DIVISION 08 00 00 - OPENINGS

081100 METAL DOORS AND FRAMES

A. Manufacturers that are members of the Steel Door Institute (SDI) 
   www.steeldoor.org/ are acceptable suppliers for University construction projects.

B. Follow the recommendations of the SDI for selection, preparation and installation 
   of metal doors and frames. Specify reinforcement plates for hinges, door closers, 
   locksets, and any special hardware in accordance with SDI recommendations.

C. Provide welded steel frames, constructed in accordance with SDI Classification for 
   Level 3 Extra Heavy Duty.
   1. Provide welded corners at steel frames.
   2. Knockdown frames (KD) may be used if the corners are field welded or when 
      approved by the UAO.
   3. Wrap-around frames are preferred to flush frames. Select frames made in 
   4. Grouting of frames in masonry walls is not required unless for fire label.
   5. Masonry Frame Anchors: Provide counter-sunk anchors and fill flush before 
      painting.

D. Comply with SDI Classification of Level 3 and Physical Performance Level A, Extra 
   heavy-duty, Model 2 – Seamless for flush doors. At the minimum, all doors shall 
   be 1-3/4 inches thick and have welded, seamless edges and smooth faces.

E. Provide hot-dipped galvanized doors and frames for exterior openings, in high 
   humidity areas, or wet locations. Provide foamed-in-place polyurethane cores for 
   doors and integral weather stripping (gasketted frame) installed in a kerf in the 
   frame. Fill exterior frames with non-expanding insulating foam like Hilti CF812.

F. Provide a permanently fastened metal label on fire doors and frames indicating the 
   fire-resistive rating. Stick-on labels are not acceptable.

G. Glazing: The preferred glass size is 3 inches wide by 33 inches high, located at 
   strike side of door. Use clear ceramic glass for all glazed openings complying with 
   ANSI Z97.1 and CPSC 16CFR1201. Install glazing beads at interior (room side) of 
   doors and frames. For remodeling projects, include replacement of wired glass 
   with new glass.

H. See Section 083100 for roof access doors and Section 087100 for Hardware.
I. Provide a side hinged exit door 3'-4" wide at loading docks.

**O81400 WOOD DOORS**

A. Acceptable manufacturers for supplying flush wood doors include:

   - Algoma Hardwoods, Inc.  www.algomahardwoods.com
   - Oshkosh Wood Door Company  www.oshkosdoor.com
   - Chappell Door Co.  www.chappelldoor.net
   - Eggers Industries  www.eggersindustries.com
   - Graham Manufacturing  www.grahamdoors.com
   - Marshfield Door Systems  www.marshfielddoors.com
   - VT Industries  www.vtindustries.com
   - Mohawk Flush Doors  www.mohawkdoors.com

B. Comply with Architectural Woodwork Institute (AWI) Quality Standards for Custom Grade (Section 1300) and with ANSI/WDMA Industry Standard I.S. 1-A-04, and Intertek/Warnock Hersey guidelines for positive pressure at labeled doors.

C. Specifiers need to be aware that “Premium Grade” doors have face veneer requirements that can significantly affect door costs. Refer to this comparison Chart: [https://www.wdma.com/Portals/0/technical/bulletins/WDMA_Tech_Bulletin-QSI-WDMA-AWS_Comparison(rev3).pdf](https://www.wdma.com/Portals/0/technical/bulletins/WDMA_Tech_Bulletin-QSI-WDMA-AWS_Comparison(rev3).pdf)

D. University Architect must approve the following:
   1. Doors over 7 feet high
   2. Transoms
   3. Stile and rail doors
   4. Veneers other than standard (Red Oak)
   5. Wood doors with opaque paint finishes
   6. Exterior wood doors
   7. Sliding or folding doors

E. Standard Door Construction:
   1. 3'-0" wide x 7'-0" high x 1 ¾" thick, flush door with plain sliced, book matched Red Oak veneer with matching hardwood stiles and rails.
   2. Provide 5-ply or 7-ply doors, with a face veneer, cross banding ply and a core, all securely bonded together utilizing type 1 (fully waterproof) adhesive.
   3. Specify factory preparation for hardware and factory finishing.
   4. Do not specify opaque or solid color paint finishes on wood doors.
   5. The preferred glass size is 3 inches wide by 33 inches high, located at strike
side of door.
6. Use clear ceramic glass for all glazed openings in fire doors and complying with ANSI Z97.1 and CPSC 16CFR1201.
7. Install glazing beads at interior (room side) of doors and frames.

F. Hardware (See also Section 087100):
1. Specify continuous hinges at high frequency swinging doors (entrances, corridors, main stairways).
2. Specify one lock block 5 inches by 12 inches for mortise locks and two such blocks for panic devices in a labeled door.
3. Use sex bolts for mounting closers.
4. Provide a coordinator at the top of the frame for doors with astragals. Use only metal astragals.
5. Do not specify mortised flush bolts or mortised rods in wood doors. Use surface mounted bolts or panic hardware on double doors.

