DIVISION 08 OPENINGS

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Unless stated otherwise, the standards in this Facilities Design Manual (FDM) are directed to the Design Professional to incorporate into the Project.

Although the Owner encourages improved concept, method and product recommendations by the Design Professional, deviation from these standards, including product requests for "approved equivalent" status, requires written justification from the Design Professional and written approval from the Owner's Representative before completion of Design Development Documents.

Changes to this Section since the last issuance are indicated with yellow highlighted text.

Links to Support Documents, external webpages and other FDM sections are shown in underlined text.

08 00 00 OPENINGS

A. REFERENCE ABBREVIATIONS

1. ASTM — ASTM International (formerly in the USA: American Society for Testing and Materials)
2. AWS — Architectural Woodwork Standards
3. BHMA — Builders Hardware Manufacturers Association
4. EQ — Indoor Environmental Quality (LEED category)
5. LEED — Leadership in Energy and Environmental Design
6. MR — Materials and Resources (LEED category)
7. SDI — Steel Door Institute
8. WDMA — Window & Door Manufacturers Association

B. SUSTAINABLE DESIGN

1. Wherever possible, whether the Project is registered for LEED certification or not, specify local competitive products with attributes from LEED MR and EQ categories applicable to the Project.

08 09 00 INSPECTION AND TESTING OF DOOR SYSTEMS

A. REQUIRED SPECIFICATION SECTION

1. Create Specification Section 08 09 00 Inspection and Testing of Door Systems that includes the following required content (copied or paraphrased) applicable to the Project.

B. PART 1 GENERAL REQUIRED CONTENT

1. Section Includes
   a. Procedures for inspection and performance testing of door systems
2. Related Sections
   a. List Division 08 Sections relating to doors applicable to the Project.
   b. List access control sections applicable to the Project.
3. Performance Requirements
   a. Inspect, adjust, replace components of, and test each door system as needed to comply with performance requirements specified in this Section.
4. Submittals
   a. Submit to the Owner's Representative a certified complete list of door systems that comply with inspection, testing and performance requirements of this Section.
5. Coordination
   a. Coordinate with inspection and testing done by the Electronic Access Control System Contractor to ensure hardware is functioning properly.

C. PART 3 EXECUTION REQUIRED CONTENT

1. New Frame Inspection and Correction
   a. Verify new door frames are rigidly anchored and are not more than 1/16 inch out of level, plumb, planar alignment or member twist.
   b. If any parameter does not meet requirements, correct and re-inspect.
2. Existing Door and Frame Inspection and Correction
   a. For existing doors and frames included in the Work, operate the door and inspect head, jamb, meeting stiles and thresholds for evidence of binding, loose and poor-fitting hardware and door components.
   b. Adjust, tighten or replace hardware and door components as required for proper operation.
3. Final Inspection and Correction

a. At completion of the Project, verify frames, doors and hardware are installed as required by the Contract Documents and by approved changes during construction.

1) If noncompliant, correct and re-inspect.

b. Using key to operate lock cylinder, verify all lockset functions operate properly.

1) If any function does not perform properly, correct and re-inspect.

4. Final Door System Testing and Correction

a. After building environmental systems are operating as specified, conduct the following tests to ensure each completed door system will close and latch, or be properly secured, without assistance.

1) If a door system does not pass each test, correct and re-test.

b. Spring Hinge and Closer Tests (for doors so equipped)

1) Preparation

a) Adjust spring speed from 1.5 to 2 seconds when closing from 70 degrees to closed position.

b) Adjust closer speed from 5 to 6 seconds when closing from 90 degrees to 12 degrees.

c) Adjust closer power to the lowest value within the following ranges that consistently passes the following tests, measuring with a door force gage located 1 inch from latch edge of door.

(1) Interior non-fire doors

(a) Force required to push door to open position: not more than 5 pounds

(2) Interior fire doors, exterior doors, and manually operated low energy power operated doors

(a) Force required to unlatch door: not more than 15 pounds

(b) Force required to set door in motion: not more than 30 pounds

(c) Force required to push door to open position: not more than 15 pounds

2) Spring Hinge and Closer Full Open-to-Latch Test

a) Open door to full open position and release door.

3) Closer Half Open-to-Latch Test

a) Open door to half open position and release door.

