

## Design and Construction Standards

### Division 08 – Openings

#### General

In general, follow the guidelines below when designing, specifying and installing doors, hardware, or window systems. Unless specifically indicated otherwise, these guidelines are not intended to restrict or replace professional judgment.

1. All “Openings” in a building façade shall be designed with Energy Efficiency in mind, and at a minimum shall comply with the Michigan Energy Code. LEED Principals shall also be utilized where required by the University, or appropriate for the building design. The Professional shall include appropriate documentation and design calculations where necessary to achieve minimum ratings or design goals.
2. Where “labeled” windows, doors, or frames are required the labels shall be protected from paints, stains, or coatings.
3. Security and safety are a critical concern in building design and construction. To that end, the Professional shall coordinate all lock types and keying procedures with the EMU Project Manager and the Lock Shop prior to the completion of Construction Documents. When required by the Physical Plant (due to size or scope of project) the following Lock and Key meetings may be required during the course of the project:
  - a. Design Meeting with the Professional, EMU Project Manager, and EMU Lockshop. This meeting shall be held prior to the completion of Design Development documents.
  - b. Pre-Ordering Meeting with the Professional, Contractor, Hardware Supplier, EMU Project Manager and EMU Lockshop. This meeting shall be held as early as possible in the construction phase of the project to aid in reducing the ordering lead times:
    - i. Based on experience, lead times for ordering doors and hardware are often lengthy. The Contractor shall coordinate schedule and delivery of Doors and Hardware in order to achieve complete installation significantly prior to building (or project area) occupancy. The Contractor shall be encouraged to begin the ordering process as early in the project as practical in order to achieve a timely installation.
  - c. Pre-Installation Meeting with the Professional, Contractor, Hardware Supplier, EMU Project Manager and EMU Lockshop. This meeting shall be held prior to the installation of doors or hardware (frames may be installed during rough framing).
4. Submittals of Opening products shall include:
  - a. Schedules
  - b. Product Data (cut sheets)

- c. Inspection Report: Submit inspection report specified in 3.1.C.2. for locksets, exit devices, ADA special closers, door closers and all electrical hardware.
  - d. Product and Finish Samples:
    - i. Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample, if required, of each type of exposed hardware unit, finished as required and tagged with full description for coordination with schedule.
    - ii. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, may be used in the work, within limitations of keying coordination requirements.
  - e. Elevation and Wiring Drawings:
    - i. Submit elevation drawing showing relationship of all electrical and pneumatic hardware components to door and frame. Indicate number and gage of wires required. Indicate size of air tubing required. Indicate PSI requirements.
    - ii. Submit wiring drawing showing point-to-point wire hook up for all components.
  - f. Submit drawing showing point hookup of air tubing for all components.
    - i. Submit system operations descriptions for each type of opening; describe each possible condition.
  - g. Submit System Operation Description as part of the original hardware schedule submittal. Failure to include will result in the schedule being returned not reviewed and not approved.
5. Generally, aesthetic considerations are the prerogative of the architect. Consult with the Physical Plant concerning visual effects which do not correspond to general design features stated in this guideline.

### **Section 08 06 00 Schedules for Openings**

1. Refer to the Architectural / Engineering Standards for Design and Construction Documents for information regarding door, hardware, and window schedules.
2. In addition to the requirements of the EMU Architectural / Engineering Standards for Design and Construction Documents, provide the following minimum information as part of the Hardware Schedule:
  - a. Schedules shall be professionally prepared, typed copy, legible, and complete. Schedules submitted for review and approval shall be submitted with all attached cut-sheets in 8 ½" x 11" format.

- b. Preface sheet listing category only and manufacturer’s names of items being furnished as follows:

<b>CATEGORY</b>	<b>SPECIFIED</b>	<b>SCHEDULED</b>
Hardware Device	Manufacturer A	Manufacturer B
Hardware Device	Manufacturer X	Manufacturer X
Hardware Device	Open	Manufacturer Z

- c. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
  - d. Hardware Description: Quantity, category, product number, fasteners, and finish.
  - e. For all locking doors, the restricted keyway series.
  - f. Headings that refer to the specified Hardware Set Numbers.
  - g. Scheduling Sequence shown in Hardware Sets.
  - h. Product date of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
  - i. Riser drawings, wiring drawings and system operation description.
  - j. U.S. Standard Finish symbols or BHMA Finish symbols.
  - k. Manufacturer’s product data (cut sheets) for each type of hardware supplied.
3. Generally, follow guidelines established in Door & Hardware Institute Handbook” Sequence and Format for the “Hardware Schedule”, modified as described above.
  4. Final door hardware adjusting shall be performed after the facility’s HVAC system has been balanced and approved.
  5. Due to the critical nature of security and door hardware, it is imperative that the following process is utilized for the development of door and hardware schedules, and for the ordering and approval of selected hardware:
    - a. During design, a complete door and hardware schedule shall be developed and submitted for review and approval of the EMU Project Manager and the EMU Lockshop. This shall be performed prior to the completion of final Construction Documents.
    - b. The Door and Hardware supplier shall prepare shop drawing submittals for review and approval. This submittal shall include schedules for all doors, the identified hardware, and the lock type for each door. Both the Professional and the EMU Physical Plant will review the shop drawings prior to approval to proceed. This shall be done in conjunction with the Pre-Ordering Meeting.
    - c. The Contractor (and Sub-Contractor if required) shall request, in writing, to the EMU Lockshop for authority to purchase restricted keyways (cylinder cores). The type and manufacturer of the keyways used for the project will be as directed by the EMU Lockshop. This request shall include the project name, vendor name, lock housing type, master lock series, finish, quantities, and any pertinent information specifically related to the order. This shall be done in conjunction with the Pre-Ordering Meeting.

