length Required		PE
1	Rim Exit Device (exit only)	6100 EO Less Dogging	630	YA
1	Surface Closer (spring backstop arm)	4430	600 x 689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Rain Guard	346C x Door Width +4"		PE
1	Gasketing	Provided By Frame Supplier		
1	Sweep	3452CNB x Length Required		PE

H. Set: 7.0

2	Continuous Hinge	CFM HD1 x Length Required		PE
1	Dust Proof Strike	570	US26D	RO
2	Manual Flush Bolt	555 / 557 (As Required)	US26D	RO
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
2	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
1	Rain Guard	346C x Door Width +4"		PE
2	Sweep	3452CNB x Length Required		PE
1	Astragal	357SP x Length Required		PE

I. Set: 8.0

1	Continuous Hinge	CFM HD1 x Length Required		PE
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Closer (regular arm)	4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Saddle Threshold	271A MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
1	Rain Guard	346C x Door Width +4"		PE
1	Sweep	315CN x Length Required		PE
1	Sweep	345AV x Length Required		PE

J. Set: 9.0

1	Continuous Hinge	CFM HD1 x Length Required		PE
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
1	Rain Guard	346C x Door Width +4"		PE
1	Sweep	3452CNB x Length Required		PE

K. Set: 10.0

1	Continuous Hinge	CFM HD1 x Length Required		PE
1	Cylindrical Lock (utility)	AU 5430LN Temp Core	626	YA
2	Core	SFIC Medeco X4	626	MC
1	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Threshold	273x224AFGT MSES25SS x Length Required		PE
1	Gasketing	303AS (Head & Jambs)		PE
1	Rain Guard	346C x Door Width +4"		PE
1	Sweep	3452CNB x Length Required		PE

Notes: Verify and coordinate threshold type and model with existing conditions and provide

accordingly.

L. Set: 11.0

2	Continuous Hinge w/PT	CFM SLF-HD1 PT x Length Required		PE
1	Removable Mullion	KRM200 x Length Required	600	YA
1	Rim Exit Device (nightlatch w/elec. latch retraction)	6200 P S 121NL Temp Core Less Dogging	630	YA
1	Rim Exit Device (exit only w/elec. latch retraction)	6200 P S EO Less Dogging	630	YA
4	Core	SFIC Medeco X4	626	MC
1	Cylinder Housing	As Required		YA
2	Pull	RM3331-36 Mtg-Type 12XHD	US32D	RO
2	Surface Closer (backstop arm w/hold open)	4420T	689	YA
2	Drop Plate	488	689	YA
2	Spacer	293S	689	YA
1	Gasketing	Provided By Frame Supplier		
2	Door Wire Harness	QC-C3**** x Length / Type as Required)		MK
2	Frame Wire Harness	QC-C1500P		MK
1	Card Reader	Provided by Electrical Contractor		
2	Electric Power Transfer	EL-CEPT		SU
1	Aiphone	Provided by Electrical Contractor		
1	Power Supply / Controller	Provided by Electrical Contractor		
1	Wiring Diagram	Elevations and Point to Point		WW

Notes:
Electronic Operation: Free egress at all times. Presenting valid credential to card reader and/or Aiphone retracts latch bolts allowing entry. Entry also possible via key override. Request to exit switches, incorporated in exit devices, signal an authorized egress. Fail Secure.

M. Set: 12.0

2	Continuous Hinge w/PT	CFM SLF-HD1 PT x Length Required		PE
1	Removable Mullion	KRM200 x Length Required	600	YA
2	Rim Exit Device (exit only w/elec. latch retraction)	6200 P S EO Less Dogging	630	YA
3	Core	SFIC Medeco X4	626	MC
1	Cylinder Housing	As Required		YA
2	Pull	RM3331-36 Mtg-Type 12XHD	US32D	RO
2	Surface Closer (backstop arm w/hold open)	4420T	689	YA
2	Drop Plate	488	689	YA
2	Spacer	293S	689	YA
1	Gasketing	Provided By Frame Supplier		
2	Door Wire Harness	QC-C3**** x Length / Type as Required)		MK
2	Frame Wire Harness	QC-C1500P		MK
2	Electric Power Transfer	EL-CEPT		SU
1	Power Supply / Controller	Provided by Electrical Contractor		
1	Wiring Diagram	Elevations and Point to Point		WW

Notes:
Electronic Operation: Free egress at all times. Latch bolts retracted at scheduled times via security software allowing entry. Request to exit switches, incorporated in exit devices, signal an authorized egress. Fail Secure.

