

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Door hardware and related items necessary for complete installation and operation of doors will be bid with the door hardware for the entire campus. The intent of issuing this section is to ensure that doors and frames are bid including the correct hardware preparations.
- B. Coordination of required power and wiring requirements for electric hardware items with power and wiring requirements supplied under Division 26 and 28.

1.2 RELATED WORK (Items not included in this project manual are available from the Construction Manager upon request).

- A. General requirements: Section 01 00 00
- B. Caulking: Section 07 92 00 - JOINT SEALANTS
- C. Application of door hardware by work packages. The sections listed below that are not included in this work package are available through the Construction Manager. (See 1.9 C. 4.)
 - 1. EWP-3:
 - a. Hollow Metal Doors and Frames: Section 08 11 13
 - b. Wood Doors: Section 08 14 00
 - c. Access Doors and Frames: Section 08 31 13
 - d. Overhead Coiling Grilles: Section 08 33 26
 - e. Sound Control Door Assemblies: Section 08 34 73
 - f. All Glass Entrances and Storefronts: Section 08 42 41 26
 - g. Exterior Aluminum Doors: Section 08 44 13 - Glazed Aluminum Curtain Walls
 - h. Automatic Door Operators: Section 08 71 1311
 - 2. EWP-4:
 - a. Hollow Metal Doors and Frames: Section 08 11 13
 - b. Access Doors and Frames: Section 08 31 13
 - c. Exterior Overhead Coiling Grilles: Section 08 33 27
 - d. Security Doors and Frames: 08 34 53
 - 3. EWP-6:
 - a. Hollow Metal Doors and Frames: Section 08 11 13
 - b. Overhead Coiling Doors: Section 08 33 23
 - c. Automatic Sliding Entrance Doors: Section 08 42 29.23
 - d. Interior Automatic Sliding Entrance Doors: Section 08 42 29.53
 - e. Exterior aluminum doors: Section 08 44 13 - Glazed Aluminum Curtain Walls
 - f. Automatic Door Operators: Section 08 71 13.11
 - 4. WP-8:
 - a. Wood Doors: Section 08 14 00
 - b. Interior Aluminum Doors and Frames: Section 08 11 16
 - c. Wood Balanced Doors Entrances: Section 08 42 36
 - d. Hollow Metal Doors and Frames: Section 08 11 13
 - e. Access Doors and Frames: Section 08 31 13

- f. Floor Hatches: Section 08 31 19
 - g. Coiling Counter Doors: Section 08 33 13
 - h. Overhead Coiling Doors: Section 08 33 23
 - i. Overhead Coiling Grilles: Section 08 33 26
 - j. Security Doors and Frames: Section 08 34 53
 - k. Automatic Door Operators: Section 08 71 13.11
- D. Finishes: Section 09 06 00 - SCHEDULE FOR FINISHES
- E. Painting: Section 09 91 00 - PAINTING
- F. Electrical: Division 26
- G. Card Readers: Section 28 13 11 - PHYSICAL ACCESS CONTROL SYSTEMS

1.3 QUALITY ASSURANCE

- A. The Hardware Schedule shall be prepared by an A.H.C. member who shall be responsible for providing complete requirements of this Project.
- B. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) and VA Barrier Free Design Guidelines, unless specified otherwise.
- C. Provide rated door hardware assemblies where required by 2006 NFPA 101 (Life Safety Code) and 2006 version of the International Building Code (IBC).
- D. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- E. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- F. The following items shall be of the same manufacturer, if possible, except as otherwise specified:
- 1. Mortise locksets.
 - 2. Hinges for hollow metal and wood doors.
 - 3. Surface applied overhead door closers.
 - 4. Exit devices.
 - 5. Floor closers.
- G. All exterior door hardware shall comply with ANSI A250.13:
- 1. Positive and Negative Wind Pressure: 85 pounds per square foot.
- H. Provide power supplies that fulfill the requirements of the electrified door hardware. Note that with some products the door hardware may require proprietary power supplies. The quantity, size and location shall be coordinated with Divisions 26 and 28.

1.4 WARRANTY

- A. Door hardware shall be subject to the terms of FAR Clause 52.24-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
 - 1. Locks, latchsets, and panic hardware: 5 years.
 - 2. Door closers and continuous hinges: 10 years.

1.5 MAINTENANCE MANUALS

- A. In accordance with Section 01 00 00 - GENERAL REQUIREMENTS, article titled "INSTRUCTIONS". Furnish maintenance manuals and instructions on all door hardware.

1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 23 - SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23 plus 2 copies to the VAMC Locksmith.
- B. Hardware Schedule:
 - 1. Prepare and submit to Architect for approval an itemized schedule of hardware within thirty (30) days after award of contract.
 - 2. Hardware Schedules shall be submitted separate from door schedules.
 - 3. Proposed hardware set submittal designations shall match architectural hardware set designations used in this section. A suffix may be added to the architectural set hardware designation to sub-divide a hardware set.
 - 4. Door and door frame schedules submitted by other sections shall have hardware set numbers, complete with added prefix, coordinated with submitted hardware schedule.
 - 5. Furnish required quantity of approved copies of schedule to Construction Manager for distribution to various trades.
 - 6. The hardware schedule shall specifically indicate degree of swing for all doors having a closer or overhead stop.
 - 7. Prepare and submit hardware schedules in the following form format, and in an EXCEL spread sheet capable of sorting by door number and by hardware set in numerical order:

Hardware Set #	Associated Door #	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHM A Finish Designation

- C. Samples and Manufacturers' Literature:

- 1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.

2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.
- D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.
- E. Wiring Diagrams: Provide complete and detailed system operation diagrams and schematic elevations specially developed for each opening requiring electrified hardware, except openings where only magnetic hold-opens or door position switches are specified. Provide these diagrams with hardware schedule submittal for approval. Provide detailed wiring diagrams with hardware delivery to jobsite.
1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Include diagrams for openings with electronic hardware specified elsewhere including, but not limited to, power-operated entrance doors (swing, slide, and revolving).
 - b. Details of interface of electrified door hardware and building safety and security systems.
 - c. Schematic diagram of systems that interface with electrified door hardware.
 - d. Point-to-point wiring.
 - e. Risers.
 - f. Elevations doors controlled by electrified door hardware.
 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware with associated wiring diagram.
 3. See "PRE-INSTALLATION MEETING" under ELECTRIC COORDINATION below.

1.7 DELIVERY AND MARKING

- A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.8 PRE-INSTALLATION MEETING

- A. Convene a pre-installation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer's Representative. Review the following:
1. Inspection of door hardware.
 2. Job and surface readiness.
 3. Coordination with other work.
 4. Protection of hardware surfaces.
 5. Substrate surface protection.
 6. Installation.
 7. Adjusting.

8. Repair.
9. Field quality control.
10. Cleaning.

1.9 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on the door schedule. Symbols for hardware sets consist of letters HW followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Manufacturers' Catalog Number References: Where manufacturers' products are specified herein, products of other manufacturers which are considered equivalent to those specified may be used. Manufacturers whose products are specified are identified by abbreviations as follows:
1. Adams-Rite, Adams Rite Mfg. Co., Pomona, CA
 2. Best, Best Access Systems, Indianapolis, IN
 3. Corbin Russwin, ASSA ABLOY, New Haven, CT
 4. Don-Jo, Don-Jo Manufacturing, Sterling, MA
 5. G.E. Security, GE Security, Inc., Bradenton, FL
 6. Markar, Markar Architectural Products, Pomona, CA
 7. Pemko, Pemko Manufacturing Co., Ventura, CA
 8. Rixson, Rixson, Franklin Park, IL
 9. Rockwood, Rockwood Manufacturing Co., Rockwood, PA
 10. Securitron, Securitron Magnalock Corp., Sparks, NV
 11. Southern Folger, Southern Folger Detention Equipment Co., San Antonio, TX
 12. Stanley, The Stanley Works, New Britain, CT
 13. Tice, Tice Industries, Portland, OR
 14. Trimco, Triangle Brass Mfg. Co., Los Angeles, CA
 15. Zero, Zero Weather Stripping Co., New York, NY
- C. Keying: The existing Stanley/Best Great Grandmaster key shall be used for this project. The owner will furnish all necessary key system information. The key system shall be small format (Best size and profile.) removable core type as described in Part 2 - Products. The key blanks shall be protected by a utility patent with a minimum seven years remaining on the patent from the start of construction, and protected by contract-controlled distribution. The manufacturer shall furnish code pattern listings in both paper and electronic formats so keys may be reproduced by code; provide electronic format in file type required by project's key control software. The manufacturer shall design the new key system with the capacity to rekey the existing system and also provide for 25 percent expansion capability beyond this requirement. Submit a keying chart for approval showing proposed keying layout and listing expansion capacity.
1. Keying information will be furnished to the Contractor by the Resident Engineer.
 2. Supply information regarding key control of cylinder locks to manufacturers of equipment having cylinder type locks. Notify Resident Engineer immediately when and to whom keys or keying information is supplied. Return all such keys to the Resident Engineer.
 3. Provide temporary construction cores for use during the construction phase. These cores are to remain the property of the supplier, and shall be returned to the supplier, by the Construction Manager, following installation of the permanent cores.
 4. Provide permanent cores for door hardware specified in EWP-3, EWP-4 and EWP-6. Quantities to be provided by the Construction Manager. (See 1.2 C.)

1.10 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):
- F883-04 Padlocks
 - E2180-07 Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
- A156.1-06 Butts and Hinges
 - A156.2-03 Bored and Pre-assembled Locks and Latches
 - A156.3-08 Exit Devices, Coordinators, and Auto Flush Bolts
 - A156.4-08 Door Controls (Closers)
 - A156.5-01 Auxiliary Locks and Associated Products
 - A156.6-05 Architectural Door Trim
 - A156.8-05 Door Controls & Overhead Stops and Holders
 - A156.12-05 Interconnected Locks and Latches
 - A156.13-05 Mortise Locks and Latches Series 1000
 - A156.14-07 Sliding and Folding Door Hardware
 - A156.15-06 Release Devices-Closer Holder, Electromagnetic and Electromechanical
 - A156.16-08 Auxiliary Hardware
 - A156.17-04 Self-Closing Hinges and Pivots
 - A156.18-06 Materials and Finishes
 - A156.20-06 Strap and Tee Hinges, and Hasps
 - A156.21-09 Thresholds
 - A156.22-05 Door Gasketing and Edge Seal Systems
 - A156.23-04 Electromagnetic Locks
 - A156.24-03 Delayed Egress Locking Systems
 - A156.25-07 Electrified Locking Devices
 - A156.26-06 Continuous Hinges
 - A156.28-07 Master Keying Systems
 - A156.29-07 Exit Locks and Alarms
 - A156.30-03 High Security Cylinders
 - A156.31-07 Electric Strikes and Frame Mounted Actuators
 - A250.8-03 Standard Steel Doors and Frames

- D. National Fire Protection Association (NFPA):
- 80-10 Fire Doors and Fire Windows
 - 101-09 Life Safety Code

- E. Underwriters Laboratories, Inc. (UL):
- Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

- A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:
1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
 2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.
- B. Provide quantity and size of hinges per door leaf as follows:
1. Doors up to 1210 mm (4 feet) high: 2 hinges.
 2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
 3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
 4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
 5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
 6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
 7. Provide heavy-weight hinges where specified.
 8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.
 9. Comply with the more stringent requirement if Door Hardware Schedule and above requirements do not agree. Butt Hinges shall not be substituted for CONTINUOUS HINGES, unless approved by Architect.
- C. Provide electric transfer hinges with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harness for connection to electric operated locking devices and power supplies. Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Wire nut connections are not acceptable.
- D. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

2.2 CONTINUOUS HINGES

- A. ANSI/BHMA A156.26, Grade 1-600.
 - 1. Listed under Category N in BHMA's "Certified Product Directory."
- B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete
- C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.
 - 1. Base Metal for Exterior Hinges: Stainless steel.
 - 2. Base Metal for Interior Hinges: Steel, or Stainless steel, as noted in Hardware Set.
 - 3. Base Metal for Hinges for Fire-Rated Assemblies: Steel, or Stainless steel, as noted in Hardware Set.
 - 4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.
 - 5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.
 - 6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
 - 7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
 - 8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.
 - 9. Manufacturer Continuous Hinges to correct length in factory. Field modification of Continuous Hinges is not permitted.

2.3 DOOR CLOSING DEVICES

- A. Closing devices shall be products of one manufacturer for each type specified.

2.4 OVERHEAD CLOSERS

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
 - 1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
 - 2. Where specified, closer shall have hold-open feature.
 - 3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
 - 4. Material of closer body shall be forged or cast.
 - 5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
 - 6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
 - 7. Closers shall have full size metal cover; plastic covers will not be accepted.

8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½" (38mm) minimum piston diameter.
15. Mental Health and Behavioral Patient Rooms: Provide concealed door closers with parallel arms and advanced backcheck.

2.5 DOOR STOPS

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.
- C. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width.
- D. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- E. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- F. Provide appropriate door mounted stop on doors in individual toilets where wall mounted stops cannot be used.
- G. Provide overhead surface applied stop Type C02541, ANSI A156.8 where shown in remarks column of door schedule.
- H. Provide door stops on doors where combination closer magnetic holders are specified and wall stops cannot be used.
- I. Where the specified wall stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

2.6 OVERHEAD DOOR STOPS AND HOLDERS

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited

by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.7 LOCKS AND LATCHES

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than seven pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching CORBIN RUSSWIN Museo 128. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At out swing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
 2. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.

2.8 PUSH-BUTTON COMBINATION LOCKS

- A. ANSI/BHMA A156.13, Grade 1. Battery operated pushbutton entry.
- B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines. Match lever handles of locks and latchsets on adjacent doors.
- C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

2.9 ELECTROMAGNETIC LOCKS

- A. Delayed-Egress Locks: BHMA A156.24.
1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds, as required by NFPA 101.
 2. 1200 lbs holding force.
 3. Security Grade: Activated from secure side of door by initiating device.

4. Movement Grade: Activated by door movement as initiating device.
5. The lock housing shall not project more than 4-inches (101mm) from the underside of the frame head stop.

2.10 KEYS

- A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	Quantity
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

2.11 KEY CABINET

- A. ANSI Standard A156.5. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and mechanical pushbutton door lock. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent. Provide minimum number of multiple cabinets where a single cabinet of largest size will not accommodate the required number of keys.
- B. Key tags shall consist of two sets: Permanent self locking and loan key snap hook type with tag colors as follows: Red fiber marker of the permanent self locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap hooks engraved with the legend "LOAN KEY."
- C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.
- D. The Key Cabinet Manufacturer shall set up a three way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the Resident Engineer.

2.12 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates and door edging as specified below:
1. Kick plates, mop plates and armor plates of metal, Type J100 series.
 2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
 3. Kick plates and/or mop plates are not required on following door sides:
 - a. Armor plate side of doors;
 - b. Exterior side of exterior doors;
 - c. Closet side of closet doors;
 - d. Both sides of aluminum entrance doors.
 4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
 5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.
 6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.

2.13 EXIT DEVICES

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.
- B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.
- C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where

concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.

- D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.
- E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.
- F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

2.14 FLUSH BOLTS (LEVER EXTENSION)

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.
- B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.
- C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- D. Friction fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.
- E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.15 FLUSH BOLTS (AUTOMATIC)

- A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).
- B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

2.16 DOOR PULLS

- A. Conform to ANSI A156.6. Pull plate 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Cut plates of door pulls for cylinders, or turn pieces where required.

2.17 PUSH PLATES

- A. Conform to ANSI A156.6. Metal, Type J302, 200 mm (8 inches) wide by 350 mm (14 inches) high. Provide metal Type J300 plates 100 mm (4 inches wide by 350 mm (14 inches) high) where push

plates are specified for doors with stiles less than 200 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

2.18 COMBINATION PUSH AND PULL PLATES

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

2.19 COORDINATORS

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

2.20 THRESHOLDS

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with 1/4-20 stainless steel machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.
- B. For thresholds at elevators entrances see Construction Manager for Division 14 Sections regarding elevator, included in EWP-2.
- C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.
- D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) from fame face.

2.21 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS

- A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

2.22 WEATHERSTRIPS (For Exterior Doors)

- A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m³/s/m).

2.23 MISCELLANEOUS HARDWARE

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders per approved keying schedule. Provide cylinders to operate locking devices where specified for following partitions and doors:
1. Folding doors and partitions.
 2. Fire rated access doors - Engineer's key set.
- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, and frames for sound resistant, doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double acting doors. Provide 4 mutes or silencers for frames for each Dutch type door.

2.24 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES

- A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.
- B. Key padlocks as follows:
1. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.

2.25 FINISHES

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.
- B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.
- C. Miscellaneous Finishes:
1. Hinges --exterior doors: 626 or 630.
 2. Hinges --interior doors: 652 or 630.
 3. Pivots: Match door trim.
 4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
 5. Thresholds: Mill finish aluminum.
 6. Cover plates for floor hinges and pivots: 630.
 7. Other hardware: 626 or 630.

2.26 BASE METALS

- A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION

3.1 HARDWARE HEIGHTS

- A. For new buildings locate hardware on doors at heights specified below, with all hand-operated hardware centered within 864 mm (34 inches) to 1200 mm (48 inches), unless otherwise noted.
- B. Hardware Heights from Finished Floor:
1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
 2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
 3. Deadlocks centerline of strike 1219 mm (48 inches).
 4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
 5. Centerline of door pulls to be 1016 mm (40 inches).
 6. Push plates and Push/Pull shall be 1270 mm (50 inches) to top of plate.
 7. Push/Pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
 8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

3.2 INSTALLATION

- A. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements
- B. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.
- C. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

- D. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.
- E. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

- F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or Rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.
- G. After locks have been installed; show in presence of Resident Engineer that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Resident Engineer for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

3.3 FINAL INSPECTION

- A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:
1. Re-adjust hardware.
 2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
 3. Identify items that have deteriorated or failed.
 4. Submit written report identifying problems.

3.4 DEMONSTRATION

- A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of Resident/Project Engineer and VA Locksmith.

3.5 HARDWARE SETS

- A. The supplier is responsible for handing and sizing all products as listed in the door hardware sets. Quantities listed are for each pair of doors, or for each single door.

1. Products listed in the Door Hardware Sets are to be provided under and meet the requirements described in the specification sections noted.
2. Section 08 71 00 – Door Hardware.
3. Section 28 13 00 – Access Control.

Manufacturers' Abbreviations

1. MR - Markar
2. RF - Rixson
3. AD - Adams Rite
4. RO - Rockwood
5. RU - Corbin Russwin
6. BL - Blumcraft
7. MA - Door manufacturer
8. PE - Pemko
9. MK - McKinney
10. SU - Securitron
11. BM - Besam

SET-EE1.0

1	Continuous Hinge	FM-300 8'0 MB	630	MR
1	Multi-Pt Exit Device	FE5400SA EO M92 M51	722	RU
1	Conc O/H Stop	1-X36	630	RF
1	Threshold	2005AT Aluminum Pan FHSL14		PE
1	Rain Guard	346C		PE
1	Gasketing	S44BL		PE
1	Gasketing	B74		PE
1	Gasketing	379CPK		PE
1	Gasketing	3151CN		PE
1	Gasketing	319CN		PE
1	Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA

Notes:

- * DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.
- * 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.
- * REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

SET: EE2.0

1	Continuous Hinge	FM-300 8'0 AR-EPT-4612-2 MB	630	MR
1	EM Multi-Pt. Device	FE5400S 1259905 M92 M99 M52	630	RU
2	Cylinder (SFIC) x CC	(VERIFY TYPE REQUIRED)		MA
2	Permanent Core	(KEY TO NEW SYSTEM)		MA
1	Conc O/H Stop	1-X36	630	RF
1	Rain Guard	346C		PE
1	Gasketing	S44BL		PE
1	Gasketing	B74		PE
1	Gasketing	379CPK		PE
1	Gasketing	3151CN		PE

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1	Gasketing	319CN	PE
1	Wire Transfer	4612-2	AD
1	ElectroLynx Harness	QC-C006	MK
1	ElectroLynx Harness	QC-C1500	MK
1	Power Supply	BPS-24-1	SU
1	Door Position Switch	(BY DIVISION 28 SUPPLIER)	MA
1	Card Reader	(BY DIVISION 28 SUPPLIER)	MA

Notes:

* CARD READER, DOOR CONTACT (DPS), REMOTE RELEASE SWITCH TO BE PROVIDED BY DIVISION 28 SUPPLIER.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO RFI 05562 FOR "SEQUENCE OF OPERATION" NARRATIVE.

RFI 7500 : 120VAC power is not required

SET HW-EE6.0

1	Pivot FM190		626	RF
1	Conc O/H Stop	1-X36 105 DEGREES	630	RF
1	Floor Closer	27-100A 8.5# SC 105 DEGREES	626	RF
1	Rain Guard	346C non-hold open (N)		PE
1	Gasketing	3151CN Per RFI 4871.		PE
1	Gasketing	319CN		PE
1	Multi-Pt. Device	FE5400SA EO M92 M51	630	RU
1	Threshold	2748D x Type 13 x FHSL14		PE
1	Gasket (Integral)	(By Alum Door Mfg)		MA
1	Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA
	Power transfer	(BY DIVISION 28 SUPPLIER)		RFI 8122

Notes:

* REVIEW HARDWARE AND DOOR DIMENSIONS WITH DOOR SUPPLIER TO VERIFY COMPATIBILITY, PRIOR TO ISSUING TEMPLATES AND ORDERING MATERIAL.

* DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE

SET HW-EE8.3

RFI 06243

2	Top Offset Pivot	050322	626	KA
4	Intermediate Offset Pivot	037233/037234	626	KA
2	LH/RH Bottom Offset Pivot	050327/050326	626	KA
2	Dummy Touch Bar x Pull	350 990DT 32D-AM		VO
2	Surf. O/H Stop	90 S (105 degrees)	630	GL
1	Gasket (Integral)	(By Alum Door Mfg)		MA

Notes:

* AUTOMATIC OPERATORS, ACTIVATION SWITCHES AND ALL NECESSARY ACCESSORIES TO BE PROVIDED BY EXTERIOR GLASS/CURTAINWALL CONTRACTOR.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO RFI 06243 FOR "SEQUENCE OF OPERATION" NARRATIVE.

* REFER TO RFI 06243 FOR DOOR ROUGH-IN ELEVATION.

SET: EE12.0

* Hinges (NRP) QUANTITY & TYPE AS REQUIRED – HEAVY WEIGHT			
2	Flush Bolt 555 US26D		RO
1	Dust Proof Strike 570 US26D		RO
1	Multi-Point Lock FE6855 PSH	630	RU
1	Cylinder (SFIC) x CC (VERIFY TYPE REQUIRED)		MA
1	Permanent Core (KEY TO NEW SYSTEM) MA		
2	Conc O/H Stop 1-X36	630	RF
1	Closer (surface) DC6210 A3 M75	689	RU
1	Threshold 2005AT ALUM PAN FHSL14		PE
1	Rain Guard 346C		PE
1	Gasketing S44BL		PE
1	Gasketing B74		PE
1	Gasketing 379CPK		PE
2	Gasketing 3151CN		PE
2	Gasketing 319CN		PE
1	Astragal 357SS		PE
2	Door Position Switch (BY DIVISION 28 SUPPLIER)		MA

Notes:

- * DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.
- * 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.
- * REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

Set: EE12.1

*	Hinges (Heavy Weight)	QUANTITY & TYPE AS REQUIRED-NRP	630	MC
1	Exit Device	ED5472B P950 M52 M64 M107	630	RU
1	Exit Device	ED5473B P957 M52 M64 M107	630	RU
3	Cylinder (SFIC) x CC	(VERIFY TYPE REQUIRED)		MA
3	Permanent Core	(KEY TO NEW SYSTEM)		MA
2	Conc O/H Stop	1-X36	630	RF
2	Closer (surface)	DC6210 A3 M75	689	RU
1	Threshold	2005AT ALUM PAN FHSL14		PE
1	Rain Guard	346C		PE
1	Gasketing	S44BL		PE
1	Gasketing	B74		PE
1	Gasketing	379CPK		PE
2	Door Bottom	3151CN		PE
2	Gasketing	319CN		PE
2	Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA

SET HW-EE14.0

2	Pivot	FM190	626	RF
1	Removable Mullion	FE708A 8' M96		RU
3	Cylinder (SFIC) x CC	(VERIFY TYPE REQUIRED)		MA
3	Permanent Core	(KEY TO NEW SYSTEM)		MA
1	EM Multi-Pt. Device	FE5400S 1259905 M92 M99 M52	630	RU
1	Multi-Pt. Device	FE5400S EO M92 M51	630	RU
2	Conc O/H Stop	1-X36 105 DEGREES	630	RF
2	Floor Closer	27-100A 8.5# SC	626	RF
1	Threshold	2748D x Type 13 x FHSL14		PE
1	Rain Guard	346C		PE
2	Gasketing	315CN		PE
2	Gasketing	319CN		PE
2	Wire Transfer	4612-2		AD
2	ElectroLynx Harness	QC-C1500		MK
2	ElectroLynx Harness	QC-C006		MK
1	Power Supply	BPS-24-1		SU
1	Gasket (Integral)	(By Alum Door Mfg)		MA
2	Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA
1	Card Reader	(BY DIVISION 28 SUPPLIER)		MA

105 DEGREES non-hold open (N) Per RFI 4871.

Notes:

- * REVIEW HARDWARE AND DOOR DIMENSIONS WITH DOOR SUPPLIER TO VERIFY COMPATIBILITY, PRIOR TO ISSUING TEMPLATES AND ORDERING MATERIAL.
- * CARD READER, DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.
- * 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

Set: EE14.1 (New for 2-3/8" door 1P100A.1)

2	Top Offset Pivot	050322	626	KA
4	Intermediate Offset Pivot	037233/037234	626	KA
2	LH/RH Bottom Offset Pivot	050327/050326	626	KA
4	Cylinder (SFIC) x CC	(VERIFY TYPE REQUIRED)		MA
4	Permanent Core	(KEY TO NEW SYSTEM)		MA
2	EM Exit Device (FSE)	CD QEL WP-RX HH9847 GBK	32D-AM	VO
2	Pull	RM3311-96 BTB MP	US32D	RO
2	Surf. O/H Stop	90 S	630	GJ
2	Closer	4021	689	LC
2	Closer Drop Plate	4020-18G	689	LC
1	Threshold	2005AT Aluminum Pan FHSL14		PE
1	Rain Guard	346C		PE
2	Gasketing	315CN		PE
2	Gasketing	319CN		PE
2	Wire Transfer	4612-2		AD
1	Power Supply	BPS-24-1 (or coordinate with Div. 28 supplier)		SU
1	Gasket (Integral)	(By Alum Door Mfg)		MA
2	Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA
1	Card Reader	(BY DIVISION 28 SUPPLIER)		MA

Notes:

- * CARD READER, DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.
- * 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.
- * REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

Set: EE14.0 (exit devices)

2	EM Exit Device (FSE)	CD E WP-RX HH9847 E996L GBK (Lever – match design of lock levers)	32D-AM	VO
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* REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

SET: EE16.0

* Hinges (NRP) QUANTITY & TYPE AS REQUIRED – HEAVY WEIGHT

1 Multi-Point Lock	FE6855 PSH	630	RU
1 Cylinder (SFIC) x CC	(VERIFY TYPE REQUIRED)		MA
1 Permanent Core	(KEY TO NEW SYSTEM)		MA
1 Conc O/H Stop	1-X36	630	RF
1 Closer (surface)	DC6210 A3 M75	689	RU
1 Threshold 2005AT	ALUM PAN FHSL14		PE
1 Rain Guard	346C		PE
1 Gasketing	S44BL		PE
1 Gasketing	B74		PE
1 Gasketing	379CPK		PE
1 Gasketing	3151CN		PE
1 Gasketing	319CN		PE
1 Door Position Switch	(BY DIVISION 28 SUPPLIER)		MA

Notes:

* DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO "TY" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

SET: EE20.0

1	Continuous Hinge FM-300 8'0 MB	630	MR
1	Continuous Hinge FM-300 8'0 AR-EPT-4612-2 MB	630	MR
2	Flush Bolt 555 US26D		RO
1	Dust Proof Strike 570 US26D		RO
1	EM Mortise Lock ML20905 25MT 24AD M92 M26	630	RU
1	Cylinder (SFIC) x CC (VERIFY TYPE REQUIRED)		MA
1	Permanent Core (KEY TO NEW SYSTEM)		MA
2	Conc O/H Stop 1-X36	630	RF
1	Closer (surface) DC6210 A3 M75	689	RU
2	Door Stop 462 EXP US2C RO		
1	Threshold 2005AT ALUM PAN FHSL14		PE
2	Gasketing	315CN	PE
1	Rain Guard	346C	PE
1	Gasketing	S44BL	PE
1	Gasketing	B74	PE
1	Gasketing	379CPK	PE
2	Gasketing	319CN	PE
1	Astragal	357SS	PE
1	Wire Transfer	4612-2	AD

1	ElectroLynx Harness	QC-C1500	MK
1	ElectroLynx Harness	QC-C006	MK
1	Power Supply	BPS-24-1	SU
2	Door Position Switch (BY DIVISION 28 SUPPLIER)		MA
1	Card Reader (BY DIVISION 28 SUPPLIER)		MA

Notes:

* CARD READER, DOOR CONTACT (DPS) TO BE PROVIDED BY DIVISION 28 SUPPLIER.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO "1Y" SERIES SECURITY DRAWINGS FOR "SEQUENCE OF OPERATION" NARRATIVE.

RFI 7500 : 120VAC power is not required

Set: EE21.1

RFI
06243

2 Top Offset Pivot 050322 626 KA
 4 Intermediate Offset Pivot 037233/037234 626 KA
 2 LH/RH Bottom Offset Pivot 050327/050326 626 KA
 1 EM Exit Device (FSE) QEL WP-RX HH9847DT 990DT GBK 630 VO
 1 EM Exit Device (FSE) QEL WP-RX HH9847NL-F 990NL GBK 630 VO
 1 Cylinder (SFIC) x CC (VERIFY TYPE REQUIRED) MA
 1 Permanent Core (KEY TO NEW SYSTEM) MA
 2 Surf. O/H Stop 90 S (105 degree) 630 GJ
 1 Threshold 2005AT ALUM PAN FHSL14 PE
 2 Gasketing 315CN (or By Alum Door Mfg) PE
 1 Rain Guard 346C PE
 1 Gasket (Integral) (By Alum Door Mfg) MA
 2 Door Position Switch (BY DIVISION 28 SUPPLIER) MA
 2 Wire Transfer 4612-2 AD
 1 Power Supply BPS-24-1 (or coordinate with Div. 28 supplier) SU
 2 Auto. Door Operator (Ref. Section 08 71 13.11) BM
 1 Card Reader (BY DIVISION 28 SUPPLIER) MA

Notes:

* AUTOMATIC OPERATORS, ACTIVATION SWITCHES AND ALL NECESSARY ACCESSORIES TO BE PROVIDED BY EXTERIOR GLASS/CURTAINWALL CONTRACTOR.

* 120VAC POWER, CONDUIT, AND WIRING TO BE PROVIDED BY DIVISION 26 SUPPLIER.

* REFER TO RFI 6243 FOR DOOR ROUGH-IN ELEVATION.

* REFER TO RFI 6243 FOR SEQUENCE OF OPERATIONS NARRATIVE.

SET HW-1E

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Hospital Latch (Locking) SARGENT 7837PT
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Closer C02061 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Heavy-Duty Armor Plates J101 x 3.175 MM (0.125 INCH) THICKNESS (ONE EACH SIDE)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154

SET HW-1P

- 2 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 2 Vertical Rod Lock SARGENT NB-7013-ETREM, or equal
- 2 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 2 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 2 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.
- 2 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 2 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 2 Auto Door Bottoms R0Y346 – HEAVY DUTY
- 2 Set Self-Adhesive Seals R0E154

NOTES:

- OVERLAPPING ASTRAGAL CANNOT BE USED. BOTH LEAVES ARE "ACTIVE"
- COORDINATE WITH DOOR AND FRAME SUPPLIER TO ENSURE COMPATIBILITY AT RATED DOORS

SET HW-1AT

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Push/Pull Plate Set 1894-4 x 1195-1 PULL (TRIMCO), or equal

- 1 Kick Plate J102
- 1 Closer C02011 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6200-M71]
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 3 Silencers L03011

SET HW-2B

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Lock (Keyed Privacy/Ind) F13 x OCCUPANCY INDICATOR [CORBIN RUSSWIN ML2065 M19S]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02061 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
(COORDINATE TYPE WITH DOOR SUPPLIER AT RATED DOORS)
- 2 Set Self-Adhesive Seals R0E154

SET HW-2M

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Lock (Public Restroom) F09 [CORBIN RUSSWIN ML2042]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02011 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6200-M71]
- 1 Kick Plate J102
- 1 Mop Plate J102
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 2 Sets Self-Adhesive Seals R0E154

SET HW-2AG

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Lock (Keyed Privacy/Ind) F13 x OCCUPANCY INDICATOR [CORBIN RUSSWIN ML2065 M19S]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02061 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Kick Plate J102
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 2 Set Self-Adhesive Seals R0E154

SET HW-3A

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Lock (Office) F04 [CORBIN RUSSWIN ML2051]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)

- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Coat Hook L03121

NOTE: OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.

SET HW-3K

- * Hinge T4A3786 [MCKINNEY] * QUANTITY AS REQUIRED, PER CODE
- 1 EM Hinge (Power Transfer) T4A3786-QC8 [MCKINNEY] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C200/300/400 (VERIFY SIZE) (ELEC HINGE TO ELEC LOCK) ***ELEC ITEM***
- 1 EM Lock (FSE-REX) F07 (E01-REX, E06) 24VDC [CORBIN RUSSWIN ML20905] (FAIL SECURE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02021 (PT4D, PT4H) [CORBIN RUSSWIN DC6210]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Power Supply REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED [SECURITRON BPS SERIES] ***ELEC ITEM***

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26. RFI 7500 : 120VAC power is not required
- CARD READER & DOOR POSITION SWITCH (DPS) BY DIVISION 28.

SET HW-4A

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02011 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6200-M71]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154

[CLICK HERE FOR HW-4C \(RFI 7500.2\)](#)

SET HW-4F

- * Hinges (NRP) QUANTITY & TYPE AS REQUIRED
- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)

- 1 Closer C02061 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Kick Plate J102
- 1 Set Self-Adhesive Seals R0E154

SET HW-4G

- * Hinges (NRP) QUANTITY & TYPE AS REQUIRED
- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057 25M]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02061 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154

SET HW-4K

- * Hinges QUANTITY & TYPE AS REQUIRED
- 1 Vertical Rod Lock SARGENT 12-NB-7006-ETREM X THERMAL PIN, or equal
- 1 Vertical Rod Lock SARGENT 12-NB-7010-ETREM X THERMAL PIN, or equal
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 2 Heavy-duty Armor Plate (UL) J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 2 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.
- 2 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 2 Sets Self-Adhesive Seals R0E154

NOTES:

- OVERLAPPING ASTRAGAL CANNOT BE USED. BOTH LEAVES ARE "ACTIVE"
- COORDINATE WITH DOOR AND FRAME SUPPLIER TO ENSURE COMPATIBILITY AT RATED DOORS

SET HW-4AG

- * Hinges QUANTITY & TYPE AS REQUIRED – HEAVY WEIGHT
- 1 Set Auto Flush Bolts TYPE 25 LESS BOTTOM BOLT [ROCKWOOD 1840]
- 1 Coordinator TYPE 21A [ROCKWOOD 1600 SERIES X BRACKET, AS REQUIRED]
- 1 Exit Device ED5657AL [CORBIN RUSSWIN], or equal
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Set Meeting Stile Astragals R3E834
- 2 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 2 Kick Plates J102
- 2 Overhead Stop C01541-ADJUSTABLE (SURFACE AT RATED DRS) [RIXSON 1 SERIES CONCEALED]
- 1 Set Self-Adhesive Seals R0E154

SET HW-5C

SINGLE "OUTSWING" DOOR (OHS)

* Hinges T4A3786-NRP * QUANTITY AS REQUIRED, PER CODE

- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Kick Plate J102
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 3 Silencers L03011

SET HW-5F

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Heavy-Duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS (ONE EACH SIDE)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 3 Silencers L03011

SET HW-5G

SINGLE "OUTSWING" DOOR

* Hinges TA2714-NRP * QUANTITY AS REQUIRED, PER CODE

- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 3 Silencers L03011

SET HW-6A

SINGLE "INSWING" DOOR (WALL STOP)

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY

- (COORDINATE TYPE WITH DOOR SUPPLIER AT RATED DOORS)
- 2 Sets Self-Adhesive Seals R0E154

SET HW-6B

SINGLE "INSWING" DOOR (OVERHEAD STOP)

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Kick Plate J102
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-6C

SINGLE "OUTSWING" DOOR (WALL STOP)

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 1 Kick Plates J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-6D

SINGLE "INSWING" DOOR

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)

- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-6E

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS (MARKAR HG-305 X ADJUSTA SCREW)
- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 2 Sets Self-Adhesive Seals R0E154

SET HW-7B

SINGLE "IN SWING" DOOR AT MEDICINE/PHARMACY ***EM LOCK X REX (ON BOARD)*** ***CARD READER*** ***DOOR POSITION SWITCH (DPS)***

- 1 EM Continuous Hinge A51031B x(2) 4-THRUWIRE TRANSFER TRANSFERS X IN-HINGE ACCESS PANEL [MARKAR FM-300-MB X ADJUSTA-SCREWS MP-EAMP] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C200/300/400 (VERIFY SIZE) (ELEC HINGE TO ELEC LOCK) ***ELEC ITEM***
- 1 EM Lock (FSE-REX) F07 (E01-REX, E06) 24VDC [CORBIN RUSSWIN ML20905] (FAIL SECURE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Power Supply REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED [SECURITRON BPS SERIES] ***ELEC ITEM***

CARD READER (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- CARD READER & DOOR POSITION SWITCH (DPS) BY DIVISION 28.

SET HW-7D

Hinges QUANTITY & TYPE AS REQUIRED

- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]

- 1 Kick Plate J102 (@ STORAGE, EVM, & HAC ROOMS ONLY)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154

SET HW-8A

Hinges QUANTITY & TYPE AS REQUIRED

- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer (@ Rated Doors) C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-8B

Hinges QUANTITY & TYPE AS REQUIRED

- 1 Lock (Classroom) F08 [CORBIN RUSSWIN ML2055]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer (@ Rated Doors) C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-9A

Hinges QUANTITY & TYPE AS REQUIRED

- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY
- 2 Sets Self-Adhesive Seals R0E154

SET HW-9E

SINGLE "OUTSWING" DOOR

* Hinges TA2714-NRP * QUANTITY AS REQUIRED, PER CODE

- 1 Lock (Storeroom) F07 [CORBIN RUSSWIN ML2057]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Kick Plate J102
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Threshold J32300 x 57 MM WIDTH (2-1/4 INCHES)
- 1 Auto Door Bottom R0Y346 – HEAVY DUTY

2 Sets Self-Adhesive Seals R0E154

SET HW-9R

SINGLE DOOR AT STORAGE ***EM LOCK X REX (ON BOARD)*** ***CARD READER*** ***DOOR POSITION SWITCH (DPS)***

* Hinge T4A3786 [MCKINNEY] * QUANTITY AS REQUIRED, PER CODE

- 1 EM Hinge (Power Transfer) T4A3786-QC8 [MCKINNEY] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C200/300/400 (VERIFY SIZE) (ELEC HINGE TO ELEC LOCK) ***ELEC ITEM***
- 1 EM Lock (FSA-REX) F07 (E01-REX, E06) 24VDC [CORBIN RUSSWIN ML20903] (FAIL SAFE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Kick Plate J102
- 2 Sets Self-Adhesive Seals R0E154
- 1 Power supply (Per RFI 4625)

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26. ← RFI 7500 : 120VAC power is not required
- CARD READER, DOOR POSITION SWITCH (DPS) BY DIVISION 28.

SET HW-10B

SINGLE INTERIOR STAIR DOORS ***EM EXIT DEVICE X REX (ON BOARD)*** ***CARD READER*** ***DOOR POSITION (DPS)***

- * Hinge T4A3786-NRP [MCKINNEY] * QUANTITY AS REQUIRED, PER CODE
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C006 (VERIFY SIZE) (ELEC HINGE TO ELEC EXIT DEVICE) ***ELEC ITEM***
- 1 EM Exit Device (FSA-REX) ED5200A 9903 (FAIL SAFE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02021 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Power Supply REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED, FIRE ALARM CONTACT [SECURITRON BPS SERIES] ***ELEC ITEM***

CARD READER (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- CARD READER & DOOR POSITION SWITCH (DPS) BY DIVISION 28.
- EM EXIT DEVICE (FSA-REX) POWER SUPPLY TO BE CONNECTED TO FIRE ALARM TO AUTOMATICALLY UNLOCK UPON SIGNAL FOR FIRE DEPARTMENT ACCESS.

SEQUENCE OF OPERATION: REFER TO TY SERIES DRAWINGS

SET HW-10C

SINGLE INTERIOR STAIR DOOR (EXIT ONLY) ***EM EXIT DEVICE X REX (ON BOARD)*** ***DOOR POSITION SWITCH (DPS)***

- 1 EM Continuous Hinge A51031B x (2) 4-THRUWIRE TRANSFER TRANSFERS X IN-HINGE ACCESS
PANEL [MARKAR FM-300-MB X MP x EAMP] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C006 (VERIFY SIZE) (ELEC HINGE TO ELEC EXIT DEVICE) ***ELEC ITEM***
- 1 EM Exit Device (FSA-REX) ED5200A ~~25M LEVER~~ 9903 (FAIL SAFE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02021 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6210-M71]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Power Supply REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED [SECURITRON BPS SERIES] ***ELEC ITEM***
- DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***
- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- DOOR POSITION SWITCH (DPS) BY DIVISION 28.
- EM EXIT DEVICE (FSA-REX) POWER SUPPLY TO BE CONNECTED TO FIRE ALARM TO AUTOMATICALLY UNLOCK UPON SIGNAL FOR FIRE DEPARTMENT ACCESS.