**Section 08 10 00      Doors and Frames**

1. Design parameters for door materials, types, and applications are generally under the purview of the Professional. Refer to the Design Standards for typical preferred door and hardware types by room / location.
2. ADA / Barrier Free Accessible Doors and Frames shall be designed, specified, and installed with the following characteristics:
  - a. For all Accessible doors, provide a flush panel of at least 12" in height at the bottom of doors to meet ADA requirements.
  - b. Minimum door slab width of 36"; however 42" width doors may be encouraged at exterior doors, or doors subject to heavy traffic. Provide automatic opening systems for Accessible exterior doors.
  - c. Fire separation doors in path of travel (e.g. corridors) shall be held-open with fire alarm disabled magnetic hold-opens. The Professional shall coordinate all associated trades.
  - d. At wood doors, provide kick or armor plates.

**Section 08 11 00      Metal Doors and Frames**

1. All hollow metal doors and frames shall comply with the Steel Door Institute (SDI).
2. Hollow Metal Doors and Frames shall be designed, specified, and installed with the following characteristics:
  - a. Exterior Doors shall have the following attributes:
    - i. Not less than 16-gauge, hot dipped zinc-coated steel sheets (Galvannealed) meeting ASTM A653, zinc-iron alloy-coated, with A60 coating.
    - ii. The top channel of each metal door shall be turned web up, to avoid a dirt pocket or moisture trap.
    - iii. Full glazed doors shall have 12-inch bottom rails.
    - iv. "High Frequency" hinge preparation and reinforcement is required.
  - b. Interior Doors shall have the following attributes:
    - i. Not less than 18-gauge metal.
    - ii. Full glazed doors shall have 12-inch bottom rails.
  - c. Access Doors shall have the following attributes:
    - i. Provide at all plumbing chases and in ceiling areas where code required, or otherwise needed for access for maintenance purposes. Coordinate all locations with Electrical, Plumbing and HVAC Contractors.
    - ii. Shall be metal, framed, painted to match adjacent surface, or pre-finished "white". Factory finish preferred when possible.
    - iii. Provide closers where required for fire codes.
    - iv. Access Door locks shall be coordinated with the Lock Shop prior to specification.

- d. Hollow Metal Frames shall have the following attributes:
  - i. Knock-down frames are generally prohibited; however, such frames may be used in movable partitions. In remodeling work, permission will be granted by the Physical Plant to use knock-down frames if conditions justify their use.
  - ii. Frames shall be one-piece, welded frames of not less than 16-gauge hot dipped zinc-coated steel sheets (Galvannealed) meeting ASTM A653, zinc-iron alloy coated, with A60 coating for interior doors
  - iii. Frames in interior walls through 8-inch thickness shall be full width of wall.
  - iv. Frames for exterior doors shall be one-piece, welded frames of 14-gauge or heavier metal. All entrance door frames shall be heavily reinforced at hinge, strike and closer locations for "High Frequency" use. Frames shall have a hot dipped zinc coating.
  - v. Frames shall be appropriately anchored to wall framing, including all reinforcing, anchors, clips, etc. High security rooms shall also have appropriate wall framing to support door frame.
- e. For information and standards for Aluminum Doors and Frames, refer to Section 08 40 00 Entrances, Storefronts, and Curtainwalls.

### **Section 08 14 00 Wood Doors**

1. Quality Standards - Either AWI or WDMA I.S.1-A should be referenced as the quality standard in the specifications. Reference the latest edition of whichever standard is used.
2. Wood Door Construction - In general, manufacturer's standard products are acceptable, provided they comply with the following requirements:
  - a. The University's standard interior wood door is solid core, of flush construction, and Custom grade. Consult with University Design Manager before specifying stile and rail doors or other construction grades.
  - b. All wood doors shall be at least 1 3/4" thick to accommodate mortise locks.
  - c. 5-ply cores are preferred, unless cost considerations are paramount, when either 5- or 7- ply will be acceptable. Consult with University Design Manager to determine appropriate quality level.
  - d. Veneers: Judicious selection of face veneers shall be exercised. The contractor shall be required to make a grain selection, prior to placing wood doors in the more prominent or public places, subject to the approval of the Professional. Wood doors in, or adjacent to, wood paneling will have veneers to match the paneling. Do not specify exotic grades of wood with potentially long lead times and significant upcharges.
  - e. Glazing: Refer to another Guideline Chapter "Glass and Glazing" for requirements related to glass. For fire doors with lites, fire-rated safety glazing is preferred to non-safety rated wire glass. Factory glazing should always be specified for fire-rated openings and is preferred for non-rated openings.