G. Match wood frames and glazing stops with that of the door's face veneer.
083100 ACCESS DOORS AND PANELS

A. Roof Door Openings: Provide fiberglass reinforced flush panel doors with aluminum frames, threshold and continuous geared hinges for access to roof areas where exposed to weather. Hinge doors to swing out towards roof surface.
   1. Provide at mechanical rooms, penthouses, stairwells.
   2. See Division 070500 for roof hatches.

B. Specify closer with hold open arm and mortise lockset with key cylinder on interior (room side) with door always operable from the exterior.

C. Acceptable Manufacturers:
   1. Special-Lite, Inc. www.special-lite.com
   2. Corrim Company www.corrim.com
   3. Fib-R-Dor www.fibrdor.com
   4. Simon Door www.simondoor.com

D. Chase Access Doors: Provide wall access panels with cylinder core where exposed to view in restrooms, corridors and occupied rooms.
   1. Provide stainless steel finish at restrooms, custodian closets, food service areas, and exterior locations.
   2. Provide painted finish to match adjacent surfaces at other locations.
   3. Ceiling access panels and wall access panels located within custodian closets do not require a cylinder core.
   4. Verify with university locksmith for type of key cylinder cores.
084000 ALUMINUM ENTRANCES AND STOREFRONTS

A. Acceptable Manufacturers:
   1. Storefront Framing & Doors:
      Kawneer  www.kawneer.com
      U.S. Aluminum  www.crl-arch.com
      Wausau Metals  www.wausauwindow.com
      EFCO  www.efcocorp.com
      Vistawall Architectural Products  www.vistawall.ae
      YKK AP America, Inc  www.ykkap.com

   2. Exterior Aluminum Plank Flush Doors (Damage-Resistant):
      Cross Aluminum Products  www.crossaluminum.com
      Special-Lite, Inc.  www.special-lite.com

B. Design Standards – Building Entrances:
   1. Provide minimum 3'-4" wide doors at all exterior doors and at interior doors of
      airlocks.
   2. Specify wide stile (5") framed entrance doors with a center rail for entrances.
      Locate center rail at the same centerline as the panic device mounting height.
   3. Provide thermally broken framing and non-thermal (1-3/4" thick) doors.
   4. Fill space between exterior frames and wall with non-expanding insulating foam
      like Hilti CF812.
   5. Standard Finish: Clear anodized aluminum
   6. Glazing: Fully tempered insulated glass
   7. Side Lite Guards: Provide center rail at same height as door hardware
   8. See Section 087100 for hardware requirements.
   9. Coordinate with Division 28 and Safety, Security and Privacy Base Bid
      Standards.

C. University Architect must approve the following:
   1. Doors over 7 feet high
   2. Painted finishes or other than standard clear anodized finish
   3. Doors with "balanced" hardware are prohibited
   4. Exterior wood doors
   5. Sliding or folding doors

D. Full plate glass doors (no stiles or rails) are prohibited.
A. Window design will require review and approval by the University Architect’s Office. New buildings and replacement windows for existing construction are covered by this Standard.

B. The “Collegiate Gothic” style of architecture requires special detailing to provide windows that replicate the old style steel windows with glazing putty and muntins.
   1. Replacement windows for existing buildings shall have similar sight lines for frames, sash and muntins.
   2. IU Environmental Health and Safety will test existing perimeter sealants and glazing compounds for asbestos.

C. The following manufacturers can supply aluminum windows for replication of historic windows. Other manufacturers may be considered with approval of the UAO.
   1. Wausau Window and Wall Systems  www.wausauwindow.com
   2. EFCO  www.efcocorp.com
   3. Kawneer (Traco Windows)  www.kawneer.com
   5. Peerless Products  www.peerlessproducts.com

D. Windows shall have the following features:
   1. Thermally broken sash and frames
   2. Beveled frame and muntins to replicate putty-glazed windows or lead tape for decorative glass.
      a. Provide sight line of approximately 13/16 inch wide, with beveled frame
      b. Fasten muntins to sash to prevent twisting or movement.
      c. Muntins to “float” above the surface of the glass
      d. No “between the glass” muntins unless approved by the UAO.
   4. Hardware for out-swinging casement windows:
      a. Heavy-duty exposed hinges (no tri-bar hinges)
      b. Heavy-duty multi-point locking device (no cam locks)
      c. Single arm rotating crank operator with limit device
      d. Interior screens without wickets
   5. Hardware for single hung windows with balances:
      a. Cam locks at meeting rail
      b. Self-latching lifts at bottom sash
      c. Fixed upper sash (no double-hung windows)
d. Sash stops to limit size of opening  
e. Exterior half-screens  
6. Hardware for projected window sash:  
   a. Heavy-duty 4--bar hinges  
   b. Heavy-duty multi-point locking device.  
   c. Single arm rotating crank operator with limit device  
   d. Interior screens without wickets.  
7. Finish: 70% PVDF Coating (Kynar 500) complying with AAMA 2605  
10. Warranty: 10-year, materials and labor for windows and glazing.