SET HW-11D

PAIR OF DOUBLE-EGRESS CORRIDOR DOORS

EM HOLDER/RELEASE

- 2 Continuous Hinges A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 2 Exit Device (CVR-LBR) TYPE 7 or 8 F01 (CORBIN RUSSWIN ED5860B-M55)
- 2 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 4 Kick Plates J102
- 1 Edge Guard (Wood Doors only) J208M / J211, CUT FOR HARDWARE (MARKAR EG-308)
- 1 Edge Guard x Astragal MARKAR EG-T-308 X GASKET, CUT FOR HARDWARE
- 2 Elec Mag Holder/Release RIXSON 998, or equal ***ELEC ITEM***
- 1 Set Self-Adhesive Seals R0E154

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

SET HW-11H

PAIR OF CORRIDOR DOORS

- 2 Continuous Hinges A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 2 Exit Device (CVR-LBR) CORBIN RUSSWIN ED5860B 25955-M55 or equal

- 2 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 2 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 2 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 2 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Edge Guard (Wood Doors only) J208M / J211, CUT FOR HARDWARE (MARKAR EG-308)
- 2 Meeting Stile Gasket PEMKO 18041CNB (FULL HEIGHT), or equal
- 1 Set Self-Adhesive Seals R0E154

SET HW-11K

PAIR OF INTERIOR "OUTSWING" DOORS ***ELEC EXIT DEVICE*** ***CARD READER*** ***DOOR POSITION SWITCH (DPS)***

- 2 EM Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL ADJUSTA-SCREWS x CURRENT TRANSFER PREPARATION [MARKAR HG-305-MB X ADJUSTA-SCREWS X CTP] ***ELEC ITEM***
- 2 Power Transfer Device EPT/EPTL (SECURITRON), or equal ***ELEC ITEM***
- 2 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 2 Power Transfer Device MCKINNEY QC-C006 (VERIFY SIZE) (ELEC HINGE TO ELEC EXIT DEVICE) ***ELEC ITEM***
- 1 EM Exit Device (ELP-REX-CVR) CORBIN RUSSWIN ED5860B 959 M92 (REX) M94 (ELP) ***ELEC ITEM***
- 1 EM Exit Device (REX-CVR) CORBIN RUSSWIN ED5860B M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 2 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 2 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 2 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 2 Set Self-Adhesive Seals R0E154
- 2 Meeting Stile Gasket PEMKO 18041CNB (FULL HEIGHT), or equal
- 1 Power Supply TYPE REQUIRED BY EXIT DEVICE MANUFACTURER (CORBIN RUSSWIN 781N) ***ELEC ITEM***
- 1 EM Keyswitch MK SERIES (SECURITRON), or equal ("ON" / "OFF" SWITCH FOR DOOR SYSTEM) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE KEYSWITCH)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)

CARD READER (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- CARD READER, DOOR POSITION SWITCH (DPS) BY DIVISION 28.
- OVERLAPPING ASTRAGAL CANNOT BE USED. BOTH LEAVES ARE "ACTIVE"
- COORDINATE WITH DOOR AND FRAME SUPPLIER TO ENSURE COMPATIBILITY AT RATED DOORS

SET HW-11P

SINGLE "OUTSWING" CORRIDOR DOORS (RATED) ***ELEC EXIT DEVICE*** ***CARD READER*** ***DOOR POSITION SWITCH (DPS)***

- 1 EM Continuous Hinge A51031B x (2) 4-THRUWIRE TRANSFER TRANSFERS X IN-HINGE ACCESS PANEL [MARKAR FM-300-MB X ADJUSTA-SCREWS MP-EAMP] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C200/300/400 (VERIFY SIZE) (ELEC HINGE TO ELEC LOCK) ***ELEC ITEM***
- 1 EM Exit Device (ELP-REX) CORBIN RUSSWIN ED5200A 25M955 M92 (REX) M94 (ELP) ***ELEC ITEM***
- 1 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 1 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Sets Self-Adhesive Seals R0E154
- 1 Power Supply TYPE REQUIRED BY EXIT DEVICE MANUFACTURER (CORBIN RUSSWIN 781N)
- 1 EM Keyswitch MK SERIES (SECURITRON), or equal ("ON" / "OFF" SWITCH FOR DOOR SYSTEM) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE KEYSWITCH)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)

CARD READER (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- CARD READER, DOOR POSITION SWITCH (DPS) BY DIVISION 28.

SEQUENCE OF OPERATION: REFER TO TY SERIES DRAWINGS

SET HW-11Q

PAIR OF CORRIDOR DOORS (NON-RATED) ***AUTOMATIC DOOR OPERATOR***

- 2 Continuous Hinges A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 2 Push Bar 45 X VERIFY LENGTH (ROCKWOOD), or equal
- 2 Pull 120 (ROCKWOOD), or equal
- 1 Set Meeting Stile Astragals R3E834
- 2 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 2 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Sets Self-Adhesive Seals R0E154

POWER ASSIST DOOR OPERATOR (BY 08 71 13.11 SUPPLIER) ***ELEC ITEM***

ACTIVATION SWITCH (FOR (BY 08 71 13.11 SUPPLIER)

POWER ASSIST DOOR OPERATOR) ***ELEC ITEM***

NOTES:

- LOW ENERGY POWER ASSIST DOOR OPERATOR, ACTIVATION SWITCH AND ACCESSORIES BY 08 71 13.11 SUPPLIER (EACH LEAF)
- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

SET HW-11T

PAIR OF DOUBLE EGRESS CORRIDOR DOORS (NON-RATED) ***AUTOMATIC DOOR OPERATOR***

- 2 Continuous Hinges A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 2 Push Bar 45 X VERIFY LENGTH (ROCKWOOD), or equal
- 1 Edge Guard x Astragal MARKAR EG-T-308 X GASKET, CUT FOR HARDWARE
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 4 Heavy-duty Armor Plate J101 x 3.175 MM (0.125 INCH) THICKNESS
- 2 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Sets Self-Adhesive Seals R0E154

POWER ASSIST DOOR OPERATOR (BY 08 71 13.11 SUPPLIER) ***ELEC ITEM***

ACTIVATION SWITCH (FOR (BY 08 71 13.11 SUPPLIER)

POWER ASSIST DOOR OPERATOR) ***ELEC ITEM***

NOTES:

- LOW ENERGY POWER ASSIST DOOR OPERATOR, ACTIVATION SWITCH AND ACCESSORIES BY 08 71 13.11 SUPPLIER (EACH LEAF)
- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

SET HW-12D

SINGLE "INSWING", ***EM LOCK X REX (ON BOARD)*** ***CARD READER*** ***DOOR POSITION SWITCH (DPS)***

* Hinge T4A3786-NRP [MCKINNEY] * QUANTITY AS REQUIRED, PER CODE

- 1 EM Hinge (Power Transfer) T4A3786-QC8 [MCKINNEY] ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C1500 (POWER SUPPLY TO ELEC HINGE) ***ELEC ITEM***
- 1 Power Transfer Device MCKINNEY QC-C200/300/400 (VERIFY SIZE) (ELEC HINGE TO ELEC LOCK) ***ELEC ITEM***
- 1 EM Lock (FSA-REX) F07 (E01-REX, E06) 24VDC [CORBIN RUSSWIN ML20903] (FAIL SAFE) M92 (REX) ***ELEC ITEM***
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
- 1 Kick Plate J102
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Set Self-Adhesive Seals R0E154
- 1 Power Supply REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED [SECURITRON BPS SERIES] ***ELEC ITEM***

CARD READER (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

DOOR POSITION SWITCH (BY DIVISION 28 SUPPLIER) ***ELEC ITEM***

NOTES:

- 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
- CARD READER & DOOR POSITION SWITCH (DPS) BY DIVISION 28.
- EM LOCK (FSA-REX) POWER SUPPLY TO BE CONNECTED TO FIRE ALARM TO AUTOMATICALLY UNLOCK UPON SIGNAL FOR FIRE DEPARTMENT ACCESS.

SET HW-13A

SINGLE "INSWING", PUSH BUTTON COMBINATION LOCK OVERHEAD STOP

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 1 Keypad Lock N3 – A156.13 F07 G1 E06 [CORBIN RUSSWIN ML20834]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Armor Plate J101 x 1.275 MM (0.050 INCH) THICKNESS
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Set Self-Adhesive Seals R0E154

SET HW-13B

SINGLE "INSWING", PUSH BUTTON COMBINATION LOCK, WALL STOP

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 1 Keypad Lock N3 – A156.13 F07 G1 E06 [CORBIN RUSSWIN ML20834]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02011 (PT4D, PT4F, PT4H) [CORBIN RUSSWIN DC6200-M71]
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Armor Plate J101 x 1.275 MM (0.050 INCH) THICKNESS
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Set Self-Adhesive Seals R0E154

SET HW-13D

SINGLE "OUTSWING", PUSH BUTTON COMBINATION LOCK, WALL STOP

- 1 Continuous Hinge A51031B x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS [MARKAR HG-305-MB X ADJUSTA-SCREWS]
- 1 Keypad Lock N3 – A156.13 F07 G1 E06 [CORBIN RUSSWIN ML20834]
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Closer C02061 (PT4D, PT4H) [CORBIN RUSSWIN DC6210-A1]
- 1 Wall Stop L02101 CONVEX [ROCKWOOD 402]
- 1 Armor Plate J101 x 1.275 MM (0.050 INCH) THICKNESS
- 1 Edge Guard (Wood Doors only) J208M / J211 (VERIFY SIZE), CUT FOR HARDWARE (MARKAR EG-308)
- 1 Set Self-Adhesive Seals R0E154

SET HW-14D

Hinges QUANTITY & TYPE AS REQUIRED

- 1 Latchset F01 [CORBIN RUSSWIN ML2010]
- 1 Closer C02051 (PT4D, PT4H) [CORBIN RUSSWIN DC6200-A1]
NOTE: PROVIDE PLATE AND/OR BRACKET, AS NECESSARY, FOR INSTALLATION WITH OVERHEAD STOP.

- 1 Kick Plate J102
- 1 Overhead Stop C01541-ADJUSTABLE [RIXSON 1 SERIES CONCEALED]
- 1 Set Self-Adhesive Seals R0E154

SET HW-17B

AUTOMATIC DOOR ASSEMBLIES

NOTE:

- ALL HARDWARE PROVIDED BY AUTOMATIC DOOR ASSEMBLY MANUFACTURER

SET HW-17E

OVERHEAD COILING DOOR

- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)

SET HW-18B

- 2 Pivot Set (HD/LL) L147 (RIXSON)
- 2 Intermediate Pivot (HD/LL) ML19 (RIXSON)
- 1 Vertical Rod Lock SARGENT 74-NB-7013-ETREM, or equal (Lead Lined)
- 1 Vertical Rod Lock SARGENT 74-NB-7010-ETREM, or equal (Lead Lined)
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 2 Kick Plate J102 X ADHESIVE FASTENING (COORDINATE FASTENERS)
- 2 Wall Stop (Heavy Duty) 487 [ROCKWOOD] NOTESOLID BACKING REQUIRED FOR INSTALLATION
- 2 Door Bottom (Surface) 18061CNB (VERIFY FASTENERS)
- 2 Set Self-Adhesive Seals R0E154
- ~~COORDINATE LEAD LINING / SHIELDING REQUIREMENTS WITH DOOR AND FRAME SUPPLIER~~

SET HW-18C

- 1 Pivot Set (HD/LL) L147 (RIXSON)
- 1 Intermediate Pivot (HD/LL) ML19 (RIXSON)
- 1 Hospital Latch (Locking) SARGENT 74-7837PT (LEAD LINED)
- 1 Cylinder (SFIC) x Const Core (PROVIDE TYPE REQUIRED TO OPERATE LOCK)
- 1 Permanent Core (SFIC) (KEY TO NEW SYSTEM WITH UTILITY PATENT)
- 1 Kick Plate J102 X ADHESIVE FASTENING (COORDINATE FASTENERS)
- 1 Wall Stop (Heavy Duty) 487 [ROCKWOOD] NOTESOLID BACKING REQUIRED FOR INSTALLATION
- 1 Door Bottom (Surface) 18061CNB (VERIFY FASTENERS)
- 2 Set Self-Adhesive Seals R0E154
- ~~COORDINATE LEAD LINING / SHIELDING REQUIREMENTS WITH DOOR AND FRAME SUPPLIER~~

SET HW-21BB

- 1 Continuous Hinge A51031B X INTEGRAL HINGE GUARD CHANNEL
[MARKAR FM-300-MB]

Addendum 03-Post bid

7/3/2013

1	Exit Device ED5600L 910	US32D		RU
1	Door Closer DC3210 (CORBIN RUSSWIN), OR APPROVED EQUAL		689	RU
1	Kick Plate J102 (K1050 10" 4BE CSK)	US32D		RO
1	Door Stop L02101 (402)	US32D		RO
3	Silencer L03011 (608)			RO

SET HW-21BC

1	Continuous Hinge A51031B X INTEGRAL HINGE GUARD CHANNEL [MARKAR FM-300-MB]			
1	Exit Device ED5600L 910	US32D		RU
1	Door Closer DC3210 (CORBIN RUSSWIN), OR APPROVED EQUAL		689	RU
1	Kick Plate J102 (K1050 10" 4BE CSK)	US32D		RO
1	Overhead Stop (SURFACE) 9 SERIES-ADJUSTABLE (RIXSON), OR APPROVED EQUAL			
3	Silencer L03011 (608)			RO

END OF SECTION 087100

SECTION 08 71 13.11
LOW ENERGY POWER ASSIST DOOR OPERATORS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies equipment, controls and accessories required to provide low energy power assisted automatic operation of swing doors. The door operator system shall be complete including operator, controls, door arm and operator enclosure (header and cover).

1. Provide Low Energy Power Assist Door Operators at Concourse Doors 1A301.1 and 1A301.2 and elsewhere indicated. See "Power Assist" in HW Sets under Section 08 71 00, Door Hardware.

1.2 RELATED WORK (Items not included in this Project Manual are available from the Construction Manager upon request).

- A. Aluminum frames entrance work; Section 08 41 13, Aluminum-Framed Entrances and Storefronts.
- B. Door hardware; Section 08 71 00, Door Hardware.
- C. Glass and glazing of doors and frames; Section 08 80 10, Interior Glazing.
- D. Finish Color, Section 09 06 00, SCHEDULE FOR FINISHES.
- E. Smoke detectors for control of fire/smoke doors to be wired per Section 28 31 00, Fire Detection and Alarm.
- F. Electric general wiring, connections and equipment requirements; Division 26, ELECTRICAL.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.
- C. Shop Drawings:
1. Show location of controls and safety devices in relationship to each automatically operated door. Include templates, wiring diagrams, fabrication details, anchorage and other information to providers of related work to coordinate proper installation of door operators.

1.4 PERFORMANCE/DESIGN REQUIREMENTS

- A. Power assisted automatic door equipment shall accommodate normal traffic as well as the weight of the doors.
- B. Equipment: UL approved and comply with applicable codes. Motors shall be rated minimum one-quarter horsepower and shall be single phase and 115 volts.
- C. Fire Rated Doors: Provide operators and accessories as required for proper operation. Assemblies to be UL listed.
- D. Electrical Wiring: Provide wiring so that only a single power supply is required. Equipment and wiring shall be as specified in Division 26, ELECTRICAL.
- E. Emergency Exit Doors: Comply with requirements for doors serving as exit components in the means of egress, as certified by the manufacturer for the condition shown.
- F. Service Life: Operators to be capable of operating without failure of any component, for not less than 300,000 open and close cycles, with normal maintenance as defined in manufacturer's standard operating manual.

1.5 ELECTRIC COORDINATION

- A. Power Supplies: Power supplies provided by Division 26 for all electrically operated hardware including the following:
 - 1. Electric strikes.
 - 2. Electric door operators.
 - 3. Magnetic locks.
 - 4. Electrified panic devices.
- B. Division 26 Electric Devices: The following electric devices are provided by Division 26.
 - 1. Conduit, Wiring, and Junction Box to Operator: Final connecting of wiring of operator to power supply at junction box to operator.
- C. Section 08 71 13.11: Provide all wiring and components necessary for a complete installation of Low Energy Power Assist Door Operators to the power supply junction box in conformance with Division 26; including but not limited to:
 - 1. Conduit and wiring.
 - 2. Activation devices
 - 3. Relays, transformers.
 - 4. All junction boxes., except junction boxes required for electric strikes.
- D. Electrical Devices by Finish Hardware Supplier: The following electrical devices are provided under Section 08 71 00:
 - 1. Electric strikes.
 - 2. Junction Boxes for Electric Strikes: Hardware supplier to forward boxes to hollow metal supplier for installation in frames.
- E. Voltages and Operation Requirements:

1. Operator: 115 VAC/Single Phase.
2. Electric Strikes: 24 VAC, continuous duty, silent operators.
3. Electric strikes to be "Fail Secure".
4. Verify voltages with Division 26 upon award of Contract.

1.6 QUALITY ASSURANCE

- A. Subcontract: Subcontract automatic door work to entrance door contract for proper coordination and undivided responsibility where systems abut or connect to one another.
- B. Standards: Provide automatic door operators complying with AANSI/BHMA A156.19 and UL Standard 325.
- C. One manufacturer of automatic door equipment shall be used throughout the building.
- D. Qualifications:
 1. Manufacturer's Qualifications: Provide units produced by a firm with not less than 5 years successful experience in the fabrication of automatic door equipment of the type required for this project.
 2. Installer's Qualifications: Engage an installer who is an authorized representative of the automatic door equipment manufacturer for both the installation and maintenance of the type of units required for this project.
 - a. AAADM certified.
 - b. Minimum Experience: At least 3 years of experience in the installation and service of automatic door equipment of the same manufacturer.
- E. Maintenance Proximity: Not more than 1 hour normal travel time from Installer's place of business and project site.

1.7 WARRANTY

- A. Power assisted door operators, accessories, controls and other related equipment shall be subject to the terms of the "Warranty of Construction", FAR clause 52.246-21, except that the warranty period shall be two years in lieu of one year.
 1. Warrant systems free of defects due to faulty materials and workmanship.
 2. Include repair and replacement of defective materials and components at no additional cost to Owner.

1.8 APPLICABLE PUBLICATIONS (Latest edition unless otherwise noted.)

- A. The publications listed below form a part of this specification to the extent referenced and may be referenced in the text by the basic designation only.
- B. American National Standards Institute (ANSI):
 1. ICC/ANSI A117.1 Guideline for Accessible and Usable Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People

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2. 156.19 Power Assist and Low Energy Power Operated Door
 - C. American Association of Automatic Door Manufacturers (AAADM).
 - D. Builders Hardware Manufacturers Association, Inc. (BHMA):
 1. 156.19 Power Assist and Low Energy Power Operated Doors
 - E. Underwriters Laboratory, Inc. (UL):
 1. UL 325 Electric Door, Drapery, Gate, Louver and Window Operators and Systems.

PART 2 - PRODUCTS

2.1 OPERATORS

- A. Automatic door operators shall be for institutional doors and shall be electromechanical and surface mounted above the door to the header or transom bar. The opening force shall be generated by a permanent magnet DC motor driving a combination spiral bevel/spur gear reducer and transmitted to the door through an arm linkage. Opening speed shall be adjustable and feature dual backcheck control allowing adjustment of backcheck speed and position. Closing shall be by spring force generated by a metal compression spring. The spring shall reduce manual opening force to not more than 67 N (15 lbf). The minimum diameter of spring wire shall be 0.007 mm (172 in.). Under the specified design load of the door, the spring shall be capable of performing 2,000,000 cycles before fracture. Adjustable closing speed and fixed latch speed shall control the door in the closing cycle. The doors shall be operated manually at any time without damage to the operator or components.
- B. All operators shall have checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle. Operators shall recycle doors instantaneously to full open position from any point in closing cycle when control switch is reactivated.
- C. Operator shall be swinging type enclosed in housing. Operator shall open door by energizing motor and shall stop by electrically reducing voltage and stalling motor against mechanical stop. Door shall close by means of spring energy, and close force shall be controlled by gear system and motor being used as dynamic break without power. System shall operate as manual door control in event of power failure. Opening and closing speeds shall be adjustable:
 1. Swing Operator Housing: Housing shall be 140 mm (5-1/2 inches) wide by 150 mm (6 inches) high aluminum extrusions with enclosed end caps for application to 100 mm (4 inch) and larger frame systems. All structural sections shall have a minimum thickness of 3.7 mm (0.146 inch) and be fabricated of 6063-T5 aluminum alloy.
 2. Swing Power Operator: Completely assembled and sealed unit which shall include helical gear drive transmission, mechanical spring and bearings, all located in cast aluminum case and filled with special lubricant for extreme temperature conditions. A "DC" shunt-wound permanent magnet motor with sealed ball bearings shall be attached to transmission system. Complete unit shall be rubber mounted with provisions for easy maintenance and replacement, without removing door from pivots or frame.
 3. Connecting hardware for swing overhead concealed type power operator shall have drive arm attached to door with a pin linkage rotating in a self-lubricating bearing and adjustable slide block, traveling in an interconnected track and top pivot assembly. Top

track and pivot assembly shall be fabricated of steel. Door shall not pivot on shaft of operator.