N. Set: 13.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
2	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
2	Surface Closer (regular arm w/hold open)	4410	689	YA
2	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Astragal	S771C x Door Height		PE
2	Door Bottom	PDB4131CE x Length Required		PE

O. Set: 14.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Mortise Exit Device (intruder)	6135-2 AU656F Temp Core	630	YA
1	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
2	Surface Closer (parallel arm w/hold open)	PR4410	689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
2	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
2	Door Bottom	PDB4131CE x Length Required		PE
1	Astragal	S771C x Door Height		PE

P. Set: 15.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Mortise Exit Device (intruder)	6135-2 AU656F Temp Core	630	YA
1	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
3	Core	SFIC Medeco X4	626	MC
3	Cylinder Housing	As Required		YA
1	Surface Closer (parallel arm w/hold open)	PR4410	689	YA
1	Surface Closer (top jamb w/hold open)	3511	600 x 689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
2	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
2	Door Bottom	PDB4131CE x Length Required		PE
1	Astragal	S771C x Door Height		PE

Q. Set: 16.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
2	Fire Rated Surf Vert Rod (passage)	6170F LBR AU628F	630	YA
1	Concealed Overhead Stop	1ADJ-X36	630	RF
2	Surface Closer (regular arm)	4400	689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Astragal	S771C x Door Height		PE

R. Set: 17.0

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Fire Rated Rim Exit (passage)	6100F AU628F	630	YA
1	Surface Closer (parallel arm)	PR4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

Notes:
Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

S. Set: 18.0

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Rim Exit Device (intruder)	6105-2 AU626F Temp Core	630	YA
3	Core	SFIC Medeco X4	626	MC
3	Cylinder Housing	As Required		YA
1	Surface Closer (backstop arm)	4420	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Door Bottom	PDB4131CE x Length Required		PE

T. Set: 19.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Mortise Exit Device (intruder)	6135-2 AU656F Temp Core	630	YA
1	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
1	Surface Closer (top jamb)	3501	689	YA
1	Surface Closer (backstop arm)	4420	689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
2	Door Bottom	PDB4131CE x Length Required		PE
1	Astragal	S771C x Door Height		PE

Notes:
Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

U. Set: 20.0

6	Hinge (heavy weight)	T4A3786	US26D	MK
1	Mortise Exit Device (intruder)	6135-2 AU656F Temp Core	630	YA
1	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
1	Surface Closer (top jamb)	3501	689	YA
1	Surface Closer (parallel arm)	PR4400	689	YA
2	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
2	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
2	Door Bottom	PDB4131CE x Length Required		PE
1	Astragal	S771C x Door Height		PE

V. Set: 21.0

6	Hinge	TA2714	US26D	MK
1	Dust Proof Strike	570	US26D	RO
2	Manual Flush Bolt	555 / 557 (As Required)	US26D	RO
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
2	Surface Overhead Stop	10-X36	630	RF
2	Silencer	608 (or) 609 (As Required)		RO

W. Set: 22.0

6	Hinge	TA2714	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Manual Flush Bolt	555 / 557 (As Required)	US26D	RO
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
2	Surface Overhead Stop	10-X36	630	RF
1	Saddle Threshold	271A MSES25SS x Length Required		PE
2	Silencer	608 (or) 609 (As Required)		RO

Notes:
Verify threshold type and model is appropriate for floor transition.