E. Window design considerations  
1. Rounded or Arch-topped windows may eliminate some of the listed window manufacturers.  
2. Muntin design should result in similar sized divided lites at all windows.  
3. Maintain the same sight lines for fixed windows as for an operable window when viewed from the exterior.  
4. Maintain the appearance of double hung windows for fixed windows by recessing the lower sash at the meeting rail of fixed windows.  
5. Provide fully tempered glass at windows.  
6. Review selection of Tinted or Low-E coated glass with University Architect  
7. Specify interior removable stops for reglazing except when interior access to windows is blocked.  
8. Provide interior muntins with spacers at the insulated glass for VIP areas or rooms.  
9. Limit operable windows to the minimum required for access to roof areas, for emergency ventilation of the building, or for LEED certification.  
10. Detail sill end dams and flashing for windows on drawings and verify proper installation with sample or mock-up.  
11. Fill the gap between exterior frames and wall construction with non-expanding insulating foam like Hilti CF812.  
12. Provide operable windows (with maintenance key) for access to small roof areas.

F. Operation & Maintenance Manuals - Provide project specifics for glazing systems, including but not limited to: manufacturer’s warranties, shop drawings, installation photographs, and installer’s contact information, for each of the following:  
1. Glass curtain wall and skylight framing systems  
2. Entrance and storefront systems  

ARCHITECTURAL STANDARDS – DIVISION 8 – DOORS AND WINDOWS  
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3. Glazing and glazing material specifications
4. Spandrel panel specifications
5. Sealants and flashing
087100  DOOR HARDWARE

A. Door hardware schedules for each opening are required as part of the Contract Documents.
   1. Retain the services of an Architectural Hardware Consultant as part of the design team for Capital Projects to prepare the schedules.
   2. Manufacturer’s Representatives of listed hardware are familiar with these Standards and can provide advice to the hardware specifier.
   3. Coordinate a meeting between user representatives and IU locksmith for keying.
   4. Complete schedules are required at the 95% Construction Document submittal.
   5. See Division 28 – Electronic Safety and Security for coordination of door hardware of this Section with electronic security requirements. Report conflicts to the UAO Team Leader for resolution.

B. Key Cores and Keys:
   1. The IU Construction Manager will arrange a meeting between the building user representative and the university locksmith to determine key control and keying requirements.
   2. During the construction phase, it will be the responsibility of the Contractor to provide temporary construction lock cores for job site security.
   3. The university locksmith will coordinate with the lock core supplier on master keying of buildings.
   4. On all projects, the university's locksmith will install lock cores and cut the keys for distribution to building occupants.
   5. Specify a minimum of three blank keys for each lock core.
   6. At no time is the Contractor to furnish or possess lock cores, grand master, master, or door keys.
   7. Do not specify key cabinets for buildings.

C. Card Key Access Technologies (See Division 28)
   1. Support contact-less smart card readers using MIFARE DESFire EV1 standard.
   2. Solutions shall use secure data application areas on the card: reliance solely on Card Serial Number (CSN) verification is not sufficient.
   3. During transition to contact-less smart cards, provide multiple technology support (magnetic stripe, proximity and contact-less).
   4. Integrate with university Open Options DNA Fusion system except as follows:
      a. At IU Southeast campus, integrate with IUS’s Lenel System
      b. At IU Bloomington campus, Residential Programs and Services, integrate with CBORD CS Access.
      c. Provide conduit and pull boxes at all building entrances for future use. Verify size of conduit, routing of conduit, and locations.
D. Refer to the spreadsheet at the end of this Section for the various types of locking hardware in use on the different campuses.
   1. The University Architect’s Office may approve variations from the standard hardware listed below.
   2. Select hardware from the list of Acceptable Manufacturers.
   3. Preferred finish for hardware is Satin Chrome (US 26D/BHMA 626)

E. Acceptable Hardware Manufacturers:
   1. Hinges: Hagar, Ives, McKinney, Stanley
   2. Closers: LCN 4040 XP (no substitutions)
   3. Automatic Door Operators, LCN 4600 (no substitutions)
   4. Exit Devices, Von Duprin 98/99 series (no substitutions)
   5. Locks and Keying – Reference IU Campus Hardware Standards Matrix
   6. Door Holders/ Stops: Sargent, Ives, Rockwood, Architectural Builders Hardware
   7. Weather-stripping & Thresholds: Reese, Zero, National Guard, Pemko
   9. Automatic Flush Bolts: Ives, Rockwood
   10. Door Coordinators: Ives, Rockwood
   11. Door Silencers: Ives,
   12. Kickplates: Brookline, Rockwood, Ives
   13. Lock Protector: Ives,
   14. Continuous Gear Hinges: Roton, Ives, Select Products, Markar, McKinney, Pemko, Hagar, Stanley
   15. Removable Mullions: Von Duprin with key cylinder