- f. Finish: Specify factory finishing for transparent finishes. Factory finishing of adjacent wood frames is recommended to maintain a consistent appearance. Opaque finishes may be field painted but should be factory primed. Specify Medium Density Overlay in lieu of wood veneers for opaque finishes.
  - g. Specify pre-fitting and pre-machining for all fire doors.
  - h. Specify a warranty period lasting the life of the door for flush wood interior doors. Do not design doors which will void the warranty because of oversized cutouts or insufficiently sized stiles and rails.
3. Fire Rated Wood Doors shall have the following attributes:
- a. Flush wood doors, or veneer, finish, and appearance to match other flush wood doors.
  - b. Label, appropriately affixed to the stile or head bearing the classification of fire rating.
  - c. Appropriate blocking and supports within the door located to receive and house door hardware, including but not limited to closers, locksets, hinges, and push bars.
  - d. Mineral Core Labeled doors are prohibited because the narrow rails and stiles are anticipated to reduce the service life and security of these doors.
4. Wood Frames shall be prohibited, except in architecturally significant applications, or renovations of existing buildings. These shall only be specified and installed with the authorization of the Physical Plant. Wood frames shall match finish and appearance of the wood doors.

### **Section 08 40 00 Entrances, Storefronts, and Curtainwalls**

1. Aluminum Doors, Frames, and Storefront applications shall be designed, specified, and installed with the following characteristics:
- a. Aluminum Entrance Doors shall have the following attributes:
    - i. Narrow stile and narrow top and bottom rail aluminum doors are prohibited.
    - ii. Dimensions of components shall be at least:
      - 1. Metal thickness - 1/8 inch
      - 2. Head rail size - 6-1/2 x 1-3/4 or 6 x 2 inches
      - 3. Stile size - 5-1/2 x 1-3/4 or 5 x 2 inches
      - 4. Bottom rail size - 12-1/2 x 1-3/4 or 12 x 2 inches
      - 5. Hardware reinforcement - 1/4 inch thick metal material
    - iii. Doors shall be fully glazed.
    - iv. Doors may have a mid-rail located at the center of the exit devise.
  - b. Aluminum Entrance Frames shall have the following attributes:
    - i. Dimensions of components shall be at least:
      - 1. Metal thickness - 1/8 inch
      - 2. Head size - 4-1/2 x 1-3/4 or 4 x 2 inches
      - 3. Jamb size - 4-1/2 x 1-3/4 or 4 x 2 inches
      - 4. Bottom rail size – 10 inch high minimum
      - 5. Hardware reinforcement - 1/4 inch thick metal material

- c. All aluminum shall be factory finished. Clear or bronze anodized shall be the typical finish, however other colors and finishes may be used with the authorization of the Physical Plant.
- d. Continuous hinges shall be used on all ADA applications.
- e. Concealed closers or panels are not permitted.
- f. All aluminum applications at exterior walls shall be thermally broken.
- g. All doors and frames shall accommodate insulated glazing. Refer to 08 80 00 Glazing for additional information.
- h. Refer to 08 50 00 Windows for information regarding aluminum frame windows.
- i. Acceptable manufacturers and models:
  - i. Special-Lite SL-450T and SL-600T
  - ii. Kawneer 500 Tuffline
  - iii. Equivalent by Tubeline

### **Section 08 50 00 Windows**

1. When practical or necessitated by the HVAC design, windows shall be provided with operable vent sections to obviate the need conditioned air. The same shall be true when the HVAC system requires windows without vents section.
2. All aluminum windows shall have a thermal barrier and be certified and labeled with AAMA certification.
3. Custom Windows: The following requirements shall be included in the specifications:
  - a. Performance Requirements: The manufacturer shall submit copies of reports of tests made on previously manufactured windows of the same type to be furnished for this project, made or witnessed by an independent testing laboratory and showing conformance to the following performance standards:
    - i. Air infiltration of an assembled sash and frame shall not exceed 0.15 cubic feet per minute, per foot of sash perimeter, when the window is subjected to a static pressure equivalent to a wind velocity of 50 miles per hour.
    - ii. There shall be no apparent water leakage to the interior side of the window when tested for fifteen minutes with water spray at a rate of five gallons per square foot per hour under a pressure equivalent to a wind velocity of 50 miles per hour.
    - iii. All aluminum windows shall have a thermal barrier and be certified and labeled with AAMA certification.
  - b. Window Glazing Method: Windows shall preferably be designed for glazing from inside only; for other methods of glazing, confer with the University Architect.
  - c. Design: Avoid sliding and double-hung sash; use hoppers and types with compression gaskets.