X. Set: 23.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Door Stop	RM861	US26D	RO
3	Silencer	608 (or) 609 (As Required)		RO

Y. Set: 24.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Overhead Stop	10-X36	630	RF
3	Silencer	608 (or) 609 (As Required)		RO

Z. Set: 25.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Closer (backstop arm)	4420	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
3	Silencer	608 (or) 609 (As Required)		RO

AA. Set: 26.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (storeroom)	AU 5405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Closer (parallel arm)	PR4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

BB. Set: 27.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (office)	AU 5407LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Door Stop	RM861	US26D	RO
3	Silencer	608 (or) 609 (As Required)		RO

CC. Set: 28.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (classroom)	AU 5408LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Door Stop	RM861	US26D	RO
3	Silencer	608 (or) 609 (As Required)		RO

DD. Set: 29.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (intruder)	AU 5418LN Temp Core	626	YA
2	Core	SFIC Medeco X4	626	MC
1	Surface Closer (parallel arm)	PR4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Door Bottom	PDB4131CE x Length Required		PE

EE. Set: 30.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (intruder)	AU 5418LN Temp Core	626	YA
2	Core	SFIC Medeco X4	626	MC
1	Surface Closer (backstop arm)	4420	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Gasketing	S88D (Head & Jambs)		PE
1	Door Bottom	PDB4131CE x Length Required		PE

FF. Set: 31.0

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Cylindrical Lock (intruder)	AU 5418LN Temp Core	626	YA
2	Core	SFIC Medeco X4	626	MC
1	Surface Closer (parallel arm)	PR4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
1	Gasketing	S88D (Head & Jambs)		PE

GG. Set: 32.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (privacy)	AU 5402LN	626	YA
1	Surface Overhead Stop	10-X36	630	RF
1	Gasketing	S88D (Head & Jambs)		PE

HH. Set: 33.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (privacy)	AU 5402LN	626	YA
1	Surface Closer (backstop arm)	4420	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Gasketing	S88D (Head & Jambs)		PE

II. Set: 34.0

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Deadbolt (classroom)	D162 Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Push Plate	70C	US32D	RO
1	Pull Plate	110x70C	US32D	RO
1	Surface Closer (parallel arm w/hold open)	PR4410	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
3	Silencer	608 (or) 609 (As Required)		RO

JJ. Set: 35.0

3	Hinge (heavy weight)	T4A3786	US26D	MK
1	Deadbolt (classroom)	D162 Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Push Plate	70C	US32D	RO
1	Pull Plate	110x70C	US32D	RO
1	Surface Closer (backstop arm w/hold open)	4420T	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
3	Silencer	608 (or) 609 (As Required)		RO

KK. Set: 36.0

1	Rim Exit Device (classroom/storeroom)	6105 AU626F Temp Core	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
1	Surface Closer (spring backstop arm)	4430	600 x 689	YA

Notes:
Balance of existing hardware to remain.

Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing door and frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

LL. Set: 37.0

1	Surface Vert Rod Exit (classroom)	6175 LBR AU626F Temp Core	630	YA
1	Surface Vert Rod Exit (exit only)	6170 EO Less Dogging	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
2	Surface Closer (parallel arm w/hold open)	PR4410	689	YA

Notes:
Balance of existing hardware to remain.

Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing door and frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

MM. Set: 38.0

1	Rim Exit Device (classroom/storeroom)	6105 AU626F Temp Core	630	YA
2	Core	SFIC Medeco X4	626	MC
2	Cylinder Housing	As Required		YA
1	Surface Closer (parallel arm)	PR4400	689	YA

Notes:
Balance of existing hardware to remain.

Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing door and frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

NN. Set: 39.0

1	Removable Mullion	KRM200 x Length Required	600	YA
1	Rim Exit Device	6105 121NL Temp Core	630	YA
1	Rim Exit Device	6105 EO Temp Core	630	YA
4	Core	SFIC Medeco X4	626	MC
4	Cylinder Housing	As Required		YA
2	Pull	RM202 Mtg-Type 12XHD	US32D	RO
2	Surface Closer (spring backstop arm w/hold open)	4430T	600 x 689	YA

Notes:
Balance of existing hardware to remain.

Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing door and frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

OO. Set: 40.0

1	Unit Lock (storeroom)	AU 6405LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

PP. Set: 41.0

1	Unit Lock (office)	AU 6407LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

QQ. Set: 42.0

1	Unit Lock (classroom)	AU 6408LN Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

RR. Set: 43.0

1	Unit Lock (intruder)	AU 6418LN Temp Core	626	YA
2	Core	SFIC Medeco X4	626	MC

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

SS. Set: 44.0

1	Unit Lock (privacy)	AU 6402LN	626	YA

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

TT. Set: 45.0

1	Unit Lock (passage)	AU 6401LN	626	YA

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

UU. Set: 46.0

1	Deadbolt (classroom)	D162 Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

VV. Set: 47.0

2	Concealed Vert Rod Exit Device	EL RX 1686 Less Trim	AL	KA
2	Door Loop	TSB-C		SU
1	Power Supply	PS914-2RS		VD

Notes:
Balance of existing hardware to remain.

Contract Hardware Distributor to verify and coordinate scheduled hardware with existing conditions and provide accordingly.

Contract Hardware Distributor to prepare existing door and frame and provide all fillers plates and accessories required for proper installation and function of new hardware.

WW. Set: 48.0

1	Existing Hardware To Remain	

XX. Set: 49.0

1	All Hardware Provided By Door Supplier	

YY. Set: 50.0

2	Continuous Hinge w/PT	CFM HD1 PT x Length Required	PE
1	Software	KW-SS1	SA
1	Key Management System	EA-100117	MC
3	Door Wire Harness	QC-C3**** x Length / Type as Required)	MK
3	Frame Wire Harness	QC-C1500P	MK
2	Electric Power Transfer	EL-CEPT	SU
1	Key Cabinet	1200 Series (Type & Size Required)	LU

Notes:
Installation tools and Owner's component stock for electronic access control / Key Cabinet / Key Management Software

ZZ. Set: 51.0

3	Hinge	TA2714	US26D	MK
1	Cylindrical Lock (passage)	AU 5401LN	626	YA
1	Surface Closer (regular arm)	4400	689	YA
1	Kick Plate	K1050 10" high 4BE CSK	US32D	RO
1	Door Stop	RM861	US26D	RO
3	Silencer	608 (or) 609 (As Required)		RO

Notes:
Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

AAA. Set: 52.0

1	Deadbolt (classroom)	D162 Temp Core	626	YA
1	Core	SFIC Medeco X4	626	MC
1	Surface Closer (regular arm w/hold open)	4410	689	YA

Notes:
Balance of existing hardware to remain.

Verify and coordinate scheduled hardware with existing conditions and provide accordingly.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 GENERAL

1.01 SCOPE

A. This section of specifications includes all labor, supervision, equipment, tools, materials and all other means of construction necessary to perform the glass and glazing work as shown on the drawings, described in this specification, or as is necessary to complete the work in a first class manner.

B. Sizes for glass shall be taken from actual frames and sash. This work contemplates all glass set in place and the Contractor shall assume all responsibility in regard to correct sizes. Sizes, if shown on the drawings are approximate, and shall be used for estimate only.

C. Work includes, but is not necessarily limited to the following:
1. Glass panels (non-insulated and insulated) to be field installed in doors and frames

1.02 RELATED WORK INCLUDED IN OTHER SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to: All Sections in Divisions 00, 01, and 02 of these Specifications.

B. Metal Doors and Frames - Section 081100.

C. Wood Doors - Section 081400.

D. Aluminum Framed Entrances and Storefronts - Section 084113.

1.03 STANDARDS

A. Materials and labor shall meet requirements and recommendations of applicable portions of the following standards listed:
1. American National Standards Institute, ANSI
2. Laminators Safety Glass Association, LSGA
3. Federal Specifications, FS
4. Insulating Glass Certification Council, IGCC
5. Sealed Insulating Glass Manufacturers Association, SIGMA
6. Flat Glass Marketing Association, FGMA
7. American Society for Testing and Materials, ASTM
8. Safety Glazing Certification Council, SGCC

1.04 QUALITY ASSURANCE

A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with the Safety Glazing Certification Council (SGCC)

according to ANSI Z97.1 and testing requirements of Federal Specification CPSC 16 CFR Part 1201 for category II materials.