4. Electrical Control: Operator shall have a self-contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator. Relays shall be plug-in type for individual replacement and all connecting harnesses shall have interlocking plugs. Control shall also include time delay for normal cycle. Swing door control shall include safe-swing circuit with optional switching which automatically limits power and slows door when approached from the doors swing area.
5. On pairs of doors, operators shall allow either door to be opened manually without the other door opening.

2.2 MICROPROCESSOR CONTROLS

- A. The system shall include a multi-function microprocessor control providing adjustable hold open time (1 to 30 sec.), LED indications for actual position unknown, system status, open obstruction shutdown, activation signal, safety mat/sensor signal, Stop-and-Hold signal, and mode selector switches providing a means for easy field selection of the following functions: push-to-operate, latch assist and stack pressure. Control shall be capable of receiving activation signals from any device with normally open dry contact output.
 1. With push-to-operate function enabled, the control shall provide a means of initiating a self-start activation circuit by slightly pushing the door open at any point in the door swing.
 2. Latch Assist shall provide a two second impulse in the close direction to overcome restrictions with locking devices of pressure differentials, allowing the unit to operate in standard time delay mode, and permitting the door to close from the full open position after the hold time is satisfied. All activation modes shall provide fully adjustable opening speed.
- B. The door shall be held open by low voltage applied to the continuous duty motor. The control shall include an adjustable safety circuit that monitors door operation and shuts the motor off if an open obstruction is sensed. The control shall include a recycle feature the reopens the door if an obstruction is sensed at any point during its closing cycle. The control shall include a standard three position toggle switch with functions for ON, OFF, and HOLD OPEN.

2.3 ENCLOSURE

- A. Operator shall be completely self-contained within an extruded aluminum housing (alloy 6063-T6) to conceal operator mechanism and mounting brackets and with removable access cover with an overall maximum size of 140 mm (5-1/2 inches) wide by 150 mm (6 inches) deep. Header color shall be integral color anodized/painted to match adjacent storefront/frame finish.

2.4 ACTIVATION DEVICES

- A. Automatic: Opening cycle shall be activated by pressing switches with international symbol of accessibility and "PRESS TO OPERATE DOOR" engraved on the faceplate. Switches shall be installed in a standard 2-gang electrical wall box and placed in a location in compliance with ANSI A117.1. Switches may be wall mounted or mounted on a free standing post or guard rail. Provide two stations for each opening; one on both sides of opening; coordinate locations with Architect.

1. Switch Plate Cover: 6 inch square stainless steel.
- B. Manual: Push-to-operate; manually pushing the door shall activate the automatic opening cycle. Door shall automatically close after timer delay expires.
- C. Opening and closing force, measured 25 mm (1 inch) out from the lock stile of the door, shall not exceed 67 N (15 lbf) to stop the door when operating in either direction or cycle.
- D. Opening Time: Doors shall be field adjusted so that opening time to back check or 80 degrees, whichever occurs first, shall be 3 seconds or longer as required in Table I. Backcheck shall not occur before 60 degrees opening.
 1. Total opening time to fully open shall be as in Table II.
- E. Closing Time:
 1. Doors shall be field adjusted to close from 90 degrees to 10 degrees in 3 seconds or longer as required in Table I.
 2. Doors shall be field adjusted to close from 10 degrees to fully close position in not less than 1.5 seconds.
 3. Doors shall be field adjusted to remain fully open for not less than 5 seconds.
 4. Table I provides speed settings for various widths and weights of doors for obtaining results complying with this paragraph.
- F. Cycle Tests:
 1. Low Energy Power Operated, Low Energy Power Open and Power Assist Operators shall be cycle tested for 300,000 cycles.
 2. Use the widest and heaviest door specified as a test specimen. Narrower or lighter doors of the same configurations shall then be considered to meet the cycle test requirements.

Table I

Minimum Opening Time to Backcheck or 80 degrees, whichever occurs first and the Minimum Closing Time from 90 degrees to Latch Check or 10 degrees.

"D" Door Leaf Width- mm (inches)	"W" Door Weight in kg (pounds) Matrix Values are in seconds				
	(100) 45.4	(56.7) 125	(68.0) 150	(79.4) 175	(90.7) 200
(762) 30	3.0	3.0	3.0	3.0	3.5
(914) 36	3.0	3.5	3.5	4.0	4.0
(1067) 42	3.5	4.0	4.0	4.5	4.5
(1219) 48	4.0	4.5	4.5	5.0	5.5

Doors of other weights and widths can be calculated using the formula: $T = DvW/133$ in US units; $T = DvW/2260$ in SI (metric) units; T = Time, seconds; D = Door width, mm (inches); W = Door weight, kg (lbs).

The values for "T" time have been rounded up to the nearest half second.
These values are based on a kinetic energy of 1.25 lbf-ft.

Table II

Total Opening Time to Full Open Position

Backcheck at 60 degrees	Backcheck at 70 degrees	Backcheck at 80 degrees
Table I plus 2 seconds	Table I plus 1.5 seconds	Table I plus 1 second

Note: To determine maximum times from close to full open, the operator shall be adjusted as shown in the chart. Backcheck occurring at a point between positions in Table II shall use the lowest setting. For example, if the backcheck occurs at 75 degrees, the full open shall be the time shown in Table I plus 1.5 seconds.

2.5 POWER UNITS

- A. Provide separate self-contained electric circuits for automatic operators located on each floor of the building. Interruption or failure of power circuits for operators located on one floor of the building shall not interfere with continuous performance of automatic operated doors located on other floors. Capacity and size of power circuits shall be in accordance with automatic operator manufacturer's specifications.

2.6 SAFETY DEVICES

- A. Time delay switches shall be adjustable between 5 to 60 seconds and shall control closing cycle of doors.
- B. Decals with sign "In" or "Do Not Enter" shall be installed on both faces of each door where directed by Architect, and shall conform to the requirements of ANSI/BHMA A156.19.
- C. Each swing door shall have installed a motion sensor to detect any person standing in the door swing path and prevent the door from opening.
- D. Motion sensors shall consist of detection modules, factory prepared to be attached to each side of the lock/strike stile, an armored flex link power cable and bracket assembly, factory prepared for attachment to the pivot stile; a logic board and a position encoder which shall mount to the operator. The detection modules shall contain transmitting and receiving diodes and sense multidimensional zones for detection of people and/or objects in the door area. Detection modules shall be high impact, shock resistant zinc castings with tinted lenses. The swing door sensor system shall provide complete operate and safety zone coverage. These zones shall be fully adjusted to meet specific jobsite conditions (sidewalls, adjacent panels, etc.). The system shall not be affected by ultrasonic, ambient light or radios frequencies within the vicinity of the swing door.

2.7 ACCESSORIES

- A. Fasteners: Aluminum, non-magnetic stainless steel, or other noncorrosive metal compatible with the items being fastened. For exposed fasteners (if any), provide Phillips flat-head screws with finish matching item fastened.
- B. Hardware:
 - 1. Keyed Switch: Manufacturer's standard key operated 3-position switch; cylinder furnished under Section 08 7100 - Door Hardware.
 - a. "ON" Position: Turns operator on.
 - b. "OFF" Position: Turns operator off.
 - c. Hold-Open Switch: Toggle switch to hold door in open position.

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- C. Miscellaneous: As required for complete installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate installation of equipment with other related work. Manual controls and power disconnect switches shall be recessed or semi-flush mounted in partitions. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment in finish work.
- B. Install power units in locations shown. Where units are to be mounted on walls, provide metal supports or shelves for the units. All equipment, including time delay switches, shall be accessible for maintenance and adjustment.
- C. Operators shall be adjusted and must function properly for the type of traffic (pedestrians, carts, stretchers and wheelchairs) expected to pass through doors. Each door leaf of pairs of doors shall open and close in synchronization. On pairs of doors, operators shall allow either door to be opened manually without the other door opening.
- D. Install controls at positions shown and make them convenient for particular traffic expected to pass through openings. Maximum height of push plate wall switches from finished floors shall be 40 inches unless otherwise approved by the Resident Engineer and Architect.

--- END ---

SECTION 08 80 10
INTERIOR GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section Includes:
1. This section specifies interior glass, plastic, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.
 2. Laminated Glass (LAM GL): All laminated glass shall be fabricated as laminated safety glazing. Includes work designated on the Finish Legend and drawings as "LAM GL", series, including but not limited the following:
 - a. LAM GL-1.
 - b. LAM GL-2.
 - c. LAM GL-10.
 3. FR-1: Fire Resistant Glass Without Wire Mesh
 4. Unframed mirrors. Identified as MR-1, 2, and 3 on drawings. See Toilet Accessory Legend on Drawing 8AI620.
- B. Products Provided but not Specified Under this Section:
1. Fire-Retardant Particleboard: Provide as specified in Section 06 64 00 – Architectural Woodwork.

1.2 RELATED WORK (Items not included in this Project Manual are available through Construction Manager upon request)

- A. Factory glazed by manufacturer in following units:
1. Doors with glazed openings: Section 08 11 13, Hollow Metal Doors and Frames, and Section 08 14 00, Wood Doors.
 2. Interior Aluminum Doors and Frames: Section 08 41 13.
 3. Fire-rated assemblies.
- B. Interior All Glass Entrances and Storefronts: Section 08 41 26.
- C. Glazed Curtain Wall:
1. Section 08 44 13 Glazed Aluminum Curtain Walls.
 2. Section 08 44 13.3 Glazed Aluminum Curtain Walls for Dixie.
- D. Section 06 40 00, Architectural Woodwork
1. Particle board backing.
- E. Light Control Films: Section 08 87 15.
- F. Color of spandrel glass, tinted (heat absorbing or light reducing) glass, and reflective (metallic coated) glass: Section 09 06 00, SCHEDULE FOR FINISHES.
- G. Gypsum Board: Section 09 29 00.
- H. Painting: Section 09 91 00.

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- I. Glass markerboards: Section 10 11 16, Custom Rail-Mounted Markerboards.

1.3 DEFINITIONS

- A. Relite: Sidelight, borrowed light, glazed transom, or similar condition.
- B. STC: Sound Transmission Class.

1.4 LABELS

- A. Temporary labels:
1. Provide temporary label on each light of glass and plastic material identifying manufacturer or brand and glass type, quality and nominal thickness.
 2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
 3. Temporary labels shall remain intact until glass and plastic material is approved by Resident Engineer.
- B. Permanent labels:
1. Locate in corner for each pane.
 2. Safety Glazing: Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
 - a. Tempered glass.
 - b. Laminated glass.
 - c. Organic coated glass.
 - d. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
 3. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.

1.5 DESIGN REQUIREMENTS

- A. See "Suitability of Products" under QUALITY ASSURANCE below.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the criteria listed below:
- C. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
1. Specified Design Wind Loads: 10 pounds per square foot, but not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures": Section 6.0 "Wind Loads."

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- D. Safety Glazing: Provide safety glazing at all locations required by authorities having jurisdiction and where indicated.
1. Provide at locations where top edge of glazing is not captured or is exposed.

1.6 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Building Enclosure Vapor Retarder and Air Barrier:
1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
 2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- C. Glass Thickness:
1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7 code.
 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 3. Test in accordance with ASTM E 330.
 4. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.
- D. Deflection: At design live load, glass deflection at center of pane not to exceed the lesser of either:
1. 3/4 inch.
 2. L/175; where L is the longest edge of glass.
 3. As required by Code.
- E. Sealant and adhesives used shall meet VOC requirements in conformance with Section 01 81 13, Sustainable Design Requirements.

1.7 SUBMITTALS

- A. In accordance with Section 01 33 23, Shop Drawings, Product Data, and Samples.
- B. Manufacturer's Certificates:
1. Certificates stating that wire glass, meets requirements for safety glazing material as specified in ANSI Z97.1.
 2. Certificate on shading coefficient.
 3. Certificate on "STC" value when value is specified.
- C. Preconstruction adhesion and compatibility test report.
- D. Warranty:
1. Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- E. Manufacturer's Literature and Data:

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1. Glass, each kind required.
 2. Elastic compound for metal sash glazing.
 3. Putty, for wood sash glazing.
 4. Glazing cushion.
 5. Sealing compound.
 6. Sealants.
- F. Samples: Submit and obtain approval of samples before proceeding. Minimum 2 samples of each item required.
1. Glass: Each type of glass proposed for the project; make samples not less than 12" square.
 2. Sealants: Color samples of all exposed sealants Sealant, as specified in Section 07 92 00, Joint Sealants.
- G. Special Samples: After approval of "Samples" above, submit additional samples to jobsite before proceeding. One sample of each item required. Minimum size 24" x 48". Samples once approved to remain at jobsite or other location approved by Architect and serve as basis to judge installed work. Approved samples may be incorporated into the work.
1. Laminated Glass: One of each type in the series.
- H. Shop Drawings: Required data for shop drawings on glazing may be incorporated with shop drawings for framing members. Show sizes and thicknesses of glass; proposed "bites" in frames, sizes and locations of blocks, clips, beads, stops, edge treatments; note quality, type, color, and strength of each light. Submittal for this Section shall indicate specification section where Shop Drawings will be provided to meet the requirement of this Section and the submittals shall be submitted concurrently.
- I. Mirror Mastic Certification: Provide certifications from mirror manufacturer and mastic manufacturer. See Mirror Mastic in PART 2
- J. Sample Warranty: Submit with shop drawings in accordance with Section 01 33 25, Warranties.
- K. Quality Assurance: Submit written statements of compliance with the following subjects as described under QUALITY ASSURANCE.
1. Suitability of Product.
 2. Component Compatibility.
- L. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.
- M. LEED Submittals:
1. Product Data for Credit IEQ 4.1: For glazing sealants used inside the weatherproofing system, documentation including printed statement of VOC content.
 2. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.
- N. Closeout Submittals:
1. Warranty: Upon completion of work under this section, submit an executed copy of the warranty in accordance with Section 01 33 25.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Suitability of Products: Glass thickness and physical properties indicated are to be confirmed by Contractor as being adequate and structurally substantial for the conditions and locations of their intended use as determined by the Code(s) governing the Work and references listed herein. Any glass considered inadequate, lacking sufficient physical qualities, or other reasons which may pose a hazardous condition should be upgraded as required and as approved by the Architect.
 - 1. Load resistance of glass may be determined in accordance with ASTM E 1300 or glass manufacturers' engineering. Glass manufacturer shall engineer applicable glass conditions excluded, if any, in ASTM E 1300.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
- E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- F. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
 - 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
 - 3. Mirrors: Comply with GANA's "Glazing Manual" and "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- G. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.
 - 1. Test Glass Type AGL-3 as a mirror.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.
- D. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

1.10 PROJECT CONDITIONS

- A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

1.11 WARRANTY

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
1. Laminated glass units to remain laminated for 5 years.
 2. Breakage due to Nickel Sulfide (NiS) inclusions for tempered glass specified to require "Heat Soak Testing".
 3. Silver spoilage on mirrors for 5 years.

1.12 APPLICABLE PUBLICATIONS (Latest edition unless otherwise noted)

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
1. Safety Glazing Material Used in Building - Safety Performance Specifications and Methods of Test.
- C. American Society for Testing and Materials (ASTM):
1. C1503 Silvered Flat Glass Mirror
 2. C542 Lock-Strip Gaskets.
 3. C864 Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 4. C920 Elastomeric Joint Sealants.
 5. C1036 Flat Glass.
 6. C1048 Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 7. C1172 Laminated Architectural Flat Glass.
 8. E84 Surface Burning Characteristics of Building Materials.
 9. E330 Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- D. British Standards (BS)
1. EN 14179 Glass in building. Heat-soaked thermally-toughened soda lime silicate safety glass. Definition and description
- E. Code of Federal Regulations (CFR):
1. 16 CFR 1201 Safety Standard for Architectural Glazing Materials; 1977, with 1984 Revision.
- F. Glass Association Of North America (GANA)
1. GANA Glazing Manual (2004) Glazing Manual
 2. GANA Sealant Manual (1990) Sealant Manual
 3. GANA Standards Manual (2001) Tempering Division's Engineering Standards Manual
- G. National Fire Protection Association (NFPA):
1. 80 Fire Doors and Windows.
- H. National Fenestration Rating Council (NFRC):

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1. Certified Products Directory (Latest Edition).
- I. Safety Glazing Certification Council (SGCC):
 1. Certified Products Directory (Issued Semi-Annually).

PART 2 - PRODUCTS

2.1 GLASS

- A. Use thickness stated unless specified otherwise in assemblies.
- B. Clear Glass:
 1. ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
 2. Thickness, 1/4 inch.
- C. Ultra-Clear Glass: ASTM C 1036, Type I, Quality-Q3, Class I, complying with other requirements specified and with visible light transmission not less than 91 percent and solar heat gain coefficient not less than 0.87.

2.2 HEAT-TREATED GLASS

- A. Clear Heat Strengthened Glass:
 1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 1/4 inch unless indicated otherwise.
- B. Clear Tempered Glass:
 1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 1/4 inch unless indicated otherwise.

2.3 LAMINATED GLASS

- A. Interlayer between glass panes: ASTM C 1172. Use heat and light stable polyvinyl butyral plasticized resin sheeting.
- B. Use 0.060 inch thick (minimum) PVB for:
 1. Horizontal or Sloped glazing.
 2. Acoustical glazing.
 3. Heat strengthened or fully tempered glass assemblies.
 - a. Exception:
 - 1) Art Glass Wall Cladding: As specified below.
- C. Use 0.030 inch thick PVB for vertical glazing where 0.060 inch PVB is not otherwise indicated or required.

2.4 FR-1: FIRE RESISTANT GLASS WITHOUT WIRE MESH

- A. FR (Fire-Rated): Provide fire-rated glazing and complying with the following:
 1. Glass or glass assembly classified by UL in Building Materials Directory or other approved testing laboratory bearing permanent mark of classification:

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2. Door Assemblies: NFPA 252.
 - a. Window Assemblies: NFPA 257.
 - b. Coordination:
 - 1) Door Assemblies: Glazing materials shall meet the requirements of the testing agency's requirements for the listed and labeled door assembly and the authority having jurisdiction.
 - 2) Window Assemblies: Glazing materials shall meet the requirements of the testing agency's requirements for the listed and labeled window assembly and the authority having jurisdiction.
 3. Manufacturer: Single manufacturer/fabricator.
 4. Appropriate for the applications of use:
 - a. Doors.
 - b. Other Than Doors: Windows, sidelights, borrowed lites, partitions, walls, and transoms.
 - c. Exterior Locations: Exterior glazing must withstand exterior conditions including temperature, moisture, and UV exposure without detrimental effects on performance or appearance. Exterior conditions include those located in or adjacent to unconditioned spaces.
 5. UL labeled. Rating not less than condition of application.
 6. Listing Marks: Each lite to be permanently labeled with a listing mark for fire resistance and safety glazing as a fire-rated assembly. See LABELS in Part 1 above.
 7. Wire glass not permitted.
 8. Clear vision assembly of glass, ceramic, film, laminated, or gel as required.
 - a. Gel: clear, non-yellowing, colorless, odorless and U.V. stable.
 - b. Ceramics: Polished or premium grade.
 - 1) Color: Clear.
 - c. Laminated: Clear, non-yellowing, colorless, odorless and U.V. stable.
 9. Product qualifies as safety glazing; meets CPSC Category II (400 ft. lbs).
 10. Product passes hose stream test for ratings above 20 minutes.
 11. Product performance must be equal from both sides of installation; e.g. performance not dependent on orientation of glass to fire.
 12. Provides heat transfer not exceeding 450 degrees F above ambient at end of 30 minutes of standard fire test (NFPA 252 & 80; Door test only) exposure for the following:
 - a. Except for fully sprinklered buildings:
 - 1) Doors in vertical exit enclosures (stairs) and exit passage ways.
 - 2) Doors tested per NFPA 252 with glazing exceeding 100 sq. inches.
 - 3) Sidelites, transoms, borrowed lites and all other non-door applications 45 minutes or less must meet NFPA 257 requirements.
 13. Glazing tested as part of a fire-resistive wall assembly in accordance with ASTM E 119 constitutes compliance of fire-resistance. Safety glazing provisions specified above are still required.

2.5 MIRRORS

- A. Unframed Mirrors: 1/4 inch thick clear, plate or float glass complying with ASTM C 1503, FS DD-G-451-d, Type 1, Class 1 Quality q1 "Mirror Select"; silver coating sealed with electrolytic copper plating and protected with mineral oxide, oil base paint.
 1. Exposed Edges: Polished finish

2.6 GLAZING ACCESSORIES

- A. Provide accessories as required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have a finish that will not corrode or stain while in service.
- B. Setting Blocks: ASTM C864:
 - 1. Channel shape; having 6 mm (1/4 inch) internal depth.
 - 2. Shore a hardness of 80 to 90 Durometer.
 - 3. Block lengths: 50 mm (2 inches) except 100 to 150 mm (4 to 6 inches) for insulating glass.
 - 4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
 - 5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.
- C. Spacers: ASTM C864:
 - 1. Channel shape having a 6 mm (1/4 inch) internal depth.
 - 2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
 - 3. Lengths: One to 25 to 76 mm (1 to 3 inches).
 - 4. Shore a hardness of 40 to 50 Durometer.
- D. Sealing Tapes:
 - 1. Semi-solid polymeric based material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
 - 2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.
- E. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.
- F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbeted sash without stops.
- G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond shaped pieces, 6 mm (1/4 inch) minimum size.
- H. Glazing Gaskets: ASTM C864:
 - 1. Firm dense wedge shape for locking in sash.
 - 2. Soft, closed cell with locking key for sash key.
 - 3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.
- I. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.
- J. Glazing Sealants: ASTM C920, silicone neutral cure:
 - 1. Type S.
 - 2. Class 25
 - 3. Grade NS.
 - 4. Shore A hardness of 25 to 30 Durometer.
- K. Structural Sealant: ASTM C920, silicone acetoxy cure:
 - 1. Type S.
 - 2. Class 25.
 - 3. Grade NS.
 - 4. Shore a hardness of 25 to 30 Durometer.