F. Automatic Swinging Door Operators
   1. Refer to the Automatic Entry Door drawing for standard details and activator control layouts for automatic door operators. See appendix drawing at end of this section.
   2. The intent is that doors will operate only with a “knowing act” of pressing the push door actuator.
   3. Provide separate power circuit for the automatic door operator(s). The automatic door operator has a built-in transformer to provide low voltage power to the other devices.
   4. Show floor plan, elevations and details on the Contract Drawings as required for actual installation.
   5. Specify BEA’s “Body Guard” presence detector (www.beainc.com) at head of swing side of all automatic doors to prevent door from opening if an object or person is in the path of the door swing.
6. The automatic door actuators can be wall mounted, placed on a pedestal or installed in a guardrail as required by job conditions.
   a. Provide concealed low-voltage wiring to all wall mounted devices.
   b. Exterior devices shall be low-voltage wired to automatic door operator by means of a guardrail or underground from a pedestal
   c. Locate actuators at push side of door and a minimum of 6'-6" away from the swing side of a door.
   d. In some remodeling projects, RF (wireless) actuators may be used with permission from the UAO.

G. First Responder Emergency Access Requirements
   1. Locate the Owner-provided emergency key lock box (Knox Box) at main entrance or where required by IU Fire and Safety Officer.
   2. Provide Key cylinder and key core as directed by local Fire Department
   3. Connect Knox Boxes to the building security/fire alarm system to indicate tampering or opening of the box.
   4. Provide cylinder key core for FEO-K1 key at elevators. Refer to Division 14 - Elevators.

H. Hinges
   1. Provide continuous gear aluminum hinges at main entrance doors, air locks, and high-frequency use doors.
   2. Provide full mortise, ball bearing, hinges elsewhere
   3. Specify stainless steel or plated brass base metal hinges at exterior locations.
   4. Pivot hinges are prohibited.

I. Door Control
   1. Specify LCN “Cush-N-Stop” arms at entrance doors.
   2. Specify LCN “HCush” (hold open) arms at roof access doors and loading docks.
   3. Avoid floor stops; provide overhead arm stops.
   4. Floor closers or concealed overhead door closers are prohibited.

J. Locksets
   1. Refer to the spreadsheet at the end of this Section for preferred locks and functions at each campus.
   2. Comply with ADA requirements for mounting heights. Provide lever handle at all locksets.
   3. Provide mortise locksets with deadbolts at doors opening onto corridors, including all classrooms, offices, elevator, mechanical or electrical rooms. See UITS standards for locks at IDF rooms.
4. Provide classroom locks with thumb turns on the interior and with (locked/unlocked) indicators on the room side of the door.

5. Cylindrical locksets within office suites, coat closets, storage rooms, and similar low-security locations are acceptable.

6. Single use restrooms require (vacant/occupied) indicators on exterior side of door.

7. Multiple use restrooms may have push/pull hardware and a key deadbolt with an interior thumb turn. The thumb turn should only unlock the door, not lock the door.

K. Panic Devices
1. Provide push-pad panic devices.
2. Use rim devices at single doors or at double doors with removable mullions.
3. Use surface rods on wood doors.
4. Use concealed vertical cable devices (Von Duprin 3349 or 9949) for metal doors.
5. At locations with high probability of damage from pushcarts to surface rod devices, use “less bottom rod” or provide rod guards. Note that guards are not permitted on wood fire doors.
6. Provide panic devices with thumb turn locks on the interior and with (locked/unlocked) indicators on the room side of the door for rooms with 50 or more occupants. A 2SI conversion kit is available from Von Duprin.
### IU Campus Hardware Standards

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<td><strong>Office Function, W/Escutcheon</strong>&lt;br&gt;#45H 7 T 14J 626</td>
<td><strong>Building Entry Concealed Rod</strong>&lt;br&gt;Von Duprin 9949-L-NL-17</td>
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<td><strong>Passage Function, W/Rose</strong>&lt;br&gt;#ND10S SPA 626</td>
<td><strong>Office Function, W/Escutcheon and Visual Indicator</strong>&lt;br&gt;#45H-7-T-14-H-626-VIT</td>
<td><strong>Classroom Egress</strong>&lt;br&gt;Single Door CD-99L-NL-17&lt;br&gt;Double Door CD-9927L-NL-17&lt;br&gt;(CD not available for Fire Doors)</td>
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