C. Insulating Glass Standard: Sealed insulated glass shall be tested and certified in accord with ASTM E2190.

D. Glass shall be graded in accordance with ASTM **C**1036 Standard Specification for Flat (Annealed) Glass and ASTM C1048 Standard Specification for Heat Treated Flat Glass for Heat Strengthened, Fully Tempered, and/or Ceramic Coated Spandrel Glass. Tempered glass must meet Safety Glazing Standards and be certified when installed in doors and/or enclosures, as well as meeting ASTM C1048. All glass shall bear the manufacturer's label, giving manufacturer's name, quality, weight and thickness.

E. Laminated architectural flat glass shall be in accordance with ASTM C1172.
1. Quality requirements for cut sizes of architectural flat glass clad polycarbonate (GCP) shall be in accordance with ASTM C1349 Standard Specification for Architectural Flat Glass Clad Polycarbonate.

F. Glass coatings (i.e., low-e coating) shall be in accordance with ASTM C1376, Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.

B. Samples: Submit samples, including colors, of each product specified herein.

C. Certificates and Labels: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements. Separate certification will not be required for glazing materials, except insulating glass units, bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
1. Insulating Glass Certification Program: Subject to compliance with requirements, provide insulating glass units permanently marked either on spacers or on at least one component pane of units with appropriate certification label of The Insulating Glass Certification Council (IGCC), include certification number, date, and manufacturer’s identification mark.
2. Submit IGCC certification number and related data for insulated glass.
3. IBC Labeling Requirements for Fire-Rated Glass: Label shall indicate product's suitability for use in what location(s), conformance with the hose stream test, conformance with any temperature rise criteria, and fire rating. Label must also indentify the manufacturer, product name, conformance to Safety Glazing Standards (ANSI Z97.1 and FS CPSC 16 CFR 1201 Category II), and include the mark of the third-party testing agency (i.e., “U.L.”).
    a. Description of Location
        D indicates doors (fire-rated glass meets fire Door assembly criteria - NFPA 252, UL 10B or UL 10C)
        O indicates opening (windows, sidelites, transoms, etc.; "**OH**" indicates fire-rated glass meets fire window assembly criteria and Hose stream test - NFPA 257 or UL9)
        W indicates walls (fire-resistance-rated glazing meets Wall assembly criteria ASTM E119; providing a barrier to radiant heat transfer)
    b. Hose Stream Test
        H indicates glazing meets Hose stream test requirements of the test standard (required for 45 minutes and above)

NH indicates the glazing does not meet the Hose stream test standard (allowed for 20 minute only)

c. Temperature Rise
   T indicates glazing meets temperature rise criteria (450 degree Fahrenheit Temperature rise criteria for 30 minutes)
   NT indicates glazing does not meet temperature rise criteria

d. Fire Rating (in minutes)

D. Manufacturer's Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, insulating glass units which develop manufacturing defects. Manufacturing defects are defined as failure to hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging at temperature above -20°F. (-28°C), deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period. Warranty Period shall be manufacturer's standard but not less than 10 years after date of final payment of the project.

E. Manufacturer's warranty on Fire Rated Glass: Warranty Period shall be not less than 5 years after date of final payment of the project.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

PART 2 PRODUCTS

2.01 NON-INSULATED GLASS

A. Clear Float Glass: glazing quality 1/4" thick, free from all defects. Furnish tempered glass in locations as shown on working drawings.

B. Fire Rated Safety Glass: Products as hereinafter listed shall be provided where fire rated frames and/or glass are indicated on drawings. Provide appropriate product in thickness as required to meet fire rating listed on drawings. Review size limitations of manufacturer's products (including maximum exposed area) and provide product as required by lite sizes indicated on drawings. All products shall be tested to meet the following: CPSC 16CFR1201 (Cat. I and II) High Impact Safety Rating, ANSI Z97.1, NFPA 252 and/or 257, positive pressure requirements, hose stream ('H'), and temperature rise ('T'); glass in openings over 3/4 hour rated shall also be tested per ASTM E119 or UL263 (barrier to radiant heat transfer). All fire rated glass shall be sized and labeled in compliance with NFPA 80 and be listed by Warnock Hersey International / Intertek Testing Services Inc.