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- L. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.
1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
 2. Designed for dry glazing.
- M. Color:
1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames shall match color of the finished aluminum and be nonstaining.
 2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted shall be as selected by Architect from manufacturer's full range of colors which shall include clear, black, gray, and neutral color.
- N. Mirror Supports:
1. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.
 - a. Finish: Clear bright anodized.
 2. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed. Adhesive shall meet VOC requirements indicated in Division 1
- O. Outside Corner Protection (OCP): Extruded aluminum with bright anodized finish. Exposed faces at outside corner are a truncated corner with three faces:
1. Length of Outside Faces: 3/8 inch, nominal.
 2. Length of truncated face: 1/4 inch, nominal.
 3. No exposed fasteners permitted.
 4. Provide full height of glass with no seams.

2.7 GLASS TYPES

- A. SG-1 SAFETY GLASS (laminated):
1. Laminated glass: 1/4" clear glass, 0.030 Clear PVB (minimum), 1/8" clear glass.
 2. Color and Appearance: In conformance with Section 09 06 00, Schedule for Finishes.
 3. Provide safety glazing labeling.
- B. GL-1 (Clear):
1. Clear float glass. 1/4" thick typical except where otherwise noted.
 2. Clear ASTM C 1036, Type I, Quality-Q3, Class I, unless otherwise indicated.
- C. GL-1T (Clear Tempered):
1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 1/4 inch unless indicated otherwise.
 3. Provide safety glazing labeling.
- D. LG-01HS (laminated, clear, heat strengthened):
1. Nominal 9/16" thick assembly of 2 lights of minimum 1/4" thick clear glass with a minimum of 0.060" special PVB interlayer. Thickness stated is minimum. Increase as required to meet DESIGN REQUIREMENTS and PERFORMANCE REQUIREMENTS.
 2. MDF Board: Provide fire retardant MDF board as specified in Section 06 40 00.
 - a. Thickness: 3/4" minimum.
 - b. Edges: Paint flat black.

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3. Panel "Z" Clips: Model MF 625 by Monarch Metal Fabrications, or approved equal. Panel "Z" Clips are interlocking aluminum extrusions 1-1/2" long, 3/16" thick (projection), 5/8" lift off.
 4. Adhesive: Silicone.
 - a. Glass shall be secured to MDF board with silicone adhesive or acceptable alternative approved by Architect.
 5. Glass panel shall be a uniform color and appearance, with no visible signs of adhesive visible through the glass.
 - a. Appearance: In conformance with Section 09 06 00, Schedule for Finishes.
 6. Provide openings in Art Glass Wall Cladding assembly to allow devices, provided by other trades, to be installed within the field of the Art Glass Wall Cladding assembly including elevator devices provided in EWP-2.
 7. Provide Safety Glass label.
 8. Tolerances: as specified in PART 3.
- E. LAM GL-1 (9/16" thick clear laminated glass): 1/4" Clear Heat Strengthened Glass, 0.060 clear PVB, 1/4" Clear Heat Strengthened Glass.
1. Appearance: Match Architect's sample of LAM GL-1. See Finish Legend for information regarding Architect's sample of LAM GL-1.
- F. LAM GL-2 (9/16" thick frosted laminated glass): 1/4" Acid Etched Heat Strengthened Glass, 0.060 clear PVB, 1/4 Clear Heat Strengthened Glass.
1. 1/4" Acid Etched Heat Strengthened Glass: Provide glass type LG-01HS with an acid etch on # 2 surface equivalent to Acid Etch 41 by Viracon, Inc.
 2. Appearance: Match Architect's sample of LAM GL-2. See Finish Legend for information regarding Architect's sample of LAM GL-2.
- G. LAM GL-10: Specified under another Division 10 Section.
- H. FR-1 (Fire Resistant Glass Without Wire Mesh): See FR-1: FIRE RESISTANT GLASS WITHOUT WIRE MESH above.

2.8 FABRICATION

- A. Cut glass to accurate sizes and shapes as indicated on drawings; allow edge clearances and tolerances in accordance with GANA recommendations, unless otherwise indicated.
- B. Edges: Factory-cut and factory-form edges for butt-glazed, heat tempered, and insulating glass; provide ground edges for exposed glass edges; provide drilled holes, notches, and other special fabrication of finishing techniques, unless otherwise approved. Cut and form edges of other glass carefully to furnish clean accurate edges.
 1. Butt-Glazed (Structural Sealant) Systems: All work in accordance with manufacturer's recommendations.
 2. Edges exposed to air: Polished finish.
 - a. Edges receiving sealant: Flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
 - b. Concealed edges: Factory option.
 - c. Joint width: 3/8" minimum; 7/16" maximum at staggered glass and 1/2" maximum at straight glass.
 3. Edge Deletion: Remove coating at perimeter bond width as recommended by glass coating manufacturer for two and four-sided structural glazed systems for either of the following conditions:
 - a. Reduction in bond strength below that of uncoated glass.

- b. Change in appearance or color at bond line as determined by Architect.

2.9 SOURCE QUALITY CONTROL

- A. Glass manufacturer shall have an established, effective "Quality Control Program" in operation at his plant. The roll ripple and bow shall be measured and recorded by the glass manufacturer on an hourly basis during heat-strengthening processes.
1. Measurements to be made using a Gar Gauge or other approved measuring devices.
 2. Records of roll ripple and bow measurements for the proposed products shall be furnished to the Architect on a weekly basis.
 3. All costs associated with this in-plant quality control program to be borne by the glass manufacturer.
 4. Glass to conform to the tolerances listed below.
- B. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
- C. Maximum peak to valley rollerwave 0.003" (0.08mm) in the central area and 0.008" (0.20mm) within 10.5" (267mm) of the leading and trailing edge.
- D. Maximum bow and warp 1/32" per lineal foot (0.79mm).
- E. Pinholes in Reflective Coating: When viewed from a distance of 6 feet, pinholes:
1. Greater than 1/16 inch in diameter is not allowed.
 2. 3/64 inch to 1/16 inch permitted only within 3 inches of the edge.
 3. Large clusters or close spacing of smaller pinholes are not allowed.
- F. Scratches in Reflective Coating: Scratches defined as hairline type only. Scratches:
1. Longer than 3 inches not permitted.
 2. Smaller than 3 inches allowed in any area.
 3. Not visible when viewed from a distance of 6 feet.
- G. Reflective Coating, Transmission, and Color: Must be within ranges as established by samples approved by Architect. See SPECIAL SAMPLES in Part 1 above.
- H. Tempered Glass:
1. Heat Soak Testing: Perform 100% heat soak program consistent with the EN 14179-1 standard (550°F +/- 18°F for a dwell time of two hours).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
 2. Verify that glazing openings conform with details, dimensions, and tolerances indicated on manufacturer's approved shop drawings.

-
- B. Advise the Construction Manager of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Preparation, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Determine the sizes to provide the required edge clearances by measuring the actual opening to receive the glass. Grind smooth in the shop glass edges that will be exposed in finish work. Leave labels in place until the installation is approved, except remove applied labels on heat-absorbing glass and on insulating glass units as soon as glass is installed. Securely fix movable items or keep in a closed and locked position until glazing compound has thoroughly set
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION - GENERAL

- A. Shop glaze or field glaze items to be glazed using glass of the quality and thickness specified or indicated. Glazing, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Aluminum windows, wood doors, and wood windows may be glazed in conformance with one of the glazing methods described in the standards under which they are produced, except that face puttying with no bedding will not be permitted. Handle and install glazing materials in accordance with manufacturer's instructions. Use beads or stops which are furnished with items to be glazed to secure the glass in place. Verify products are properly installed, connected, and adjusted.
- B. Set glazing without bending, twisting, or forcing of units.
- C. Do not allow glass to rest on or contact any framing member.
- D. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.
- E. Sheet Glass:
 - 1. Cut and set with the visible lines or waves horizontal.
- F. Patterned Glass:
 - 1. Install units with one patterned surface with smooth surface on the weather side.

-
2. Install units in interior partitions with pattern in same direction in all openings.
- G. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
 - H. Laminated Glass:
 1. Tape edges to seal interlayer and protect from glazing sealants.
 2. Do not use putty or glazing compounds.
 - I. Acoustical Insulating Glass Units:
 1. Glaze in compliance with glass manufacturer's written instructions.
 2. When glazing gaskets are used, they shall be of sufficient size and depth to cover glass seal or metal channel frame completely.
 3. Do not use putty or glazing compounds.
 4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
 - J. Installation of Heat-Absorbing Glass:
 1. Glass shall have clean-cut, factory-fabricated edges. Field cutting will not be permitted.
 - K. Fire Resistant Glass:
 1. Glaze in accordance with UL design requirements.

3.4 MIRRORS

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 2. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.
- B. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.
- C. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
- D. Wall-Mounted Mirrors and Art Glass: Install mirrors with mastic and provide temporary support until mastic has set and can support mirror. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
- E. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- F. Do not permit edges of mirrors to be exposed to standing water.
- G. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

-
- H. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

3.5 REPLACEMENT AND CLEANING

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by Resident Engineer.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.6 PROTECTION

- A. Glass work shall be protected immediately after installation. Glazed openings shall be identified with suitable warning tapes, cloth or paper flags, attached with non-staining adhesives. Reflective glass shall be protected with a protective material to eliminate any contamination of the reflective coating. Protective material shall be placed far enough away from the coated glass to allow air to circulate to reduce heat buildup and moisture accumulation on the glass. Upon removal, separate protective materials for reuse or recycling. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

3.7 GLAZING SCHEDULE

- A. For glass types not shown on drawings, provide as follows for bidding purposes: Verify specifications with Architect prior to installation.
- B. Interior
 - 1. Glass in Aluminum Frames: SG-2.
 - 2. Labeled doors: FR-1.
 - 3. Non-Labeled Doors:
 - a. Laminated Clear Glass, Type SG-1.
- C. Laminated Glass: Install as specified in doors, observation windows and interior pane of dual glazed windows where indicated.
 - 1. Provide laminated glass for all windows in Psychiatric Nursing Units, Alcohol Dependency Treatment Nursing Units, Drug Abuse Treatment Nursing Units and Security Bedrooms. Laminated glass shall be 7/16 inch thick in locked patient units and security rooms, 5/16 inch thick elsewhere.
 - 2. If laminated glass is required for double glazed windows, provide it for interior panes only.
 - 3. Where laminated glass is required for blast-resistant windows, follow UFC4-010-01, DOD Minimum Antiterrorism Standards for Buildings.

--- E N D ---

**SECTION 08 84 00
PLASTIC GLAZING****PART 1 GENERAL****1.1 DESCRIPTION**

- A. This work consists of all labor, materials, and equipment necessary for furnishing and installing multi-layered extruded cellular polycarbonate panels used as cladding for interior partitions at Dixie Stair.

1.2 RELATED WORK

- A. Section 05 51 00, Metal Stairs.
- B. Section 05 50 00, Metal Fabrications.
- C. Section 05 70 50, Architectural Metal Fabrications.
- D. Section 06 10 00, Rough Carpentry.
- E. Section 09 22 16, Non-Structural Metal Faming.

1.3 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Latest edition unless otherwise noted.
- B. American Society for Testing and Materials (ASTM):
1. D 635-03 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 1998.
 2. D 1003 - Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics; 2000.
 3. D 1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 1996 (Re-approved 2001).
 4. D 2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics; 1999.
 5. D 5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact); 1998a.
 6. E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.
 7. E 313 - Standard Practice for Calculating Yellowness and Whiteness Indices from Instrumentally Measured Color Coordinates; 2000.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 23.

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- B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Catalogs of material properties.
 2. Preparation, site care, and cleaning and maintenance instructions and recommendations.
 3. Storage and handling requirements and recommendations.
 4. Installation methods and guidelines.
 5. Chemical resistance data sheet.
- C. Shop Drawings: Show layout of panels, jointing, anchorages, and trim.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples:
1. Panels: Two samples, minimum size 3 inches (76 mm) by 6 inches (152 mm), of each specified product, color, and thickness.
 2. Accessories: Two samples, 6 inches (150 mm) long, of installation accessories.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: ISO 9002 and 14001 certified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panels in enclosed wooden crates.
- B. Store panels in dry, dark, and well ventilated area until ready for installation. Prevent dirt or debris from entering cellular structure by applying approved sealing tape.
- C. Store panels at slant of 5 to 10 degrees from vertical after removal from crates.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Provide manufacturer's standard 10 year warranty against loss in light transmission in excess of 6 percent of the original value when tested per ASTM D 1003, and against a change in yellowing index in excess of 10 delta from the original value when tested per ASTM E 313.

PART 2 PRODUCTS**2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers of products that may be incorporated into the Work include, but are not limited to, the following:
1. Basis of Design: Polygal, Inc., www.polygal.com. Using Polygal Standard panels.

2.2 MATERIALS

- A. General Requirements: Provide panels of extruded polycarbonate cellular sheet with UV-stabilized co-extruded outer layer; removable protective film on outer surface.
1. Determine light transmission in accordance with ASTM D 1003.
 2. Panel Length: Provide panels of sufficient size to span purlins and rafters without requiring joining, up to 36 feet (10.97 meters).
 3. Thermal Expansion: Maximum of 1/8 inch (3 mm) per 3 feet (914 mm), for clear and ice colors; maximum of 1/4 inch (6 mm) per 4 feet (1219 mm), for bronze; 100 degrees F (56 degrees C) temperature differential.
 4. Provide anti-fog coating.
 5. Dimensional Tolerances at 75 degrees F (24 degrees C):
 - a. Thickness: Comply with ASTM C 1036 for Type I, Transparent Flat Glazing.
 - b. Flatness, Warp, and Overall Bow: Comply with ASTM C 1048.
 6. Provide factory cut panels in required dimensions, with clean cuts without chips or other deformities; without debris, grease, oil, or other materials lodged inside cells.
- B. Panels:
1. Panel Width: 48 inches (1219 mm).
 2. Panel Thickness: 3/8 inches (10 mm).
 - a. Flammability: Horizontal burn rate of 1 inch (25 mm) or less, when tested in accordance with ASTM D 635.
 - b. Self Ignition Temperature: 986 degrees F (530 degrees C), when tested in accordance with ASTM D 1929.
 - c. Flame Spread: 20, ASTM E 84.
 - d. Smoke Developed Index: Less than 450; ASTM E 84; less than 75; ASTM D 2843.
 - e. Rib Pitch: 0.433 inches (11 mm) on center.
 - f. Weight: 0.35 pounds per square foot (1.71 kg per square meter).
 - g. Impact Strength: 2.43 foot-pound (3.29 N-meter); ASTM D 5420, with weight of 0.410 foot-pound (0.556 N-meter).
 - h. Minimum Radius for Cold Bent Arches: 5 feet 9 inches (1.75 meters).
 - i. U-Factor, Winter Night: 0.53 Btu per hour-square feet-degree F (3.01 Watt per square meter-degree K).
 - j. Color: Ice; 32 percent light transmission.
- C. Accessories:
1. Fasteners: Manufacturer's standard tapping screws for exposed fastening to metal framing.

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- a. Exposed Screw Heads: Low profile pancake type screw with Robertson (square) type drive.
2. Miscellaneous: As required for complete installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Examine crates for damage immediately upon delivery.
- D. Examine panels for damage prior to installation.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Treat open ends of panels upon opening crates to prevent dirt or other material from entering glazing.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings.
- B. Install with extruded ribs vertical with "Exposure Side" to exterior, as indicated on protective film (the printed side should be faced outside).
- C. Remove chips and dust from internal cells with compressed air. Seal open ends with approved sealing tape.
- D. Just prior to installation expose glazing edges by peeling back protective film sufficient for edge bite.
- E. Drill holes minimum 1-1/2 inches (38 mm) from edge, to allow for thermal expansion.
- F. Remove protective film immediately upon completion of installation.

3.4 PROTECTION

- A. Protect uninstalled sheet products from direct exposure to the sun's rays. Exposure to the direct rays of sun will bake the protective masking on to the sheet making removal of the masking extremely difficult or impossible. Sheets should be protected indoors until completion of project with open flute edges sealed.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END

SECTION 08 87 15
LIGHT CONTROL FILMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Section Includes: Interior light control films for animal holding rooms
 - 1. Film is indicated on "Schedule Notes" on Drawing 8AI600 and locations indicated on the Door Schedule as "R23".

1.2 RELATED WORK

- A. Doors with glazed openings: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

1.3 PERFORMANCE REQUIREMENTS

- A. Physical Properties:
 - 1. Visible Light Transmission: 6.8%
 - 2. Visible Light Reflectance: 4.5%
 - 3. Shading Coefficient: 0.30.
 - 4. Emissivity: 0.88.
 - 5. Ultraviolet Transmission (UV): <1%.
 - 6. Combustion Rate: Negligible.
 - 7. Melting Point: 240-265°C.
 - 8. Haze (Abrasion Differential): 1.94.
- B. Average Light Transmission 300um to 580um: 0.884%. Filters out the UV blue-green light spectrum.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Certificates:
 - 1. Certificates stating that control film, meets specified PERFORMANCE REQUIREMENTS for light control material for nocturnal animals in lab situations.
- C. Warranty:
 - 1. Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- D. Manufacturer's Literature and Data:
 - 1. Physical properties.
 - 2. Light transmittance values for 300 to 590um.
- E. Samples: Submit and obtain approval of samples before proceeding. Minimum 2 samples of each item required.
 - 1. Film: Each type of film proposed for the project; make samples not less than 12" square. Apply to ¼" thick clear glass.
- F. Closeout Submittals:

1. Warranty: Upon completion of work under this section, submit an executed copy of the warranty in accordance with Section 01 33 25.

1.5 QUALITY ASSURANCE

- A. Glass Film Installer Qualifications: Engage an experienced installer certified, licensed, or otherwise qualified by film manufacturer as having the necessary experience, staff, and training to install manufacturer's products according to specified requirements.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect glazing films according to manufacturer's written instructions and as needed to prevent damage condensation, temperature changes, direct exposure to sun, or other causes.

1.7 WARRANTY

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
 1. Glass film products for 10 years.

PART 2 - PRODUCTS

2.1 LIGHT CONTROL FILM

- A. Basis of Design: RC-3 (Rose-Chocolate) by Light Gard. www.lightgardfilms.com. A 2.2 mil thick product.
- B. Equal products subject to compliance with requirements acceptable by other manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 1. Examine glass and glazing units before installation is started.
- B. Advise the Construction Manager of conditions which may adversely affect control film installation, prior to commencement of installation: Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry glazing surfaces.
- B. Remove glass from glazing stops for film installation to assure complete film coverage with no gaps.

3.3 LIGHT CONTROL FILM INSTALLATION

- A. Comply with manufacturer's written instructions for surface preparation.

- B. Immediately before installation; clean substrates of substances that could impair bond of film, including dirt, oil, grease, other foreign material, and incompatible primers.
- C. Protect window frames and surrounding conditions from damage during installation.
- D. General: Comply with glazing film manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
 - 1. Install film continuously, but not necessarily in one continuous length. Install with no gaps or overlaps.
 - 2. Install with no seams .
 - 3. Do not remove release liner from film until just before each piece of film is cut and ready for installation.
 - 4. Install film full size of glass after removing from frame.
 - 5. Remove air bubbles, wrinkles, blisters, and other defects.
 - 6. Re-install glass with applied film into doors.

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SECTION 08 88 53
SECURITY GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Blast resistant and hurricane-resistant Impact Glazing at exterior openings.
2. Glazing units at exterior openings are insulated glass unless indicated otherwise.
3. All glazing between unconditioned and conditioned spaces, and glazing at interior vestibules adjacent to exterior wall.
4. Exterior Insulated Vision Glass Types: As described in PART 2, below, including the following:
 - a. IG-01 - Vision Glass.
 - b. IG-01T Vision Safety Glass)
 - c. IG-01D – Vision Glass at Dixie
 - d. IG-01TD – Vision Safety Glass at Dixie
 - e. IG-04 - Vision Glass.
 - f. IG-04T - Vision Safety Glass.
 - g. Safety glazing for the above glass types where indicated and where required by building code.
5. Exterior Non-Insulated Vision Glass Types: As described in PART 2, below, including the following:
 - a. LG-01HS - Laminated, Heat Strengthened
6. Exterior Insulated Spandrel Glass Types: As described in PART 2, below, including the following:
 - a. SG-01 - Spandrel Glass.
 - b. SG-01D – Spandrel Glass at Dixie.
 - c. SG-01T - Spandrel Glass, safety glazing.
 - d. Safety glazing for the above glass types where indicated and where required by building code.
7. Exterior Non-Insulated Spandrel Glass Types: As described in PART 2, below, including the following:
 - a. LGS-1 .
8. Safety Impact Laminated Glazing: As described in PART 2, below, including the following:
 - a. SLG-3 - Safety Laminated Glass.
 - b. SLG-4 - Safety Laminated Glass.
9. Spandrel insulation behind spandrel glass.
10. Design.