- d. **Guarantee:** Provide a written guarantee that all parts of the installation will meet specified performance requirements and will be free from defects in materials and workmanship for a period of five years following acceptance. Weather-stripping shall be guaranteed for a period of five years. Guarantee shall certify that all work is in accordance with the Contract Documents and shall contain a statement that, should any defects develop during the guarantee period, caused by improper workmanship or materials, such defects will be repaired or windows will be replaced at no expense to the University.
4. **Testing:** Field testing of non-standard installed windows may be required by the University.
5. **Clad Windows** (clad with vinyl or aluminum on the exterior) are shall be reviewed and discussed with the University for appropriate applications / locations prior to any use.

### **Section 08 60 00 Roof Windows and Skylights**

1. Skylights and Roof Windows are prohibited unless special permission is received from the Physical in writing. When utilized, they shall have the following characteristics:
  - a. At flat or low pitched roofs, they shall be set on a roof curb, fully flashed (similar to a HVAC unit) watertight. Curb height shall be a minimum of 6" above adjacent roof surface.
  - b. At pitched roofs, skylights shall be set on curbs per the manufacturer recommendations, single source or integral to the window unit, self-flashing. Provide all underlayment, Ice/Watershield, and counter-flashing for a watertight condition.
  - c. For all Skylights and Roof Windows, provide manufacturer's warranty for minimum of 5 years. Provide installers warranty for minimum of 10 years, including coverage of damage due to water infiltration.

### **Section 08 70 00 Hardware**

1. Security and safety are critical concerns for the University and while materials and manufacturers are generally performance based products, due to these security concerns, some hardware types shall be specifically required without exception. Any deviations shall be reviewed and approved by the Physical Plant, in writing, prior to completion of Construction Documents and/or installation.
2. The Hardware Supplier shall be an established firm dealing in contract building hardware. He must have an adequate inventory, qualified personnel on staff and be located within 100 miles of the project. Only domestic manufacturers are acceptable. The distributor must be a factory-authorized dealer for all materials required. Supplier shall be or have in employment an Architectural Hardware Consultant. (AHC)



3. As required in the “General” description above, design and construction meetings may be required as part of the project, specifically for the review of hardware:
  - a. Design Meeting: The Professional shall be responsible for reviewing and coordinating all door hardware prior to the completion of Construction Documents. This meeting shall include:
    - i. Prior to development of the Hardware Schedule, a Finish Hardware meeting will be held at the Physical Plant with the Professional, Professional’s hardware consultant, EMU Project Manager, and EMU Lockshop. If a Contractor and/or Hardware Supplier are already involved with the project at this point, they shall also be present.
    - ii. Purpose of the meeting is to review the contract documents’ hardware schedule requirements and will include, but not be limited to the following:
      1. Review specification requirements for hardware schedule, formats, hardware locations, opening descriptions, and other information specified.
      2. Review products specified versus products proposed.
      3. The Professional and/or Hardware Supplier shall distribute, at the meeting, samples of schedules from other projects of similar nature prepared by the same person as will prepare schedule for this project.
  - b. Pre-Ordering Meeting: The Professional shall be responsible for reviewing and coordinating all door hardware with the Contractor and Hardware Supplier prior to the ordering of hardware. This meeting shall include:
    - i. Prior to ordering Finish Hardware, a meeting will be held at the Physical Plant with the Professional, Professional’s hardware consultant, EMU Project Manager, EMU Lockshop, Contractor and Hardware Supplier.
    - ii. Purpose of the meeting is to review the contract documents’ hardware schedule requirements and will include, but not be limited to the following:
      1. Review specification requirements for hardware schedule, formats, hardware locations, opening descriptions, and other information specified.
      2. Review products specified versus products proposed.
      3. Hardware Supplier shall distribute, at the meeting, samples of schedules from other projects of similar nature prepared by the same person as will prepare schedule for this project.
    - iii. This meeting, and subsequent ordering of hardware shall be the responsibility of the Contractor, and shall be scheduled:
      1. In a timely fashion to facilitate receipt and installation of all hardware prior to project completion.
      2. As early as practical to decrease lead time issues.

3. To allow for the EMU Lockshop to perform pinning and keying of the cores prior to the project completion.
      - iv. Shop Drawings and Schedules shall be distributed no later than this meeting for review and approval. Prior to any ordering, shop drawing review for hardware shall be required by:
        1. Contractor
        2. Professional
        3. EMU Project Manager / EMU Lockshop
      - v. For restricted keyways, the EMU Lockshop shall prepare a written authorization for the Contractor / Hardware Supplier to purchase these keyways. This shall be provided only after the quantity, type, series, and finish of keyways has been determined at the Pre-Ordering Meeting.
    - c. Pre-Installation Meeting: The Contractor and Hardware Supplier shall be responsible for reviewing and coordinating all door hardware with the Professional and EMU Lockshop prior to the installation of hardware. This meeting shall include:
      - i. Before hardware installation, general contractor/construction manager shall request a hardware installation seminar to be conducted on the installation of hardware; specifically of
        1. locksets
        2. closers
        3. exit devices
        4. overhead stops
        5. coordinators.
      - ii. Manufacturer's representatives of the above products in conjunction with the hardware supplier for the project shall present the seminar. Seminar to be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors.
      - iii. Seminar to address proper coordination and installation of hardware, per finish hardware schedule for this specific project by using installation manuals, hardware schedule, templates, physical product samples and installation videos.
      - iv. When any electrical or pneumatic hardware is specified this meeting shall also include the following trades/installers: Electrical, Security, Alarm systems and Professional.
  4. Hardware Manufacturer shall be specified and installed with the following characteristics:
    - a. Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements. This requirement is mandatory whether various manufacturers listed or not.
    - b. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.