4) Closer Barely Open-to-Latch Test

a) Open door to full open position and, while holding door, allow door to close until latch bolt barely touches strike lip, then release door.

b) Where magnetic locks are used, allow door to close until strike armature is within one inch of magnetic lock, then release door.

c. Spring Hinge and Closer Passing Test Results

1) Door shall completely close and fully latch.

2) If door has magnetic lock, armature shall completely bond to lock with bonding sensor indicating secure.

d. Low Energy Power Operated Door Test

1) Preparation

a) Adjust operator to comply with the following requirements.

(1) Door to begin in closed position and opened to backcheck or 80 degrees open position, whichever is encountered first, in more than 3 seconds.

(2) Door to remain open for 5 to 6 seconds.

(3) Door to close from 90 degrees to 10 degrees in 3 to 4 seconds.

(4) Force required to stop door from opening or closing: less than 15 pounds

2) Energize power operator and allow door to open and re-close.

e. Low Energy Power Operated Door Test Results

1) Door shall completely close and fully latch.

f. Latch Bolt Release Test

1) Measure force to release latch bolt using a door force gage located 1 inch from end of lever handle or located at center of exit device push pad.

g. Latch Bolt Release Passing Test Results

1) For interior fire doors and exterior doors, latch shall release when lever is subjected to a force not more than 15 pounds.

h. Latch Bolt Security Test

1) With door closed and fully secured, pull sharply on door in direction of swing.

2) For pairs of doors, pull sharply on active door in direction of swing while simultaneously pushing on inactive door.

i. Latch Bolt Security Passing Test Results

1) Door shall remain secure.

j. Latch Bolt Dead Latch Tests

1) With door closed and latched, insert dead latch test tool, engage latch bolt and pull sharply.

2) With door open and latch bolt and dead latch in view, hold dead latch in with finger and rapidly and intermittently push (rattle) latch bolt.

k. Latch Bolt Dead Latch Passing Test Results

1) Latch bolt shall not retract.

08 10 00 DOORS AND FRAMES

A. GENERAL

1. Select doors and frames to withstand abuse, high frequency use, and require minimal maintenance.
2. Design and locate doors and frames to accommodate persons with disabilities.
3. Where possible, sprinkler the building to reduce the use of fire-rated doors.
4. Specify positive pressure tested and labeled doors and frames where required by code.
5. Specify hollow metal doors to hazardous areas and where required fire ratings are more than 20 minutes.
6. Generally specify doors with glass lites except at private offices and high security areas.
   a. For doors used by persons in wheelchairs, specify the following glass lite locations.
      1) Bottom visible edge no higher than 43 inches above finished floor
      2) Top visible edge no lower than 68 inches above finish floor
   b. For doors with a glass lite in the upper portion of the door and an ISU standard exit device, specify the bottom visible edge of the glass lite at exactly 43 inches above finish floor.
7. Specify door sizes from 3 feet by 7 feet minimum to 7 feet 2 inches by 3 feet 8 inches maximum.
   a. Where space allows, specify doors wider than 3 feet for easier access by persons in wheelchairs.
8. Specify minimum 1-3/4 inch thickness.
9. For durability, do not specify a full height glass lite on high frequency use doors.
10. Design wide openings for dock areas and for laboratories to accommodate moving of oversize equipment.
    a. Openings To Maximum 4 Feet Wide
       1) A single door is highly preferred over using a pair of doors, especially if the pair is fire-rated.
       2) Size the door no wider than necessary to accommodate anticipated equipment.
    b. Openings Over 4 Feet Wide
       1) Specify pairs of doors with minimum 3 foot wide active leaf and minimum 1 foot wide inactive leaf.

a) Specify fire doors rated without astragals to avoid using coordinators wherever possible.

2) Specify overhead sectional or rolling doors where appropriate.

c. Except for closers, overhead stops and coordinators, do not specify glass lites or hardware that is visible on the face of inactive leaves of pairs of doors that have manual or self-latching flush bolts.

11. For equal size pairs of doors that require latching, specify minimum 3 feet wide leaves with the following choice of hardware.
    a. Vertical rod exit devices that latch into the frame head only, or into both frame head and floor.
    b. Rim exit devices that latch into a key-locking removable mullion.
12. Consult with the Owner's Representative before specifying folding doors, coil type doors, storm and/or screen doors, access doors, roof hatches, cold storage doors, sound isolation doors, power opened doors and other special use doors.
13. Specify complete door and frame submittals.
14. Specify that doors and frames not fabricated to within manufacturer tolerances be removed from the site and replaced at no cost to the Owner.
15. Specify that frames not installed within specified level, plumb, planar alignment and member twist be reinstalled or removed from the site and replaced at no cost to the Owner.