B. Products Provided but not Specified Under this Section:

1. Interior Vision Control Glass Unit: Provide as specified in Section 08 88 16 - Vision Control Glass.

1.2 RELATED WORK (Items not included in this Project Manual are available through Construction Manager upon request)

A. MockUps: Section 01 43 39.

B. Wind loads at exterior enclosure: Section 01 83 16.13 - Exterior Wind Enclosure Requirements.

- C. Firestopping: Section 07 84 00.
- D. Sealant not specified herein: Section 07 92 00.
- E. Steel Doors and Frames: Section 08 11 13.
- F. Glazed Curtain Wall:
 - 1. Section 08 44 13 Glazed Aluminum Curtain Walls.
 - 2. Section 08 44 13.3 Glazed Aluminum Curtain Walls for Dixie.

1.3 APPLICABLE PUBLICATIONS (Latest edition unless otherwise noted)

- A. American Society of Civil Engineers (ASCE) and Structural Engineering Institute (SEI):
 - 1. ASCE/SEI 7 Minimum Design Loads for Buildings and Other Structures.
- B. American Society for Testing and Materials (ASTM):
 - 1. C 612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - 2. C 1036 Flat Glass.
 - 3. C 1048 Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. C 1104 Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
 - 5. C 1172 Laminated Architectural Flat Glass.
 - 6. C 1376 Pyrolytic and Vacuum Deposition Coatings on Glass.
 - 7. E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 8. E 1300 Standard Practice for Determining Load Resistance of Glass in Buildings.
 - 9. E 1886 Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
 - 10. E 1996 Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.
 - 11. E 2190 Insulating Glass Unit Performance and Evaluation.
- C. American National Standards Institute (ANSI):
 - 1. Z 97.1 Glazing Material.
- D. BSI British Standards (BS):
 - 1. EN 14179-1 Glass in building. Heat-soaked thermally-toughened soda lime silicate safety glass. Definition and description.
- E. Consumer Product Safety Commission (CPSC):
 - 1. 16 CFR 1201 Safety Standards for Architectural Glazing Materials.
- F. Glass Association of North America (GANA):
 - 1. Glazing Manual.
 - 2. Laminated Glass Design Guide.
- G. Insulating Glass Certification Council (IGCC).
- H. International Building Code (IBC), 2006 Edition.
- I. National Fenestration Rating Council (NFRC):
 - 1. Certified Products Directory.

J. National Fire Protection Association (NFPA):

1. Life Safety Code, 2006 Edition.

K. Safety Glazing Certification Council (SGCC):

1. Certified Products Directory - Safety Glazing Material Used in Buildings.

1.4 DESIGN REQUIREMENTS

A. Glazing in Curtain Wall: Comply with DESIGN REQUIREMENTS in Section 08 44 13 - Glazed Aluminum Curtain Walls and as follows:

B. See "Suitability of Products" under QUALITY ASSURANCE below.

C. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the criteria listed below:

D. Building Code: Comply with IBC.

E. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements, and Building Code if more stringent:

1. Specified Design Wind Loads: See Section 01 83 16.13 - Exterior Wind Enclosure Requirements
 - a. Importance Factor: See Structural Drawings.
 - b. Exposure Category: See Structural Drawings.
2. Probability of Breakage: Glass manufacturer to provide, on request, data substantiating glass breakage if such data is not available as manufacturer's published data. Lower Safety Factors will not be considered unless glass manufacturer specifically recommends, in writing, a lower S.F.
 - a. Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
 - b. Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.
3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
4. Glass Type Factors for Wired, Patterned, and Sandblasted Glass:
 - a. Short-Duration Glass Type Factor for Wired Glass: 0.5.
 - b. Long-Duration Glass Type Factor for Wired Glass: 0.3.
 - c. Short-Duration Glass Type Factor for Patterned Glass: 1.0.
 - d. Long-Duration Glass Type Factor for Patterned Glass: 0.6.
 - e. Short-Duration Glass Type Factor for Sandblasted Glass: 0.5.
5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
6. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

F. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

H. Safety Glass: Provide conforming safety glass at locations required by Code. Safety glass may not be specifically included in GLASS SYSTEMS nor GLASS TYPES below; however, contractor is not relieved of requirement to provide safety glass at code-mandated locations.

1.5 PERFORMANCE REQUIREMENTS

A. Glazed Openings: Openings in exterior building envelope to meet requirements of ASTM E 1996 and E 1886 tests and as follows:

1. Bottom of openings within 30 Feet from Grade: Large Missile Test.
 - a. Required Missile Level: "D".
2. Bottom of openings more than 30 Feet from Grade: Small Missile Test.
3. Test specimens for small and large missile test shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
4. Meet IBC 1609.1.2.

B. Building Enclosure Vapor Retarder and Air Barrier:

1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

C. Glass Thickness:

1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE/SEI 7 and as required by Code.
2. Limit glass deflection to $L/200$ or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 - a. L = Length of longest edge of glass

1.6 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLE.

B. Product Data: Submit complete data for security glazing. Indicate compliance with required standards, and PERFORMANCE REQUIREMENTS. Provide special requirements, if any, for glazing materials, methods, and rabbet depth.

C. Shop Drawings: Required data for shop drawings on glazing may be incorporated with shop drawings for framing members. Show sizes and thicknesses of glass; proposed "bites" in frames, sizes and locations of blocks, clips, beads, stops, edge treatments; note quality, type, color, and strength of each light.

D. Glass Samples:

1. Samples for Initial Selection: Submit and obtain approval of Samples for Initial Selection before proceeding with Samples for Verification. Erect the samples vertically at location designated by the Architect, with south exposure on exterior face of glass. Orient glass so roll wave distortion is horizontal.
 - a. Vision Glass Samples: Each type of vision glass proposed for the project; make samples. Samples not meeting Architects sample will need to be revised

- and resubmitted. After Approval of Vision Glass Samples submit Spandrel Glass samples for selection.
- 1) Sample Size: Not less than 24" square.
 - a) Quantity: Minimum 2 copies of each.
 - b. Spandrel Glass Samples: For spandrel glass types SG-01, SG-01F, LSG-1, SG-02, and SG-03. Provide each of these spandrel glass types in 8 different spandrel colors. Spandrel colors will be in shades medium gray colors to a black color. Prior to making samples Architect will provide a paint color sample or color designation for the spandrel glass samples to match.
 - 1) Sample Size: Not less than 24" square.
 - a) Quantity: Minimum 2 of each.
 - c. Sealants: Color samples of all exposed sealants.
 2. Samples for Verification: After approval of Initial Selection; submit and obtain approval of Samples for Verification before proceeding with Mockup. Erect the samples vertically at location designated by the Architect, with south exposure on exterior face of glass. Orient glass so roll wave distortion is in same alignment as required by specifications for installation.
 - a. Vision Glass Samples: For each vision glass sample approved for Initial Selection.
 - 1) Sample Size: Glass sample to fit in glazed opening of 3'-8" wide to center line of mullions x 11'-3" high to center line of mullions.
 - a) Quantity: Minimum 2 copies of each.
 - b. Spandrel Glass Samples: For Glass Types SG-01, SG-01F, LSG-1, SG-02, and SG-03 each type of glass proposed for the project; make samples not less than 24" square. Provide 3 samples for each Glass Type in different shades of medium gray colors to a black color, colors as selected by Architect based on Samples for Initial Selection. Minimum 2 samples of each item required.
 - 1) Sample Size: Glass sample to fit in glazed opening of 3'-8" wide to center line of mullions x 11'-3" high to center line of mullions.
 - a) Quantity: Minimum 2 of each.

E. Sample Warranty: Submit with shop drawings in accordance with Section 01 33 25.

F. Test Data: Submit test reports substantiating compliance with "Glazed Openings" under PERFORMANCE REQUIREMENTS above.

G. Quality Assurance: Submit written statements of compliance with the following subjects as described under QUALITY ASSURANCE.

 1. Suitability of Product.
 2. Component Compatibility.

H. Calculations: Submit calculations for review by Architect that show glazing meets requirements of specification. Submittals may or may not be returned, and will not bear stamp of approval. See "Engineer" under QUALITY ASSURANCE below.

I. Certification: Submit certification for hurricane resistant glass that products comply with PERFORMANCE REQUIREMENTS specified above.

J. Closeout Submittals:

 1. Warranty: Upon completion of work under this section, submit an executed copy of the warranty in accordance with Section 01 33 25.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer approved and certified by coated-glass manufacturer.
- B. Engineer: Shop drawings and associated calculations required for comprehensive engineering analysis and design shall bear seal and signature of Professional Engineer registered in state in which Project is located and be under his direct supervision. Maintain calculations on file and submit to Architect; see "Calculations" under SUBMITTALS above.
- C. Low E Coating: Coat glass products using magnetically sputtered vacuum deposition method (MSVD), in accordance with ASTM C 1376.
- D. Qualifications: Glazier must be experienced in cutting and installation of glass; must have plant, equipment, and personnel capable of performing the work; must be approved by Architect.
- E. Source Limitations for Glazing Accessories: Obtain from single source and from single manufacturer for each product and installation method.
- F. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- H. Allowable Tolerances: Thicknesses of glass specified are nominal; provide glass manufactured to tolerances listed in GANA manual.
- I. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials. Conforming products to be permanently marked with certification label of Safety Glazing Certification Council or other agency acceptable to authorities having jurisdiction. Such markings to be located with the lower 2 inches of lites and in accordance with ASTM C 1048 for "Permanent Identification Marking".
- J. Fire-Door Glass: Conforming products to be permanently marked with certification label by an approved third party inspection agency or other agency acceptable to authorities having jurisdiction. The label shall bear a four-part identification indicating (1) Glass tested for use in a fire door, "D" (2) Meets or does not meet hose stream requirements of test "H" or "NH" (3) Meets or does not meet temperature requirements of test, "T" or "NT" (4) fire-protection-rating period in minutes.
- K. Suitability of Products: Glass thickness and physical properties indicated are to be confirmed by Contractor as being adequate and structurally substantial for the conditions and locations of their intended use as determined by the Code(s) governing the Work and references listed herein. Any glass considered inadequate, lacking sufficient physical qualities, or other reasons which may pose a hazardous condition should be upgraded as required and as approved by the Architect.
 - 1. Load resistance of glass may be determined in accordance with ASTM E 1300 or glass manufacturers' engineering. Glass manufacturer shall engineer applicable glass conditions excluded, if any, in ASTM E 1300.
- L. Component Compatibility: Contractor to confirm chemical compatibility of all glazing components to the extent that the various materials used in the manufacturing and installation processes do not adversely affect any of the following:
 - 1. Seal of insulating glass units.

2. Finish on aluminum framing specified elsewhere.
 3. Setting blocks, shims, and accessories.
 4. Sealants including staining, bond, or other detrimental effects.
 5. Interlayers of laminated glass.
 6. Reflective finish on glass.
- M. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- N. Appearance: Each glass type to match the approved samples, and to be uniform in appearance, flat, free from irregularities and differences in appearance when viewed from exterior as judged by the Architect. Glass not complying with this requirement to be replaced with conforming glass at no additional cost to Owner.
- O. Regulatory Requirements: Comply with the following:
1. NFPA Life Safety Code.
 2. IBC.
 3. CPSC 16 CFR 1201.
 4. ANSI Z97.1.
 5. If above requirements do not agree comply, with the more stringent condition.

1.8 DELIVERY, STORAGE & HANDLING

- A. Delivery of Materials: Maintain original labels on each container or piece of glazing, except where cutting makes requirement impossible; show manufacturer's name and brand, strength, and quality of glass.
- B. Handling Materials & Equipment: Various items to receive glazing and specified elsewhere may be factory-glazed or site-glazed at Contractor's option.

1.9 PROJECT CONDITIONS

- A. Protection: Do not mark glass surface with crayons or other marking pencils; where warnings are required, fasten tapes or banners to head framing. Provide masking or other shielding for glass when performing welding or other construction work adjacent to installed glazing; replace all glass damaged due to construction operations at no additional cost to the Owner. Protect edges of glass at all times to preserve edge strength; no striking, stoning, nipping, seaming or grinding will be allowed; protect edges against abrasion, pressure, and impact.

1.10 SPECIAL WARRANTY

- A. Comply with requirements of Section 01 33 25 - Warranties.
- B. Contractor to guarantee work under this Section against defects of materials, fabrication and installation. Defects include, but not limited to:
1. Edge separation, discoloration, or loss of transparency.
 2. Loss of seal; insulating units.
 3. Loss of weathertightness; exterior glazing.
 4. Peeling, cracking or deterioration of coatings or films.
 5. Silver spoilage on mirrors.

- C. Defective units to be replaced by the Contractor at no additional cost to Owner.
- D. Warranty Periods:
1. 10 years:
 - a. Coated (Reflective) Glass and Low E glass.
 - b. Seals on insulating units (non-sloped).
 2. 5 Years:
 - a. Laminated Glass.
 - b. Breakage due to Nickel Sulfide (NiS) inclusions.
 - c. Decorative silkscreened glass.
 - d. Ceramic frit coated spandrel glass.
 - e. Weathertightness: Included under framing system in which glazing is installed, but not less than 2 years for glazing in "non-system" framing, e.g. wood, masonry.

PART 2 - PRODUCTS

2.1 GLASS

A. General:

1. Thickness: 1/4 inch unless otherwise noted or where thicker glass recommended by glass manufacturer.
2. Types: Glass is indicated by "type" on drawings. The "types" are described under GLASS TYPES below.
3. All glass to be suitable for conditions. See QUALITY ASSURANCE in Part 1 above.
4. Transparent Flat Glass: ASTM C 1036; Type I, Class 1, Quality Q3.

B. Float Glass:

1. Clear, unless indicated otherwise.
2. Heat strengthened or tempered as required. See "Heat Treated Flat Glass" below.

C. Heat Treated Flat Glass: All glass is tempered or heat strengthened.

1. Clear, unless indicated otherwise.
2. ASTM C 1048, CPSC 16 CFR 1201, and ANSI Z97.1.
3. Treat by horizontal process. No tong marks permitted.
 - a. Roll-wave distortion shall be parallel to bottom edge of glass as installed, unless otherwise indicated
4. Tempered or heat strengthened as:
 - a. Required by Code.
 - b. Recommended by the glass manufacturer due to thermal stress or structural considerations.
 - c. Tempered Glass shall be Heat Soaked:
 - 1) Perform 100% heat soak program consistent with the BS EN 14179-1 standard (550°F +/- 18°F for a dwell time of two hours).
 - a) This requirement does not relieve Contractor from meeting other specified requirements.

D. Insulating Glass:

1. Double glazed, dual sealed units, with air space between panes hermetically sealed at the perimeter of the unit.
 - a. Inner Pane: Laminated Glass.
 - b. Provide permanent label in bottom corner of the each lite identifying the interlayer type and manufacturer, and conforming to Safety Glass, above.
2. IGCC certified to ASTM E 2190.

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3. Spacer:
 - a. Hollow aluminum shape filled with desiccant; manufacturer's standard.
 - b. Corners: Bent with single joint sealed with PIB, mechanically joined and soldered, or mechanically joined and sealed with PIB. Welding and non-sealed joints not acceptable.
 4. Dual Seal:
 - a. Primary (between spacer and glass): PIB; polyisobutylene.
 - b. Secondary (outermost; between glass and over spacer): Manufacturer's standard; polysulfide, urethane, or silicone. Provide silicone for structural glazing.
- E. Laminated Glass: ASTM C 1172.
1. Assembly of two panes bonded together with interlayer.
 2. Interlayer: Fabricator's standard polyvinyl butyral (PVB) with a proven record showing no tendency to bubble, discolor, or lose physical or mechanical properties after laminating and installation.
 - a. Clear/transparent.
 - b. PVB Interlayer Thickness:
 - 1) Typical: 0.060 inch.
 - 2) Other: As indicated but at least 0.030 inches.
 3. Construction: Laminate glass with interlayers to comply with interlayer manufacturer's written recommendations.
 4. Fabricate using laminator's standard heat plus-pressure process to produce assemblies free from foreign substances and air/glass pockets.
 5. Heat treated as required. See "Heat Treated Flat Glass" above.
 6. Thickness: As required to meet PERFORMANCE REQUIREMENTS but not less than
 - a. Nominal 1/2 inch thick unit composed of two 1/4" panes.

2.2 GLASS TYPES

- A. Monolithic Units: See PERFORMANCE REQUIREMENTS, including Large and Small Missile Impact Resistant and blast requirements.
1. SLG-3 (Safety Impact Laminated Glazing):
 - a. Nominal 1-9/16 inches thick assembly; all layers clear/transparent.
 - b. Layout, inside to outside:
 - 1) 3/16 inch Heat Strengthened glass.
 - 2) 0.03 inch PVB interlayer.
 - 3) 3/16 inch Polycarbonate sheet.
 - 4) 0.06 inch PVB interlayer.
 - 5) 5/32 inch Polycarbonate sheet.
 - 6) 0.06 inch PVB interlayer.
 - 7) 5/32 inch Polycarbonate sheet.
 - 8) 0.03 inch PVB interlayer.
 - 9) 1/2 inch Air Space.
 - 10) 1/4 inch Fully Tempered glass.
 - c. Provide safety glazing labeling.
 2. SLG-4 (Safety Impact Laminated Glazing):
 - a. Nominal 1-1/16" thick, minimum, assembly of 2 lights of minimum 1/2" thick heat strengthened clear glass with a PVB interlayer.
 - b. PVB Interlayer Thickness: Provide as required to meet PERFORMANCE REQUIREMENTS.
 - c. Provide safety glazing labeling.
 3. SLG-5 (Safety Impact Laminated Glazing):

- a. Nominal 9/16" thick, minimum, assembly of 2 lights of minimum 1/4" thick heat strengthened clear glass with a PVB interlayer.
 - b. PVB Interlayer Thickness: Provide clear PVB interlayer as required to meet PERFORMANCE REQUIREMENTS, but not less than 0.06 inch thick.
 - c. Provide safety glazing labeling.
4. LGS-1 – (Clear Laminated Spandrel Glass).
- a. Nominal 9/16" thick, minimum, assembly of 2 lights of minimum 1/4" thick heat strengthened clear glass with a PVB interlayer.
 - b. PVB Interlayer Thickness: Provide as required to meet PERFORMANCE REQUIREMENTS.
 - c. Provide with full opaque ceramic frit coating on #4 surface.
 - 1) Frit Color: Custom color as selected by Architect.
 - d. Provide safety glazing labeling.
5. LG-01HS (Laminated, Clear, Heat Strengthened):
- a. Nominal 9/16" thick assembly of 2 lights of minimum 1/4" thick clear glass with a minimum of 0.060" special PVB interlayer. Thickness stated is minimum. Increase as required to meet DESIGN REQUIREMENTS and PERFORMANCE REQUIREMENTS.

B. Insulated Units: See PERFORMANCE REQUIREMENTS, including Large and Small Missile Impact Resistant and blast requirements.

1. IG-01 (Clear insulating, Low E, Laminated Glass):
- a. 1-5/16" thick units
 - b. Outer Pane: 1/4" clear heat strengthened with Low-E coating on #2 surface.
 - c. Air Space: 1/2 inch, nominal.
 - d. Inner Pane: 9/16" clear laminated Type LG-1HS, both plies heat strengthened. See "PVB Interlayer Thickness" under GLASS above.
 - e. Labeling:
 - 1) Provide safety glazing labeling at inner pane.
 - 2) Provide permanent logo in bottom corner of the each lite identifying the interlayer type and manufacturer.
 - f. Performance Data: Values below are based on a 0.060 inch clear pvb interlayer
 - 1) Transmittance:
 - a) Visible Light: 41%
 - b) Solar: 20%
 - c) U-V: < 1%
 - 2) Reflectance:
 - a) Visible Light Exterior: 34%
 - b) Visible Light Interior: 13%
 - c) Solar Energy: 40%
 - 3) ASHRAE U-Value:
 - a) Winter U-Value: 0.29
 - b) Summer U-Value: 0.26
 - 4) Shading Coefficient: 0.32
 - 5) Solar Factor (SHGC): 0.28
 - g. Basis of Design: Viracon VRE 1-46, Radiant Low-E (VRE) Insulating Laminated Glass.

2. IG-01T (Clear Insulating, Low E, Laminated Glass, Safety Glass):
- a. Same as IG-01 above except outer pane is fully tempered for safety glazing.
 - b. Labeling:
 - 1) Provide safety glazing labeling at inner and outer pane.
 - 2) Provide Safety Glass label on inner and outer panes of glass.