1. For 45 minute fire rated openings in doors.
   Products as hereinafter listed are generally laminated clear glass ceramic glazing products, and may be rated up to 90 minutes, however they are not ASTM E119 tested:
   a. SGG Keralite FR-L 5/16" thick as manufactured by Vetrotech/Saint Gobain, Auburn, WA; or
   b. FireLite Plus 5/16" thick, premium grade, polished, as manufactured by TGP (Technical Glass Products), Kirkland, WA; or
   c. Pyran Star-L 5/16" thick as manufactured by AGC InterEdge Technologies; or
   d. Pyran Platinum L 3/8" thick as manufactured by Safti First. Additional acceptable products

by Safti First:

1) For 45 min glass in doors/sidelights/transoms: SuperLite I-XL 1/4” thick specialty tempered glazing with partial radiant heat protection.

2. For 60 minute fire rated openings in doors, glass shall comply with ASTM E119. Products as hereinafter listed are multiple panes of wireless tempered, clear glass laminated with transparent gel or intumescent interlayers heated to become solid:
   a. Keralite Ultra 60 3/4" thick as manufactured by Vetrotech/Saint Gobain, Auburn, WA;
   b. Pyrostop 60 7/8” thick as manufactured by TGP (Technical Glass Products), Kirkland, WA;
   c. Pyrobel 60 1” thick as manufactured by AGC InterEdge Technologies;
   d. SuperLite II-XL 60 7/8” thick or SuperLite X-90 3/4” thick as manufactured by Safti First.

C. Laminated Safety Glass: 1/8" (minimum) clear view, heat strengthened glass bonded both sides of inner layer of plasticized polyvinyl butyryl resin (PVB). Laminated safety glass shall be as manufactured by AFGD Glass; Globe Amerada Glass Co., Elk Grove Village, IL; or equivalent. Thickness of inner PVB layer shall be as recommended by manufacturer for size of glass panel, minimum .060" inner layer required.

1. Where detailed on drawings, laminated safety glass panel shall have Speak Hole as hereafter specified mounted to glass panel. Glass fabricator shall cut openings and any required fastener holes.
2. Polish bottom edge of laminated safety glass panel that sets on plastic laminate counter.

D. Window Accessories:

1. Stainless Steel Recessed Deal (Dip) Tray: As specified in Section 123600.
2. Speak- Thru: Model N666 as manufactured by C. R. Laurence Co. (CRL), Inc., stainless steel 6” diameter with concentric circular louvers and spacer rings to accommodate thickness of glazing. Furnish to glazer of Section 088000 for shop installation into glazing panel.

2.02 INSULATED GLASS

A. Provide insulating glass and glazing that has been produced, fabricated and installed to withstand normal temperature changes, wind loading, impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of insulating glass and glazing materials, and other defects in the work. Manufacturing defects are defined in Paragraph 1.05 under “Warranty”.

B. Exterior Insulated Laminated Safety Glass Assembly:

1. Overall thickness of assembly shall be 1”, inner pane fabricated of laminated safety glass as specified in Paragraph 2.01.C, outer pane shall be 1/4” thick tinted, tempered pane, assembly shall include Low-E coating and be sealed with argon filled air space. Grey or Bronze Tint as selected by Architect.
2. Exterior insulating glass edge seal shall be equal to “Super Spacer Premium Plus” as manufactured by Edgetech, a division of Lauren International, Inc. Material shall be thermal resistant, flexible tape of all silicone foam and include dual-seal adhesives.
3. Exterior insulated glass assembly’s product performance features shall be equivalent to the following:
   a. PPG Solarban 60 Solar Control Low-E - Solarban 60 (3) Bronze* (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.32), or
   b. Pilkington’s Series of Uncoated Float Glass Outer Lite and Energy Advantage Low-E Inner Lite (#3 Surface) - Optifloat Bronze* Tint (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.45); or
   c. Guardian’s SunGuard Low-E Product SuperNeutral 68 (SN 68) (3) with Bronze* Outboard (Versalux) (U-value 0.29 Winter; Solar Heat Gain Coefficient (SHGC) 0.31).
   d *Actual tint shall be as selected by Architect upon review of submitted samples.

e. Other manufacturers' products, conforming to these specifications and above product performance features, will be considered upon review of submittals of representative samples and corresponding data.