B. EXTERIOR DOORS AND FRAMES

1. Design doors hinged on the windward jamb wherever possible to minimize damage by wind.
2. Specify doors with full insulation, exit devices, closers, full weatherstrip and, where no overhang exists, drips at head and sweep.
3. Specify overhead doors with motorized operators, full insulation and weatherstrip.
4. Specify penthouse doors and roof hatches with full insulation and weatherstrip.
5. Specify entrance doors with electric latch retraction exit devices, latch monitor and door position monitor.
6. Specify selected entrance doors with power door operators for access by persons with disabilities.
    a. Consult with the Owner's Representative for specific security/access requirements.
    b. See also paragraphs under Section 28 10 00 in FDM Part 2/Div 28 Electronic Safety And Security.

C. METAL FRAMES

1. Hollow Metal Steel Frames
    a. General
        1) Specify joints welded and ground smooth.
        2) Specify factory installed reinforcing and preparation for specified hardware.
        3) Specify reinforcing as follows.
            a) Minimum 0.167 inch (7 gage) steel or equivalent thread depth for hinges
            b) Minimum 0.093 inch (12 gage) steel for closers and overhead hold-open/stop arms
            c) Minimum 0.067 inch (14 gage) steel for strikes and other hardware
        4) Specify frames with an integral slot for the frame manufacturer's weatherstrip or smoke seal.
        5) If frames are grouted, specify a frame manufacturer-approved protective coating applied to interior frame surfaces.
        6) Specify frames factory corrosion resistant primed.
        7) For exterior frames and for interior frames in moist environments, specify minimum A60 galvanized and factory primed.
            a) Specify frame manufacturer to provide written certification that frames are galvanized as specified before delivery.
            b) Specify field application of a zinc-rich primer to abrasions in the galvanized coating followed by complete coverage with a high performance coating.

b. Exterior Hollow Metal Steel Frames
    1) Specify minimum 0.067 inch (14 gage) steel.
    2) Specify extra reinforcement or use structural steel sections at dock areas.
    3) Specify thermal break design.
c. Interior Hollow Metal Steel Frames
    1) Specify minimum 0.053 inch (16-gage) steel.
    2) Specify 0.067 inch (14 gage) steel for doors over 3 feet by 7 feet 2 inches with high frequency use or subject to occasional impact.

2. Aluminum Frames
a. General
    1) Not recommended for high frequency use.
    2) Specify 2 inch minimum face by 4-1/2 inch minimum depth.
    3) Specify internal steel reinforcing around door openings.
    4) Specify anodized or high performance coating.
b. Exterior Aluminum Frames
    1) Specify thermal break design.

D. WOOD FRAMES

1. General
a. Recommended only for buildings of wood frame construction.
b. May be used in remodeling projects to match existing design.
    1) Discuss with the Owner's Representative.

2. Interior Wood Frames
a. Specify hardwood with transparent finish.
b. Specify for non-fire rated openings.
c. Specify prefabricated fire-rated frames only for low frequency use.

E. METAL DOORS

1. Hollow Metal Steel Doors
a. General
    1) Specify joints welded, filled and ground smooth.
    2) Specify factory installed reinforcing and preparation for specified hardware.
    3) Specify reinforcing as follows.
        a) Minimum 0.167 inch (7 gage) steel or equivalent thread depth for hinges.
        b) Minimum 0.167 inch (7 gage) steel for floor closers and pivots
        c) Minimum 0.093 inch (12 gage) steel for lock front, closers and overhead hold-open/stop arms
        d) Minimum 0.067 inch (14 gage) steel for other hardware
    4) For stile and rail doors, specify minimum 6 inch stile, head and center rail depth and minimum 10 inch bottom rail depth.
    5) Specify doors corrosion resistant factory primed and field painted with a high performance coating.
    6) For exterior doors and for interior doors in moist environments, specify minimum A60 galvanized and factory primed.

a) Specify door manufacturer to provide written certification that frames are galvanized as specified before delivery.

b) Specify field application of a zinc-rich primer to abrasions in the galvanized coating followed by complete coverage with a high performance coating.

c) Specify top welded flush, completely sealed and ground smooth.