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3. IG-01D (Clear Insulating, Low E, Laminated Glass) at Dixie:
 - a. 1-5/16" thick units.
 - b. Outer Pane: 1/4" clear heat strengthened with Low-E coating on #2 surface.
 - c. Air Space: 1/2 inch, nominal.
 - d. Inner Pane: 9/16" clear laminated Type LG-1HS, both plies heat strengthened. See "PVB Interlayer Thickness" under GLASS above.
 - e. Labeling:
 - 1) Provide safety glazing labeling at inner pane.
 - 2) Provide permanent logo in bottom corner of the each lite identifying the interlayer type and manufacturer.
 - f. Performance Data:
 - 1) Transmittance:
 - a) Visible Light: 62%
 - b) Solar: 24%
 - c) U-V: 5%
 - 2) Reflectance:
 - a) Visible Light Exterior: 10%
 - b) Visible Light Interior: 10%
 - c) Solar Energy: 37%
 - 3) ASHRAE U-Value:
 - a) Winter U-Value: 0.29
 - b) Summer U-Value: 0.26
 - 4) Shading Coefficient: 0.33
 - 5) Solar Factor (SHGC): 0.29
 - 6) Relative Heat Gain: 70 Btu/hr x sq. ft.
 - g. Basis of Design: Viracon VNE 1-63, Low-E Insulating Laminated Glass.
4. IG-01TD (Clear Insulating, Low E, Laminated Glass, Safety Glass) at Dixie:
 - a. Same as IG-01D above except outer pane is fully tempered for safety glazing.
 - b. Labeling:
 - 1) Provide safety glazing labeling at inner and outer pane.
 - 2) Provide Safety Glass label on inner and outer panes of glass.
5. SG-01 (Spandrel, Clear Insulating, Low E, Laminated Glass):
 - a. Same materials and construction as IG-01 above except:
 - 1) Provide with full opaque ceramic frit coating on #6 surface.
 - a) Frit Color: Custom color as selected by Architect.
6. SG-01D (Spandrel, Clear Insulating, Low E, Laminated Glass) at Dixie:
 - a. Same materials and construction as IG-01D above except:
 - 1) Provide with full opaque ceramic frit coating on #6 surface.
 - a) Frit Color: Custom color as selected by Architect.
7. SG-01T (Spandrel, Clear Insulating, Low E, Laminated Glass, Safety Glass):
 - a. Same as IG-01T above except:
 - 1) Provide with full opaque ceramic frit coating on #6 surface.
 - a) Frit Color: Custom color as selected by Architect.
 - 2) Provide Safety Glass label on inner and outer panes of glass.
8. IG-04 (Clear Insulating, Low E, Laminated Glass):
 - a. 1-5/16" thick units.
 - b. Outer Pane: 1/4" clear heat strengthened with Low-E coating on #2 surface.
 - c. Air Space: 1/2 inch, nominal.
 - d. Inner Pane: 9/16" clear laminated Type LG-1HS, both plies heat strengthened. See "PVB Interlayer Thickness" under GLASS above.
 - e. Labeling:
 - 1) Provide safety glazing labeling at inner pane.

- 2) Provide permanent logo in bottom corner of the each lite identifying the interlayer type and manufacturer.
 - f. Performance Data: Values below are based on a 0.060 inch clear pvb interlayer.
 - 1) Transmittance:
 - a) Visible Light: 25%
 - b) Solar: 12%
 - c) U-V: < 1%
 - 2) Reflectance:
 - a) Visible Light Exterior: 15%
 - b) Visible Light Interior: 13%
 - c) Solar Energy: 19%
 - 3) ASHRAE U-Value:
 - a) Winter U-Value: 0.29
 - b) Summer U-Value: 0.26
 - 4) Shading Coefficient: 0.24
 - 5) Solar Factor (SHGC): 0.21
 - g. Basis of Design: Viracon VRE 4-46, Radiant Low-E (VRE) Insulating Laminated Glass.
9. IG-04T (Clear Insulating, Low E, Laminated Glass, Safety Glass):
- a. Same as IG-04 above except outer pane is fully tempered for safety glazing.
 - b. Labeling:
 - 1) Provide safety glazing labeling at inner and outer pane.
 - 2) Provide Safety Glass label on inner and outer panes of glass.
- C. FR (Fire-Rated): Provide fire-rated glazing and complying with applicable building, fire, safety codes and the following:
1. FR-IG-01T – Vision glass, 90 minute fire rated, safety glazing. Clear vision assembly of glass, ceramic, film, laminated, or gel as required.
 - a. Nominal Thickness: 1-3/4".
 - b. Inner Pane: 1/4" clear heat strengthened glass.
 - c. Cavity Space: 1 inch, nominal; filled with Gel.
 - d. Gel: clear, non-yellowing, colorless, odorless and U.V. stable.
 - e. Outer Pane: 9/16" clear laminated glass or clear laminated transparent ceramic glazing, with 0.060" clear PVB Interlayer.
 - f. U-Factor: not more than 0.40.
 - g. Label: 90 minute fire rated safety glazing.

2.3 GLAZING MATERIALS & ACCESSORIES

- A. Provide the following materials for setting glass in openings as indicated on drawings. See "Component Compatibility" under QUALITY ASSURANCE in Part 1 above.
- B. Setting Accessories:
 1. Blocks: Resilient blocks designed for setting glass. Chemically compatible w/sealant used; only silicone devices acceptable with silicone sealant. Durometer hardness as follows unless otherwise recommended by glass manufacturer or GANA.
 - a. Setting Blocks: 85 + 5, Shore A durometer.
 - b. Edge Blocks: 65 + 5, Shore A durometer.
 2. Spacers: Resilient accessories designed for positioning glass in rabbets; chemically compatible with sealant used; only silicone devices acceptable with silicone sealant.
- C. Gaskets and Tape:

1. Continuous black elastomeric glazing gasketing compatible with sealant and framing system and suitable for exterior use. Only silicone devices acceptable with silicone sealant.
 2. Glazing tape as recommended by manufacturer.
- D. Glazing Sealants: Provide the following glazing sealants. Color as selected by Architect.
1. Silicone Sealant: Provide in conformance with Section 08 44 13 - Glazed Aluminum Curtain Walls.
 2. Structural Glazing: Provide in conformance with Section 08 44 13 - Glazed Aluminum Curtain Walls.
 - a. Translucent or black as selected by Architect.
 - b. Verify all glazing accessories are compatible with silicone. No rubber-based products permitted including neoprene or EDPM.
 3. Others: As specified in Section 08 44 13 - Glazed Aluminum Curtain Walls, and as required for a complete installation.
- E. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.
- F. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.
- G. Spandrel Insulation: Semi-rigid board, thickness as necessary to provide thermal resistance value; rock wool insulation. Product shall be listed with testing agency for edge of slab firestopping assembly being used in conjunction with the curtain wall.
1. Provide in thickness to meet PERFORMANCE REQUIREMENTS specified in Section 08 44 13, but not less than an R-Value of 13.
 2. Physical Characteristics:
 - a. "R" Value: 4.2 per inch
 - b. Density: 4.0 pcf, minimum.
 - 1) Provide density not less than the approved edge of slab firestopping submitted for curtain wall, and as specified in Section 07 84 00 – Firestopping.
 - c. Sorption: Less than 0.03% by volume. ASTM C 1104
 - d. Type: IA, IB, II, IB, ASTM C 612
 - e. Fire characteristics per ASTM E 84:
 - 1) Flame spread: 0.
 - 2) Smoke developed: 0.

2.4 FABRICATION

- A. Cut glass to accurate sizes and shapes as indicated on drawings; allow edge clearances and tolerances in accordance with GANA recommendations, unless otherwise indicated.
- B. Edges: Factory-cut and factory-form edges for heat tempered, and insulating glass; provide ground edges for exposed glass edges; provide drilled holes, notches, and other special fabrication of finishing techniques, unless otherwise approved. Cut and form edges of other glass carefully to furnish clean accurate edges.
1. Structural Sealant Systems: All work in accordance with manufacturer's recommendations.
 - a. Edges exposed to air: Polished finish.

- b. Edges receiving sealant: Flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
 - c. Concealed edges: Factory option.
 - d. Joint width: 3/8" minimum; 7/16" maximum at staggered glass and 1/2" maximum at straight glass.
2. Edge Deletion: Remove coating at perimeter bond width as recommended by glass coating manufacturer for two and four-sided structural glazed systems for either of the following conditions:
 - a. Reduction in bond strength below that of uncoated glass.
 - b. Change in appearance or color at bond line as determined by Architect.

2.5 SOURCE QUALITY CONTROL

- A. Glass manufacturer shall have an established, effective "Quality Control Program" in operation at his plant. The roll ripple and bow shall be measured and recorded by the glass manufacturer on an hourly basis during heat-strengthening processes.
 1. Measurements to be made using a Gar Gauge or other approved measuring devices.
 2. Records of roll ripple and bow measurements for the proposed products shall be furnished to the Architect on a weekly basis.
 3. All costs associated with this in-plant quality control program to be borne by the glass manufacturer.
 4. Glass to conform to the tolerances listed below.
- B. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
- C. Maximum peak to valley rollerwave 0.003" (0.08mm) in the central area and 0.008" (0.20mm) within 10.5" (267mm) of the leading and trailing edge.
- D. Maximum bow and warp 1/32" per lineal foot (0.79mm).
- E. Pinholes in Reflective Coating: When viewed from a distance of 6 feet:
 1. Pinholes exceeding 1/16 inch in diameter are not allowed.
 2. Large clusters or close spacing of smaller pinholes are not allowed.
- F. Scratches in Reflective Coating: Scratches defined as hairline type only. Scratches:
 1. Longer than 3 inches not permitted.
 2. Smaller than 3 inches allowed in any area.
 3. Not visible when viewed from a distance of 6 feet.
- G. Reflective Coating, Transmission, and Color: Must be within ranges as established by samples approved by Architect. See SPECIAL SAMPLES in Part 1 above.

PART 3 - EXECUTION

3.1 GENERAL

- A. If another Section disagrees with a requirement of this Section comply with the more stringent requirement and receive written direction from the Contracting Officer on which requirement to comply with before starting work.

3.2 EXAMINATION

- A. Verification of Conditions:
 - 1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
 - 2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.
- B. Installer must examine substrate and conditions under which glazing work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.
- C. Glazing Materials: Installer to examine all glazing materials for proper edge finishes, defects, or damage which may affect the quality of the installation. Remove unsuitable materials and replace with suitable materials conforming to Contract Documents.

3.3 PREPARATION

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA-02 Sealant Manual.
- B. Preparation: Verify that frames to receive glazing are square and true, that perimeter clearances are sufficient to prevent "point loading", and that surfaces are clean, dry, and ready to receive glazing materials. Verify that sash corners are weathertight and that sills are weeped to the outdoors. Remove all protective coatings from framing surfaces.
 - 1. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
 - 2. Setting Blocks: Place setting blocks in frames for support of glass; place at quarter points, or if approved, equidistant from center to within 6" of edges. Size neoprene blocks to limit load from glass weight of 15 psi but in no case shorter than 4".
 - 3. Corner Seal: Apply bead of sealant at exterior sill frame corners completely sealing frame corners.
- C. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.4 INSTALLATION

- A. Install glass in openings where noted on drawings in accordance with GANA recommendations, unless otherwise indicated or specified.
- B. 4-Sided Glazing: Dry glazed with gaskets in accordance with manufacturer's written specifications and recommendations. Typical for aluminum-framed glass.

- C. Glass Positioning: Center glass in rabbets and position so as to maintain clearances on all sides, indoors and out in accordance with GANA recommendations; shim as required to position against fixed stops and frame bars. Provide edge blocks permanently fixed to framing at locations recommended by GANA; allow nominal 1/8" clearance between blocks and glass.
 - 1. Do not allow glass to rest on or contact any framing member.
- D. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.
- E. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- F. Laminated Glass:
 - 1. Tape edges to seal interlayer and protect from glazing sealants.
 - 2. Do not use putty or glazing compounds.
- G. Insulating Glass Units:
 - 1. Glaze in compliance with glass manufacturer's written instructions.
 - 2. When glazing gaskets are used, they shall be of sufficient size and depth to cover glass seal or metal channel frame completely.
 - 3. Do not use putty or glazing compounds.
 - 4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
 - 5. Install with tape or gunnable sealant in wood sash.
- H. Fire Resistant Glass:
 - 1. Fire Resistant Glass: Glaze in accordance with UL design requirements.

3.5 INSTALLATION - DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners. Seal corners by butting and sealing junctions with butyl sealant.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Trim protruding tape edge.

3.6 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to achieve full contact at perimeter of pane or glass unit.
- D. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
- E. Fill gap between glazing and stop with silicone type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line to ensure complete wetting or bond of sealant to glass and channel surfaces.
- F. Apply cap bead of silicone type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 INSTALLATION - WET METHOD (SEALANT AND SEALANT)

- A. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 6 mm (1/4 inch) below sight line.
- B. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure complete wetting or bond of sealant to glass and channel surfaces; and continue the air and vapor seal.
- C. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.8 INSULATION

- A. Install spandrel insulation behind spandrel glass where shown; provide approved suitable metal framing and mechanical anchorage devices to maintain insulation in proper position for life of building. Position insulation 1" clear or more behind spandrel glass with foil face oriented to the interior of building. See Section 08 44 13 for installation of back pan to curtain wall. Back-pan to be installed to create a vapor retarder between interior space and insulation.
- B. Framing and fasteners exposed when viewed from exterior to be painted to match color of insulation.

3.9 CLEAN-UP

- A. Upon completion, remove all excess sealant and materials from surfaces; wash and clean all glass and framing members.
- B. Contractor not to use any solvents detrimental to finish of aluminum framing or associated glazing sealants. Consult with manufacturer of finish to determine solvents and/or cleaning agents which may be used on the finish including recommended methods and limitations of procedures.

END OF SECTION

SECTION 08 90 00
LOUVERS AND VENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies:

1. All stationary louvers in exterior wall openings.
 - a. Blade Direction:
 - 1) Typical: Aluminum wind-driven rain wall louvers with fixed vertical blades. Mullion spacing as indicated on drawings.
 - b. Hurricane resistant louvers meeting Dade County requirements and meet blast resistant requirements specified.
 - c. Anchorage.
 - d. Steel support for the louvers. Drawings show the size of structural steel members required behind the louvers to accept blast load and transfer the load to the building structure.
 - e. Engineering.
 - f. Flashing at head and sill of louver unless indicated otherwise on drawings.
 - g. Blank-offs behind louvers where shown and not connected to ductwork. Blank-offs for ducted louvers provided under Division 23.

B. Work Specified Elsewhere, but Provided Under this Section:

1. Steel support for louvers: Provide as specified in Section 05 50 00, Metal Fabrications.

C. Products Provided but not specified Under this Section:

1. Steel Support System for Louvers: Provide as specified in Section 05 50 00, Metal Fabrications.
2. Work of this Section shall comply with Section 08 90 00.30, Life Safety Blast Requirements for Louvers and Vents.
3. Work of this Section shall comply with Section 08 90 00.50, Mission Critical Blast Requirements for Louvers and Vents.

1.2 RELATED WORK (Items not included in this Project Manual are available from the Construction Manager upon request)

- A. Louvers in steel doors: Section 08 11 13, Hollow Metal Doors and Frames.
- B. Louvers in wood doors: Section 08 14 00, Interior Wood Doors.
- C. Soffit Vents at DEFS soffits: Section 07 24 00, Exterior Insulation and Finish System (EIFS).
- D. Flashing: Section 07 60 00, Flashing and Sheet Metal.
- E. Color of finish: Section 09 06 00, Schedule for Finishes.

1.3 DESIGN REQUIREMENTS

- A. The Drawings show aesthetic design intent. Products provided must conform to design intent shown and performance levels specified.
- B. Louvers Not Integral with Curtain Wall Framing: Conventional units with exposed frame on exterior at louver area perimeter and continuous blades within field.
- C. Design louver systems to bear all loads and building movements indicated. Provide additional support framing, if such framing is necessary, to meet load requirements. Such framing to be not visible from the exterior.

1.4 BLAST REQUIREMENTS

- A. Blast Requirements:
 - 1. Life Safety Structures: As specified in Section 08 90 00.30, Life Safety Blast Requirements for Louvers and Vents.
 - 2. Mission Critical Structures: As specified in Section 08 90 00.50, Mission Critical Blast Requirements for Louvers and Vents.

1.5 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified Professional Engineer, using performance requirements, blast requirements, and design criteria indicated.
- B. Performance Requirements: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Comply with Florida Building Code tests for Uniform Static Air Pressure Test, Cyclic Wind Pressure Test, Large Missile Impact Test, and Wind Drive Rain Test. Mark all units, "Miami-Dade County Product Control Approved", in a location concealed from public view.
 - a. Louvers shall have a Dade Code Compliance Office Notice of Acceptance (NOA) and that have been successfully tested to TAS 201, TAS 202, and TAS 203 Protocols.
 - 1) NOA must be compliant for the installation details used, including but not limited to the adjacent material transition details.
 - 2) NOA must be current and valid.
 - 3) Product is approved to comply with the Florida Building Code including High Velocity Hurricane Zone.
 - 2. Wind Design Load: Comply with Section 01 83 16.13 - Exterior Wind Enclosure Requirements.
 - a. Louvers to meet the wind design load requirements without damage or permanent deflection.
 - b. Louvers in Curtain Wall:
 - 1) Louvers to meet the wind load requirements indicated elsewhere without damage or permanent deflection; see the Drawings and Section 08 44 13, Glazed Aluminum Curtain Wall.

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- 2) Blast Loads: As specified in Section 08 44 13, Glazed Aluminum Curtain Wall.
 3. Air Performance:
 - a. Horizontal Blade Louver: Louver shall be rated to intake not less than 700 fpm free area velocity at a static pressure differential of 0.10" W.G.; and, exhaust not less than 660 fpm free area velocity at a static pressure differential of 0.10" W.G.
 - b. Vertical Blade Louver: Louver shall be rated to intake not less than 950 fpm free area velocity at a static pressure differential of 0.10" W.G.; and, exhaust not less than 1,000 fpm free area velocity at a static pressure differential of 0.10" W.G.
 4. Free Area:
 - a. Horizontal Blade Louver: Not less than 47 percent.
 - b. Vertical Blade Louver: Not less than 37%.
 5. Water Penetration: Not more than 0.01 oz. per sq. ft. of free area at an intake air flow of 1,250 fpm free area velocity.
 6. Wind-Driven Rain Performance:
 - a. Horizontal Blade Louver: Not less than 99 percent effectiveness when subjected to a rainfall rate of 8 inches per hour and a wind speed of 50 mph at a core-area intake velocity of 676 fpm.
 - b. Vertical Blade Louver: Not less than 99 percent effectiveness when subjected to a rainfall rate of 8 inches per hour and a wind speed of 50 mph at a core-area intake velocity of 984 fpm.
 7. Anchorage: Design to withstand live and dead loads with safety factor of not less than 4.
 8. Tests for performance ratings to be in accordance with AMCA Standard 500-L and comply with requirements of AMCA Certified Ratings Program.
 - a. Louvers shall bear AMCA certified ratings seals for air performance, water penetration and wind-driven rain ratings.
 9. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.
 - a. TEMPERATURE Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Design the following connections for structural steel members shown on drawings for blast loads:
1. Connection of structural steel members to building structure.
 2. Connection of louver to supporting structure. Provide structural members behind each vertical louver mullion.
 3. See BLAST REQUIREMENTS above.

1.6 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Engineer's Seal/Signature: Shop drawings and associated calculations required for structural design shall bear seal and signature of louver manufacturer's Professional Engineer. See Professional Engineer under QUALITY ASSURANCE below, and "Structural Calculations" below.
- C. Shop Drawings:

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1. Each type, showing material, finish, size of members, method of assembly, and installation and anchorage details.
- D. Manufacturer's Literature and Data:
1. Each type of louver and vent.
 2. Provide documentation showing that louvers meet Dade Code Compliance Office Notice of Acceptance (NOA) for required wind loads.
- E. Provide detailed instructions and drawings for removal and reinstallation of removable louvers for sizes and locations indicated on drawings.
- F. Submittals required for this Sections shall be submitted complete and concurrently with Blast Submittals. Partial submittals are not acceptable.
1. Blast Submittals: SUBMITTALS as specified in:
 - a. Section 08 90 00.30, Life Safety **Blast Requirements for Louvers and Vents**.
 - b. Section 08 90 00.50, Mission Critical **Blast Requirements for Louvers and Vents**.
- G. Manufacturer shall provide an entire copy of NOA and shall be available on the job site at request of the Resident Engineer and authorities having jurisdiction. NOA will not receive Architects stamp and may or may not be returned with Submittal.
- H. Certificate of Compliance: Fabricator shall provide certification of compliance after completion of fabrication in conformance with "QUALITY ASSURANCE".
- I. Provide documentation to show that fabricator meets requirements of "APPROVED FABRICATOR" in conformance with "QUALITY ASSURANCE".
- J. Structural Calculations: Submit triplicate copies of structural calculations made by or for louver manufacturer in connection with design and detailing of the louver work, including connections and attachments. Submittals may or may not be returned, and will not bear stamp of approval. Base calculations on worst case conditions for all allowable variations, tolerances and connections. Perform calculations under direct supervision of manufacturer's Professional Engineer. Calculations shall be sealed and signed, and shall include:
1. Direction and magnitude of thermal expansion; direction and magnitude of applicable building and seismic movements.
 2. Structural forces imposed on the building structure under all conditions of construction and loading, as specified.
 3. Section property computations for framing members.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

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- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.
 - D. Performance Ratings: Test in accordance with AMCA Standard 500-L.
 - E. Licensed Ratings: In accordance with AMCA Standard 511.
 - F. Fabricator shall meet requirements of "APPROVED FABRICATOR" as defined in Section 1702 of the 2006 International Building Code.
 - G. At completion of fabrication submit a certificate of compliance, in conformance with Section 1704.2.2 of 2006 IBC; to the building official, Contracting Officer, and Architect stating that the work was performed in compliance with approved construction documents and shop drawings.
 - H. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Louisiana and who has a minimum of 10 years experience in similar louver systems in providing engineering services of the kind indicated.
 - I. Qualified **Blast** Consultant: Provide in conformance with Section 08 44 13.50, Mission Critical **Blast Requirements for** Glazed Aluminum Curtain Wall System.