- iv. Constant Latching – wood doors
  - 1. Glynn-Johnson FB-60 Series
  - 2. University Approved Other Equal product of any B.H.M.A. member
- v. Manual – metal or wood doors:
  - 1. Glynn-Johnson FB6
  - 2. University Approved Other Equal product of any B.H.M.A. member
- vi. Dust proof strikes – furnish with all flush bolts, except at openings having thresholds:
  - 1. Glynn-Johnson DP2
  - 2. University Approved Other Equal product of any B.H.M.A. member
- c. Locksets and Latchsets – Mortise Type:
  - i. Schlage (L-9000 Series)
  - ii. Corbin Russwin ML2000
- d. Lock Trim Design:
  - i. Schlage 03 Lever
  - ii. Schlage 17-D Sparta Lever
  - iii. Schlage 06 Rhodes Lever
  - iv. Schlage 93 Lever
  - v. Corbin Russwin LWM
  - vi. Corbin Russwin NSM
  - vii. Corbin Russwin NSA
  - viii. Corbin Russwin LWA
- e. Roller Latches:
  - i. Ives RL30
  - ii. University Approved Other Equal product of any B.H.M.A. member
- f. Exit Devices shall be designed, specified, and installed with the following characteristics:
  - i. Exit devices shall be touchpad type. All exit devices shall incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width. Touchpad shall match exit device finish, and shall be stainless steel for US26, US26D, US28, US32 and US32D finishes.
  - ii. Fabricated of brass, bronze, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
  - iii. All latchbolts to be delatching type, with a self-lubricating coating to reduce wear. End-cap will have three-point attachment to door. Only compression springs will be used in devices, latches, and outside trims or controls.

- iv. Strikes shall be roller type and come complete with a locking plate to prevent movement.
- v. All exit devices shall have passed a 1 million (1,000,000) cycle test based on ANSI A156.3, 1994, Grade 1 test standards and certified by an independent testing lab.
- vi. Vertical rod panic bars of any type will NOT be accepted.
- vii. Preferred manufacturers for Exit Devices are as follows:
  - 1. Von Duprin 98/99 Series Rim panic bars
  - 2. No substitution unless approved by Eastern Michigan University.
- viii. Trim Standards 990 series;
  - 1. VD 990-NL pull trim
  - 2. VD 990-DT dummy trim
  - 3. VD 992-L lever trim
  - 4. VD 994-L breakaway trim
- g. Removable Mullion: Mullions shall only be removable via use of a building key.
  - i. Exterior aluminum door.
    - 1. Von Duprin 5754
    - 2. University Approved Other meeting specifications
  - ii. Interior/Exterior, hollow metal or wood.
    - 1. Von Duprin KR4954
    - 2. University Approved Other meeting specifications
  - iii. Interior Doors – U.L. listed.
    - 1. Von Duprin KR9954
    - 2. University Approved Other meeting specifications
- h. Push and Pull Hardware:
  - i. Push Plates – plain design, wrought 8 x 20 x .050 inches, square corners, beveled edges. If stile widths will not accept 8 inches, provide stile width less two inches.
  - ii. Push Bars – Rockwood RM 350
  - iii. Push Pull Units: One inch round rod
    - 1. Push: straight push bar
    - 2. Pull: 90 degree offset, 12 inch centers. Attach top post of pull back with latch site end of push bar, bottom post of pull and hinge stile end of push bar with end caps.
    - 3. Pull Plates – Plain design, 4 x 16 x .050 inches, square corners, beveled edges; 3/4 inch round rod, straight grip with 8 inch centers.
    - 4. Pull for Bifold Doors: 1/2" diameter, 8 inch centers.
    - 5. Wire Pulls: 5/16" diameter, 4 inch centers.
  - iv. Provide push and pull hardware from any member of B.H.M.A.
- i. Rod/Latch Guard:
  - i. Von Duprin RG-27 x US32D
  - ii. University Approved Other meeting specifications