4. Submit samples of Exterior Insulated Laminated Safety Glass Assembly for Architect review/approval.

C. Interior Insulated Glass Sound Panels:

1. Overall thickness of assembly shall be 5/8", consisting of two panes of 1/8" thick clear tempered glass, sealed with 3/8" thick argon filled air space.

2.03 FABRICATION

A. Sizes: Fabricate all glass and spandrel panels to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer(s). Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.04 GLAZING

A. Glazing materials for setting glass in interior wood doors and/or hollow metal frames shall be one component silicone construction sealant, glazing tape, and/or dry glazing gasket as recommended by door or frame manufacturer and as required by Underwriter's Laboratory for fire rated units.

1. Products shall be minimum quality as represented by Spectrum 2 silicone sealant and SST-800 glazing tape as manufactured by Tremco Manufacturing Company.
2. Glazing for fire rated glass shall be as recommended by glass manufacturer and include EPDM tape or other flame resistant gasket material and calcium silicate setting blocks.

B. Glazing compounds and tapes to be used in aluminum window/door/frames (interior and/or exterior) and/or exterior hollow metal doors/frames shall be as recommended by door/frame manufacturer**.**

PART 3 EXECUTION

3.01 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

B. No sealants shall be applied when the temperature is below 40°F. unless the necessary provisions are made to elevate the temperature in the immediate application area.

3.02 SETTING OF GLASS

A. All glass shall be set in such a way that there will be equal bearing the entire width of each panel, and with proper clearance for contraction and expansion. Glass shall be set without springing. Glass shall be accurately cut to fit the frame and all edges shall be smooth, no sharp edges being left. The Contractor is responsible for broken glass due to improper setting. Set glass with waves running horizontally.

B. Glazing materials shall be used in strict accordance with manufacturer's printed directions and shall be neatly run in straight lines parallel with inside of glazing rebate. Use spacers to insure a uniform thickness of glazing compound.

C. A minimum of 1/8" bed clearance shall be maintained on each side of glass. Tape shall be applied to head, sill and jamb legs. Tape shall be butted together with no laps. Butted corners shall be tightly fit. Tape shall be held down 1/8" from top of glazing leg, the void filled and sloped with sealant as specified. Glass shall be set on neoprene setting blocks at proper spacing for glass size and pressed firmly against tape. A heel bead of sealant shall be applied at the perimeter of the inside of glass maintaining a 3/16" minimum bite on the glass or panel, a positive bond to the sash and completely filling void under the glass or panel. After stops are set and shimmed the void shall be filled with glazing compound.

D. Glazing area of frame shall be dry and cleaned with Xylol to remove all foreign residue and protective coatings before setting of glass. Glass shall be placed on setting blocks and a minimum of one-eighth (1/8) inch spacers placed on each side of glass in glazing channel.

E. Glass in hollow metal frames using glazing beads or stops shall be set in felt channel inserts or bedded in glazing compound, and shall be back and face glazed with glazing compound to prevent rattling. Glazing beads or stops shall be properly reset. Joints shall be watertight.

3.03 BREAKAGE AND CLEANING

A. The Contractor shall protect all glass from injury or breakage and shall assume all responsibility for breakage by whomsoever caused, and shall replace all cracked, broken, scratched or otherwise defective glass when directed to do so by the Architect. All glass shall be cleaned carefully at the time of final acceptance, removing all labels, excess sealant, grease, paint and other foreign substances and leave the work in perfect condition. Glass having scratches or defects which show after cleaning shall be removed and replaced with perfect glass at no cost to the Owner. The Contractor will be held responsible for all glass remaining in acceptable condition until the work has been finally accepted by the Architect and Owner.

END OF SECTION 088000