1.8 REFERENCE STANDARDS (Latest edition unless otherwise noted)

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. The Master Painters Institute (MPI):
 - 1. Approved Product List
- C. American Society for Testing and Materials (ASTM):
 - 1. A167 Stainless and Heat-Resisting Chromium - Nickel Steel Plate, Sheet, and Strip
 - 2. A1008/A1008M Steel, Sheet, Carbon, Cold Rolled, Structural, and High Strength Low-Alloy with Improved Formability
 - 3. B209/B209M Aluminum and Aluminum Alloy, Sheet and Plate
 - 4. B221 Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
 - 5. B221M Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Shapes, and Tubes
 - 6. E330 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 - 7. E1886 Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
 - 8. E1996 Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- D. National Association of Architectural Metal Manufacturers (NAAMM):

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1. AMP 500-505 Metal Finishes Manual
 - E. National Fire Protection Association (NFPA):
 1. 90A Installation of Air Conditioning and Ventilating Systems
 - F. American Architectural Manufacturers Association (AAMA):
 1. 605 High Performance Organic Coatings on Architectural Extrusions and Panels
 - G. Chapter 16 and Testing Application Standards (TAS) of the Florida Building Code (FBC) 2007
 1. TAS 100A Wind Driven Rain Penetration Test
 2. TAS 201 Impact Test Procedure(s)
 - a. Large Missile Impact
 3. TAS 202 Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Static Air Pressure.
 4. TAS 20 Criteria for Testing Product Subject to Cyclic Wind Pressure Loading.
 - H. Air Movement and Control Association, Inc. (AMCA):
 1. 500-L Testing Louvers

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum, Extruded: ASTM B221/B221M.
- B. Stainless Steel: ASTM A167, Type 302B.
- C. Carbon Steel: ASTM A1008/A1008M.
- D. Aluminum, Plate and Sheet: ASTM B209/B209M.
 1. Blades and Frame.
 2. Blank-Off Panels.
 3. Custom Panels.
- E. Screen: Aluminum.
 1. Birdscreen: 1/2" basket weave, and not less than 0.063 inch thick wire. Cover full open area of louver on interior side of fixed louvers. Secure Birdscreen to louver by means of 3/4 inch by 3/16 inch top and bottom aluminum bars screwed to louver frame.
- F. Fasteners: Fasteners for securing louvers and wall vents to adjoining construction, except as otherwise specified or shown, shall be toggle or expansion bolts, of size and type as required for each specific type of installation and service condition.

1. Where type, size, or spacing of fasteners is not shown or specified, submit shop drawings showing proposed fasteners, and method of installation.
2. Fasteners for louvers, louver frames, and wire guards shall be of stainless steel.

G. Inorganic Zinc Primer: MPI No. 19.

H. Structural Support Required but Not Provided by Other Trade Contractors: Provide stainless steel, aluminum or hot dipped galvanized steel as specified in Section 05 50 00, Metal Fabrications. See DESIGN REQUIREMENTS.

2.2 EXTERIOR WALL LOUVERS

A. General:

1. Provide Fixed Wind drive rain Louvers of size and design as shown and as follows:
 - a. Typical Depth of Fixed Louver: 6-inch deep for all fixed louvers.
2. Heads, sills and jamb sections shall have formed sealant slots or be designed to retain sealant. Head sections shall have exterior drip lip, and sill sections an integral water stop.
3. Furnish louvers with sill extension or separate sill as shown.
4. Frame shall be mechanically fastened or welded construction with exposed welds dressed smooth and flush.
5. Align splices, mullions, jambs, and stiffeners with curtain wall framing and building structure as shown on the Drawings.

B. Typical Louver: Fixed wind drive rain louver:

1. General: Frames, blades, sills, and mullions (sliding interlocking type); minimum 0.081 inch thick extruded aluminum. Blades shall be wind drive rain type and have reinforcing bosses.
 - a. Reinforce louver on interior side to meet performance requirements. Reinforcement shall be concealed from exterior view.
 - b. Vertical Blade Louvers: Typical.
2. Provide bird screens in U-shaped frames for exterior louvers; mount on inside face of louver secured with stainless steel screws.
3. Frames to be sealed watertight with silicone sealant in conformance with Section 07 92 00, Joint Sealants.
4. Wind drive rain Provide bird screens in U-shaped frames for exterior louvers; mount on inside face of louver secured with stainless steel screws.
5. Frames to be sealed watertight with silicone sealant.

C. Flashing:

1. Provide 0.8 m (0.032 inch) thick aluminum flashing with end dams at head and sills.
2. Flashing shall be provided in conformance with Section 07 60 00, Flashing and Sheet Metal.
3. Color and Finish: Match louver.

D. Blank-Off Panels:

1. Typical: Insulated, laminated metal-faced panels:
 - a. Thickness: Two inches, minimum.
 - 1) R-Value: 13, minimum.

- b. Facing: Aluminum sheet; 0.050 inches thick.
 - c. Panel Finish: Same type of finish applied to louvers, but black color.
 - d. Core: Insulation.
 - e. Edge Treatment: Trim perimeter edges with extruded-aluminum channel frames, 0.081 inches thick; mitered corners; finished to match panels.
 - f. Seal perimeter joints between panel faces and louver frame with silicone sealant or other suitable means to prevent water penetration.
2. Where Noted "Uninsulated":
 - a. Aluminum sheet; 0.050 inches thick.
 3. Wind Loads: As specified under PERFORMANCER REQUIREMENTS, above.

2.3 CLOSURE ANGLES AND CLOSURE PLATES

- A. Fabricate from 2 mm (0.074-inch) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.

2.4 STEEL SUPPORT SYSTEM FOR LOUVERS

- A. Steel Support System for Louvers: Provide as specified in Section 05 50 00, Metal Fabrications.
 1. Finish on Steel: Hot dipped galvanized.

2.5 STEEL SUPPORT FOR LOUVERS

1. Steel Support for Louvers:
 - a. Steel Framing: Provide in conformance with Section 05 50 00, Metal Fabrications.
 - 1) Finish: Hot dipped galvanized.
 - 2) Provide embeds required for steel supports.
 - b. Steel support system shall be concealed from view.
 - c. Temporary Access Opening: Steel supports at temporary access openings shall be bolted connections designed to be removed and re-installed by Owner.

2.6 FINISHES

- A. Baked PVDF: Fluoropolymer baked enamel as specified under Section 05 05 13, Shop-Applied Coatings for Metal.
 1. 2-coat PVDF finish containing mica pearlescent flake pigments.
 2. Colors: See Section 09 06 00, Schedule for Finishes

2.7 PROTECTION

- A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, by painting the contact surfaces of the dissimilar material with a heavy coat of bituminous paint (complete coverage), or by separating the contact surfaces with a performed synthetic rubber tape having pressure sensitive adhesive coating on one side.
- B. Isolate the aluminum from plaster, concrete and masonry by coating aluminum with zinc-chromate primer.
- C. Protect finished surfaces from damage during fabrication, erection, and after completion of the work in conformance with Section 05 05 13, Shop-Applied Coatings for Metal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set work accurately, in alignment and where shown. Items shall be plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors to be built into masonry construction. Provide temporary bracing for such items until masonry is set.
- C. Provide anchoring devices and fasteners as shown and as necessary for securing louvers to building construction as specified.
- D. Generally, set wall louvers in masonry walls during progress of the work. If wall louvers are not delivered to job in time for installation in prepared openings, make provision for later installation. Set in cast-in-place concrete in prepared openings.
- E. Installation to be made weathertight at all openings by sealant and flashing specified elsewhere.
- F. Install blank-off panels where shown, securely attached to louver to meet wind load requirements.
- G. Separate all dissimilar metals with suitable materials to prevent electrolysis.

3.2 CLEANING AND ADJUSTING

- A. After installation, all exposed prefinished and plated items and all items fabricated from stainless steel and aluminum shall be cleaned as recommended by the manufacturer and protected from damage until completion of the project.
- B. All movable parts, including hardware, shall be cleaned and adjusted to operate as designed without binding or deformation of the members, so as to be centered in the opening of frame, and where applicable, to have all contact surfaces fit tight and even without forcing or warping the components

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SECTION 089000.30
LIFE SAFETY BLAST REQUIREMENTS FOR LOUVERS AND VENTS

PART 1 - GENERAL

1.1 REFERENCES

- A. Physical Security Design Manual (PSDM) July 2007, for Veteran Affairs Life Safety Protected, Final Draft.

1.2 RELATED SECTIONS

- A. Blast Loads: Section 01 83 16.23 Exterior Blast Dynamic Loading
B. Louvers and Vents: Section 08 90 00 Louvers and Vents

1.3 SYSTEM DESCRIPTION

- A. General Description: louvers protect mission critical equipment and must be designed to resist blast loads at the building envelope. The requirements of this section apply to the design of louvers subject to blast loading. Design for all other loading is outside of the scope of this section.
- B. Design Requirements:
1. Minimum performance requirements for Blast Resistant Windows are specified herein for a VA building designed as a Life Safety Protected building in accordance with the PSDM.
 - a. The following buildings have been assigned a VA PSDM status of 'Life Safety':
 - 1) Outpatient Building (Building 3).
 - 2) Transitional Living Building (Building 6): Excluding the separated gymnasium structure, which is classified as a Mission Critical rated structure.
 - 3) Central Energy Plant (Building 7): The Central Energy Plant and Service Building are structurally separated but combined are classified as Building 7. The Service Building portion only is a Life Safety Protected structure.
 2. In conjunction with meeting aesthetic and performance requirements, the Contractor may propose alternate detailing methods for consideration.
 3. Minimum performance requirements for louvers are specified. All exterior louvers are blast resistant unless noted otherwise.
 4. Use dynamic analysis to design the louvers.
 5. Louver Connections:
 - a. Connections resisting blast forces shall be capable of resisting horizontal inward and outward out-of-plane forces at a minimum. Rebound loads must be calculated. Design of connections to resist other loads, including gravity, and to accommodate building drift is the responsibility of the Contractor.
 - b. Louver connections to be designed to develop the maximum capacity of the louver fins or mullions, or to resist the maximum load that can be delivered by the supported louver.

- c. The design of floor framing for adequacy in resisting all forces including louver blast connection reactions shall be coordinated with and is the responsibility of the SEOR.

C. Performance Requirements:

1. General: Provide design of exterior louvers and secondary support framing to meet the minimum requirements of the PSDM.
2. Acceptable louver fin and mullion response: fins and mullions are limited to a ductility of 3.0 and a rotation of 3.0 degrees.
3. Acceptable Yield Mode: Fins and support framing with a ductility of greater than 1.0 shall be detailed to exhibit flexural tension yielding behavior. Other yield modes are not acceptable.

4. Design Blast Loads:

- a. The design loading for dynamic analysis is based upon the actual pressure and impulse resulting from detonation of a vehicle charge at standoff. The design loading for dynamic analysis is: Ramp down load with a peak pressure of 11.5 psi and impulse of 95 psi-msec. This design load shall be applied over the areas tributary to the element being analyzed.
- b. Applying Design Load: Apply air blast pressure and impulse over the appropriate tributary area that is carried by the fin or louver mullion.

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1.4 SUBMITTALS

- A. Calculations: Provide calculations prepared by qualified blast consultant verifying that louvers meet specific blast resistance requirements detailed in this Section.
1. Prior to performing engineering calculations intended to address the blast loading identified, submit to the Owner's Blast Consultant for review a description of the technique(s) that will be employed to calculate the response of the system to the defined dynamic loading.
 2. Submit calculations to Owner's Blast Consultant for review prior to start of louver fabrication. Calculations shall include a summary of blast reaction forces to be resisted at all louver connection points by the supporting structure. The SEOR shall review these reaction forces to confirm the adequacy of the supporting structure.
 - a. Calculation package is to include a summary sheet briefly outlining the following:
 - 1) Evaluation criteria.
 - 2) Calculation assumptions.
 - 3) Table of results by type/location.
 - 4) Statement of Conformance with specification requirements.
 - 5) Blast calculations are to be appropriately keyed to the louver shop drawing and connection numbering scheme.
 - 6) Blast calculations are to be submitted at the same time as the related shop drawings.
 3. Submit analysis for louvers and connections. Submit engineering calculations to show that maximum rotation for all fins and secondary mullions does not exceed specified performance requirements under specified design load. These calculations must include, but may not be limited to, analysis of the following:
 - a. Louver Fins: Analyze all sections.
 - b. Louver Fin to Mullion Connections: Analyze all connections
 - c. Louver Mullion: Analyze all sections.
 - d. Louver Mullion to Structure Connections: Analyze all connections between framing, and between framing and the building structure.

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- e. Failure Modes: Provide analysis to illustrate that brittle modes of failure (such as shear, buckling and concrete pull-out) are avoided in all components of the system including connections.
 - 4. Calculation submittal is to be stamped and signed by a registered Professional Engineer whose qualifications meet or exceed Quality Assurance criteria.
- B. Certificates: Engineer's qualifications that meet or exceed Quality Assurance criteria: At a minimum, qualifications must list each project in which the Engineer performed analysis of louvers, the effective start and end dates of performance of the analysis and a reference.

1.5 QUALITY ASSURANCE

- A. Provide products that meet the requirements of Physical Security Design Manual (PSDM) July 2007, for Veteran Affairs Mission Life-Safety Protected, Final Draft.
- B. Engineer: Engage a licensed Engineering Professional acceptable to the owner to perform dynamic analysis of the Blast Resistant louvers. The Blast Engineer shall have a minimum of 5 years experience in blast resistant design and demonstrable experience designing blast resistant systems to comparable load requirements in the past 18 months.
- C. DELIVERY, STORAGE, AND HANDLING
- D. Deliver prefabricated units to Project as completely assembled units, ready for anchorage into supporting structure, and for interfacing with other work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Yield Strength: Provide supporting references that grade of steel or aluminum used is capable of achieving calculated ductility ratio.
 - 1. The yield strength of framing members may be increased to account for dynamic strain rate effects as follows:
 - a. Structural Steel: For $f_y = 36$ ksi, the yield strength may be increased by a factor of 1.42. For $f_y = 46$ ksi, the yield strength may be increased by a factor of 1.31.
 - b. Structural Aluminum: The yield strength may be increased by a factor of 1.14.
 - 2. Section Modulus: The plastic section modulus may be used in dynamic design calculations.
 - 3. Built-up Sections: Design built-up sections using ultimate stress and strain compatibility approaches as defined by industry standards. If built-up section is analyzed as one unit, full shear stress transfer along the line of contact between the individual sections must be illustrated.

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SECTION 08 90 00.50

MISSION CRITICAL BLAST REQUIREMENTS FOR LOUVERS AND VENTS

PART 1 - GENERAL

1.1 REFERENCES

- A. Physical Security Design Manual (PSDM) July 2007, for Veteran Affairs Mission Critical Facilities, Final Draft.

1.2 RELATED SECTIONS

- A. Blast Loads: Section 01 83 16.23 Exterior Blast Dynamic Loading
- B. Louvers and Vents: Section 08 90 00 Louvers and Vents

1.3 SYSTEM DESCRIPTION

- A. General Description: louvers protect mission critical equipment and must be designed to resist blast loads at the building envelope. The requirements of this section apply to the design of louvers subject to blast loading. Design for all other loading is outside of the scope of this section.
- B. Design Requirements:
 - 1. Minimum performance requirements for blast resistant louvers are specified herein for a VA building designed as a Mission Critical building in accordance with the PSDM. All exterior louvers are blast resistant unless noted otherwise.
 - a. The following buildings have been assigned a VA PSDM status of 'Mission Critical':
 - 1) Research Building (Building 8): The research building consists of an existing building (Dixie) and façade with a new added structure. The new structure only is classified as a Mission Critical rated structure.
 - 2. In conjunction with meeting aesthetic and performance requirements, the Contractor may propose alternate detailing methods for consideration.
 - 3. Minimum performance requirements for louvers are specified. All exterior louvers are blast resistant unless noted otherwise.
 - 4. Use dynamic analysis to design the louvers.
 - 5. Louver Connections:
 - a. Connections resisting blast forces shall be capable of resisting horizontal inward and outward out-of-plane forces at a minimum. Rebound loads must be calculated. Design of connections to resist other loads, including gravity, and to accommodate building drift is the responsibility of the Contractor.
 - b. Louver connections to be designed to develop the maximum capacity of the louver fins or mullions, or to resist the maximum load that can be delivered by the supported louver.
 - c. The design of floor framing for adequacy in resisting all forces including louver blast connection reactions shall be coordinated with and is the responsibility of the SEOR.

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- C. Performance Requirements:
1. General: Provide design of exterior louvers and secondary support framing to meet the minimum requirements of the PSDM.
 2. Acceptable louver fin and mullion response: fins and mullions are limited to a ductility of 3.0 and a rotation of 3.0 degrees.
 3. Acceptable Yield Mode: Fins and support framing with a ductility of greater than 1.0 shall be detailed to exhibit flexural tension yielding behavior. Other yield modes are not acceptable.
 4. Design Blast Loads:
 - a. The design loading for dynamic analysis is based upon the actual pressure and impulse resulting from detonation of a vehicle charge at standoff. The design loading for dynamic analysis is: Ramp down load with a peak pressure of 38 psi and impulse of 136 psi-msec. This design load shall be applied over the areas tributary to the element being analyzed.
 - b. Applying Design Load: Apply air blast pressure and impulse over the appropriate tributary area that is carried by the fin or louver mullion.

1.4 SUBMITTALS

- A. Calculations: Provide calculations prepared by qualified blast consultant verifying that louvers meet specific blast resistance requirements detailed in this Section.
1. Prior to performing engineering calculations intended to address the blast loading identified, submit to the Owner's Blast Consultant for review a description of the technique(s) that will be employed to calculate the response of the system to the defined dynamic loading.
 2. Submit calculations to Owner's Blast Consultant for review prior to start of louver fabrication. Calculations shall include a summary of blast reaction forces to be resisted at all louver connection points by the supporting structure. The SEOR shall review these reaction forces to confirm the adequacy of the supporting structure.
 - a. Calculation package is to include a summary sheet briefly outlining the following:
 - 1) Evaluation criteria.
 - 2) Calculation assumptions.
 - 3) Table of results by type/location.
 - 4) Statement of Conformance with specification requirements.
 - 5) Blast calculations are to be appropriately keyed to the louver shop drawing and connection numbering scheme.
 - 6) Blast calculations are to be submitted at the same time as the related shop drawings.
 3. Submit analysis for louvers and connections. Submit engineering calculations to show that maximum rotation for all fins and secondary mullions does not exceed specified performance requirements under specified design load. These calculations must include, but may not be limited to, analysis of the following:
 - a. Louver Fins: Analyze all sections.
 - b. Louver Fin to Mullion Connections: Analyze all connections
 - c. Louver Mullion: Analyze all sections.
 - d. Louver Mullion to Structure Connections: Analyze all connections between framing, and between framing and the building structure.
 - e. Failure Modes: Provide analysis to illustrate that brittle modes of failure (such as shear, buckling and concrete pull-out) are avoided in all components of the system including connections.

4. Calculation submittal is to be stamped and signed by a registered Professional Engineer whose qualifications meet or exceed Quality Assurance criteria.

B. Certificates: Engineer's qualifications that meet or exceed Quality Assurance criteria: At a minimum, qualifications must list each project in which the Engineer performed analysis of louvers, the effective start and end dates of performance of the analysis and a reference.

1.5 QUALITY ASSURANCE

A. Provide products that meet the requirements of Physical Security Design Manual (PSDM) July 2007, for Veteran Affairs Mission Critical Facilities, Final Draft.

B. Engineer: Engage a licensed Engineering Professional acceptable to the owner to perform dynamic analysis of the Blast Resistant louvers. The Blast Engineer shall have a minimum of 5 years experience in blast resistant design and demonstrable experience designing blast resistant systems to comparable load requirements in the past 18 months.

C. DELIVERY, STORAGE, AND HANDLING

D. Deliver prefabricated units to Project as completely assembled units, ready for anchorage into supporting structure, and for interfacing with other work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Yield Strength: Provide supporting references that grade of steel or aluminum used is capable of achieving calculated ductility ratio.
1. The yield strength of framing members may be increased to account for dynamic strain rate effects as follows:
 - a. Structural Steel: For $f_y = 36$ ksi, the yield strength may be increased by a factor of 1.42. For $f_y = 46$ ksi, the yield strength may be increased by a factor of 1.31.
 - b. Structural Aluminum: The yield strength may be increased by a factor of 1.14.
 2. Section Modulus: The plastic section modulus may be used in dynamic design calculations.
 3. Built-up Sections: Design built-up sections using ultimate stress and strain compatibility approaches as defined by industry standards. If built-up section is analyzed as one unit, full shear stress transfer along the line of contact between the individual sections must be illustrated.

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