- j. Coordinator – Frame Stop Mounted:
  - i. Door coordinator shall prevent the active door from closing before inactive door.
  - ii. Stop mounted channel 1-5/8" x 5/8" steel tubing x length to suite door opening.
  - iii. Furnish filler bars to fill gap between end of coordinator and inactive door frame. Furnish mounting brackets for all stop mounted hardware such as exit device strikes, door closers, PA shoes, etc.
  - iv. Coordinators shall be prepared (cutout) at the factory for surface applied or concealed vertical rod panic devices if required.
  - v. Manufacturer shall furnish with carry bar CB1.
    - 1. Glynn-Johnson COR x length to suit
    - 2. Door Controls, Inc. 600 Series
    - 3. Ives 900 Series
- k. Electric Strike:
  - i. Electric strikes shall provide remove release of latchbolts. They shall be designed for use with the type locks shown at each opening where required.
  - ii. They shall be UL listed as Burglary-resistant Electric Door Strikes, and where required shall be UL listed as electric strikes for fire doors or frames.
  - iii. Faceplates shall be stainless steel with finish as specified for each opening. The locking components shall be stainless steel to resist damage and abuse.
    - 1. Solenoids shall be of the continuous duty type for the voltage specified. Plug connectors will be furnished. Strikes shall have an adjustable backbox to compensate for misalignment of door and frame.
    - 2. Manufacturer:
      - a. Von Duprin 6000 Series
      - b. Folger Adams 310-4 and 712 Series
      - c. University Approved other meeting specifications
  - iv. Electric Power Transfer:
    - 1. Transfer power from door frame to edge of door. 10/24 gage wires, UL listed R4504.
    - 2. Manufacturer:
      - a. Von Duprin EPT 10
      - b. RCI R9507
      - c. University Approved other meeting specifications

- v. Closers:
1. Manufacturer:
    - a. LCN “Smoothie Series” Grade I only
    - b. No substitution without written University approval.
  2. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder. Cylinder body shall be 1 ½” in diameter, and double heat treated pinion shall be 11/16” in diameter with double D slab drive arm connection.
  3. Hydraulic fluid shall be of a type requiring no seasonal door closers adjustment for temperatures ranging from 120 degrees F to –30 degrees F.
  4. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
  5. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers.)
  6. All surface mounted mechanical closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory.
  7. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
  8. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
  9. LCN Series as listed in sets.
    - a. Size of Closers:
      - i. Sized in accordance with ANSI Standard A156.4 as shown in the applicable Table of Sizes listed in the current LCN General Catalog.
    - b. Closing power of sized closers shall be adjustable to increase closing power fifty 50% percent.
    - c. Closing power of non-sized cylinders shall be adjustable over a range of sizes.

10. Barrier Free Manual Closers:
  - a. All closers for openings that must meet the minimum requirements of the 1990 ADA act, in lieu of ANSI Standard A156.4, shall be sized in accordance with the applicable Reduced Opening Force table in the current LCN General Catalog.
  - b. All size 1 manual closers shall provide less than 5 pounds opening force on a 36" door leaf and delay closing time in accordance with the 1990 ADA requirements.
11. Combination Door Closers and Holders:
  - a. Provide closer/holders designed to hold the door in the open position under normal usage and to release and automatically close the door under fire conditions. Closer will include an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.
  - b. Where detailed, all closer/holders shall incorporate an integral smoke detector.
  - c. Where detailed, multi-point closer/holders shall incorporate a hold-open bypass feature from 0 deg. to either 80 deg. or 140 deg.
  - d. Where detailed, multi-point closer/holders shall provide a swing-free function with a no-drift feature.
  - e. Single point closer/holders shall be non-sized and incorporate adjustable hold-open force and test switch.
- vi. Electric Auto Operators:
  1. Shall be LCN Auto equalizer 4640 series. Actuators and Related Hardware shall be the 7910 & 7920 series, and must be Installed by factory authorized and trained distributor. No substitutions without written authorization from the Physical Plant.
  2. All electric auto operators shall be hard wired. R. F. operators are not permitted.
- vii. Overhead Holders and Stops:
  1. Type, function and fasteners must be same as Glynn-Johnson specified. Size per manufacturer's selector chart. Plastic end caps, hold open mechanisms and shock blocks are not allowed. End caps must be finished same as balance of unit.



2. Manufacture products using base material of Brass/Bronze for US3, US4, & US10B finished products and 300 Stainless Steel for US32 & US32D finished products.
  3. Manufacturer:
    - a. Glynn-Johnson
    - b. University Approved other meeting specifications
- viii. Trim Protector Bars:
1. Manufacturer:
    - a. Rockwood: R111LPB
    - b. University Approved other meeting specifications
- ix. Kick Plates:
1. Furnish .050 inches thick 10" high x door width less 1-1/2" at single doors, and less 1" at pairs. Where glass or louvers prevent this height, supply with height equal to height of bottom rail less
  2. Kick plates shall be drilled and counter sunk for oval head, counter sunk screws. Pan head not acceptable.
  3. Manufacturer: Any B.H.M.A. manufacturing product meeting standards is acceptable.
- x. Armor Plates:
1. Provide .050 inches thick 48" x door width less 3 inches. At exit devices provide height to bottom of exit device cases. At locksets, latchsets, or push pull latches, cut for rose or escutcheon. Bevel top edges of all plates. Drill and countersink screw holes in horizontal edges for oval head undercut screws.
- xi. Door Edgings:
1. Butted non-mortise type, .050 inches thick, same heights as armor plate, not cut out for hinges. If height interferes with lock or latch front or strikes, cut top of edging at bottom of front or strike. Make cutouts for bottom flush bolts. Provide for both hinge and latch edges.
- xii. Bumpers:
1. Manufacturer:
    - a. Ives: WS407CCV
    - b. B.H.M.A. L02101.
    - c. University Approved other meeting specifications
  2. Wrought, forged, or cast, approximately 2-1/2 inch diameter, convex or concave rubber center, concealed fasteners.

## xiii. Wall Stops:

1. Manufacturer:
  - a. Ives: FS438
  - b. Ives: FS495
  - c. B.H.M.A: L12011 or L12021.
  - d. University Approved other meeting specifications
2. Length to exceed projection of all other hardware.

## xiv. Floor Stops:

1. Manufacturer:
  - a. Ives: WS33
  - b. B.H.M.A. L02141, half dome.
  - c. University Approved other meeting specifications
2. Furnish height to suit undercut.

## xv. Wall Holders:

1. Products specified by series only; furnish strike length to exceed projection of all other hardware.
2. Wall holder must be adjustable to allow for doors on being 90 degree to wall.
3. Manufacturer:
  - a. Ives: WS40
  - b. Baldwin: 4466
  - c. University Approved other meeting specifications

## xvi. Thresholds:

1. Size: Size per door frame width as appropriate to opening size. Typically 1/4" high x 5" wide x length per opening.
2. Cope at jambs.
3. Furnish full wall opening width when frames are recessed
4. Cope in front of mullions if thresholds project beyond door faces.
5. Manufacturer:
  - a. National Guard 513
  - b. Zero 545
  - c. Reese 5405A
  - d. University Approved other meeting specifications

## xvii. Door Sweeps:

1. Surface Sweeps:
  - a. Manufacturer:
    - i. National Guard 600A
    - ii. Zero 98

- iii. Reese
  - iv. University Approved other meeting specifications
- xviii. Weather-stripping:
- 1. Apply to head and jamb stops.
  - 2. Manufacturer:
    - a. National Guard 700S
    - b. Reese 775
    - c. University Approved other meeting specifications
- xix. Meeting Stile Weather-stripping:
- 1. 2 piece nylon brush type to seal gap between pairs of doors
  - 2. Manufacturer:
    - a. National Guard 600 Series
    - b. Reese 964
    - c. University Approved other meeting specifications
- xx. Astragal:
- 1. Stainless steel, type 304, finish 2B 12 gauge 1-5/8 inch wide. Use #10 x 3/4" stainless steel sheet metal screws.
  - 2. Manufacturer:
    - a. National Guard 139SS
    - b. Reese 183SS
    - c. University Approved other meeting specifications
- xxi. Astragal, Sound
- 1. 1-5/8 aluminum housing with neoprene #6 stainless steel sheet metal screws.
  - 2. Manufacturer:
    - a. National Guard 109N
    - b. Reese DS79
    - c. University Approved other meeting specifications
- xxii. Lock Protector:
- 1. Lock protector shall eliminate gap between door and frame. No exposed fasteners on face of unit.
  - 2. Manufacturer:
    - a. Ives LG10
    - b. University Approved other meeting specifications
- xxiii. Magnetic Contacts:
- 1. Coordinate voltage requirements with electrical drawings and specifications

2. Manufacturer:
    - a. Von Duprin
    - b. University Approved other meeting specifications
- xxiv. Automatic Door Bottoms:
1. Surface: Provide UL approved at all fire doors
  2. Manufacturer:
    - a. National Guard 420
    - b. Zero 361
    - c. Reese 330
    - d. University Approved other meeting specifications
- xxv. Key Cabinet:
1. Manufacturer:
    - a. Telkee WC Series
    - b. No substitution without written University approval.
  2. Provide with a key loan record system, pre-indexed by Hardware Supplier or cylinder manufacturer representative who shall instruct Owner in usage and maintenance of key records.
  3. Verify quantity of keys with Physical Plant, but generally size for all keys as part of this project, plus 50% future expansion.
- xxvi. Miscellaneous Hardware:
1. Furnish items not categorized in the above descriptions but specified by Manufacturers names in Hardware Sets.
  2. Review all items with Physical Plant and Lock Shop prior to specifying.
- xxvii. Fasteners:
1. Furnish fasteners of the proper type, size, quantity, and finish.
  2. Fastener Type: Use appropriate fasteners per the hardware and materials of doors and frames.
    - a. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction.
    - b. Supply sex bolts for closers at lead-lined or UL listed wood doors only. Supply sex bolts when UL listing of wood doors requires them.
    - c. Furnish machine screws for attachment to reinforced hollow metal doors and frames and reinforced aluminum doors and frames.

- d. Furnish full thread wood screws for attachment to solid wood doors and frames.
  - e. "TEK" type screws are not acceptable.
7. Finishes:
- a. Finishes shall be selected as appropriate for the project. Match existing finish in renovations or comply with these standards for new or large scale projects.
  - b. Generally, Dull Chrome, US26D / BHMA 626.
  - c. Exit device touch-bars, push/pull bars, pull, push plates, kick plates, overhead holders and stops and wrought bumpers, Dull Stainless Steel, US32D / BHMA 630.
  - d. Continuous gear hinges, satin aluminum, clear anodized, US28 / BHMA 628.
  - e. Closers: Powder coated finish, color Aluminum BHMA 689.
  - f. Thresholds: Mill finish Aluminum x "SIA" finish.
  - g. Aluminum Doors:
    - i. Generally dull chrome, US26D
    - ii. Exit device touch-bars, push/pull, pull, push plates, kick plates, overhead holders and stops and wrought bumpers, Dull Stainless Steel, US32D.
    - iii. Closers: Powder coated finish, aluminum.
8. Templates and Hardware Location:
- a. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.
  - b. Furnish metal template to frame/door supplier for continuous hinge.
9. Cylinders Key Control and Keying:
- a. Contract Hardware Distributor shall meet with Architect and Owner to finalize keying requirements per meetings described elsewhere.
  - b. Provide temporary construction keying if desirable during construction period. Contractor is to furnish and install same, and later remove and return to the Distributor. Where Contractor has provided temporary keys, turn over to EMU a minimum of 12 copies of the master key accessing all temporary construction cores.
  - c. All cores and housings shall be Corbin Russwin products. The Keyway will be determined by Eastern Michigan University Lockshop. For ordering of keyways, the Contractor shall request in writing to EMU the hardware, series, and quantity of each type to be used. The EMU Lockshop shall in-turn review and prepare an authorization letter for the purchase of these restricted keyways.
  - d. Keying of permanent cylinders shall be arranged by Eastern Michigan University. The University Lockshop will perform keying and install cylinders in the final hardware. The Contractor shall install all hardware less the cylinder, and turn over all cylinders and key blanks to the Lockshop.
  - e. It is the responsibility of the General Contractor and Door Hardware Supplier to coordinate schedule with the Lockshop and ensure that an adequate timetable has been provided so that the EMU Lockshop can complete the keying and cylinder installation prior to the completion of the project.

**Section 08 80 00 Glazing**

1. Glazing for use at windows, doors, curtain walls, or other openings shall be appropriately selected with attributes based on location and application. Review all glazing selections with the Owner prior to specifying.
2. In general, glazing applications shall be designed, specified, and installed with the following characteristics:
  - a. Glazing at Fire Rated Assemblies:
    - i. Wired Glass: Wired glass is strongly discouraged, unless required by the University.
    - ii. Fire Rated Glass / Non-Wired: In lieu of the wired glass, where possible, use InfernoLite FRP 200 and 400 by Globe Amerada, PyroEdge and Pyrobel by Interedge Technologies, SuperLite I and SuperLite I-XL by SAFTI Division of O'Keefe's Inc. and FireLite and Pilkington Pyrostop by Technical Glass Products.
  - b. Laminated Glass: Glass for exterior aluminum doors shall be 1/4 inch thick laminated safety glass, or an approved equal.
  - c. Insulating Glass: The following paragraph shall be included in the specifications; edit the heading to apply to the particular type of glass specified.
  - d. Insulating And Reflective Insulating Glass, Guarantee: Provide manufacturer's written guarantee that, for ten years from date of building completion, a replacement will be provided for any unit which develops edge separation or other defects which materially obstruct vision through the glass or safety or affects the insulating qualities; except, that guarantee shall not cover glass breakage from physical abuse, earthquake, storm, or similar causes.
  - e. Partial shading of insulating glass can cause stress breakage. Manufacturers consider this to be a design error and will not replace glass broken by temperature differential stresses. Avoid partial shading of large panes.
  - f. Mirror Glass: Framed mirrors for toilet and shower rooms should be included in Division 10. Large mirrors unframed, or in custom made frames, should be included in this division.

**Section 08 90 00 Louvers and Vents**

1. Louvers and Vents for mechanical equipment, electrical equipment or similar shall be specified and designed appropriate for the opening required and the ventilation needed. Refer to the appropriate section for additional information.
2. For attic ventilation requirements (specifically in residential settings), provide code required calculations and vent areas. Roof venting applications shall be designed, specified, and installed with the following characteristics:
  - a. Soffit Vents: Continuous style venting is preferred, however regularly spaced venting intervals are acceptable with approval of the Physical Plant.

- b. Gable End Vents: Vents shall be appropriately sized and designed to maximize ventilation air travel. Designs should not allow for air to bypass main roof area and escape from another nearby vent.
  - c. Ridge Vents: Concealed type ridge vents, in conjunction with soffit vents are preferred.
- 3. Louvers and Vents at wall openings shall be of a finish to match other finish metals on the building. Where no other metals are present, metals shall be clear anodized aluminum or stainless steel.
- 4. Provide bird and insect screens at all louvers and vents with large openings.

**End of Division 08 – Openings**