d) Specify bottom provided with weep holes or equivalent to allow internal moisture to escape.

b. Exterior

1) Specify one of the following ANSI/SDI A250.8-2003 classifications as required by the Project.

a) Level 3, Physical Performance Level A, Extra Heavy-Duty 1-3/4 inch, Model 2 Seamless

b) Level 3, Physical Performance Level A, Extra Heavy-Duty 1-3/4 inch, Model 3 Stile and Rail

c) Level 4, Physical Performance Level A, Maximum-Duty 1-3/4 inch, Model 2 Seamless

2) Specify field painted with a high performance coating.

c. Interior

1) Specify one of the following ANSI/SDI A250.8-2003 classifications as required by the Project.

a) Level 2, Physical Performance Level B, Heavy-Duty 1-3/4 inch, Model 2 Seamless

b) Level 3, Physical Performance Level A, Extra Heavy-Duty 1-3/4 inch, Model 2 Seamless

c) Level 3, Physical Performance Level A, Extra Heavy-Duty 1-3/4 inch, Model 3 Stile and Rail

d) Level 4, Physical Performance Level A, Maximum-Duty 1-3/4 inch, Model 2 Seamless

2. Aluminum Doors

a. General

1) Specify only wide stile doors, not medium or narrow stile doors.

2) Specify all welded joints or mechanical joints held in compression by full width steel tie rods.

3) For durability, do not specify a full glass light unless divided with center rail.

4) Specify an anodized or high performance coating.

b. Exterior

1) Specify fully sealed joints, except for weep holes or equivalent at the bottom of the door to allow internal moisture to escape.

F. WOOD DOORS

1. Interior Wood doors

a. Recommended where 20-minute fire rating or no fire rating is required.

b. Wood fire doors of 1 hour or more fire rating may be used only if magnetically held open or used in locations of very infrequent use.

1) Specify equivalent to Algoma Superfire Door System with top rail and lock block options.

a) Specify bottom rail option if bottom vertical rod hardware is required for security.

c. Specify lifetime warranty.

d. If doors are specified field finished, specify top and bottom edges of doors completely sealed following Manufacturer's recommendations before installation.

e. Specify flush doors of Type 1 bonded structural composite lumber core 5-ply construction, faced with custom grade A plain sliced book matched hardwood veneer with matching hardwood edges and factory- or field-applied transparent finish.

1) Comply with AWS Section 9 SCLC-5 or equivalent standard by WDMA I.S. 1-A, latest editions.

2) Specify higher level grade AA veneer and grain match when required by the Building Program.

3) Following are acceptable manufacturers.

a) Algoma Hardwoods Inc, SCLC-5

http://www.algomahardwoods.com/pdf/SCLC.pdf

Warranty (page 5-6) http://www.algomahardwoods.com/pdf/AlGCAT_GEN7_8.pdf

b) Eggers Industries, SCL type
http://www.eggersindustries.com/Portals/0/Technical%20Information/Elevations/Solid%20Lumber%20Edge/382-SCL%20Core-Lumber%20Edge.pdf

Warranty http://www.eggersindustries.com/Portals/0/Technical%20Information/Warranty/278-DoorWarranty.pdf

c) Graham, GPD-EC (page 5)

http://www.grahamdoors.com/Other/Graham%20Doors/Documents/GPD%20Tech%20Data.pdf

Warranty ("Limited Lifetime"; for details, contact Customer Service) http://www.grahamdoor.com/

d) Marshfield DoorSystems, Signature LSL series

http://marshfielddoors.com/Signature_StructuralComposite.html

Warranty http://www.marshfielddoors.com/Full_Warranty.html

e) Oshkosh Door Company, GT5V (Product Data > GT5V) http://www.oshkoshdoor.com/

Warranty (Warranties and Guidelines > Full Door Warranty) http://www.oshkoshdoor.com/

f) VT Industries, 5508 http://www.vtindustries.com/images/cutsheets/7.pdf

Warranty http://www.vtindustries.com/doors/doorwarranty.pdf

4) Dimension flush doors with standard mortise lockset and glass lite no less than 8 inches from edge of door to edge of visible glass to maintain door strength.

a) Verify above acceptable manufacturer's mortise-to-glass cutout warranty exceptions to ensure lifetime warranty.

f. Specify stile and rail doors of Type 1 bonded structural composite lumber core construction, faced with custom grade A plain sliced book matched hardwood veneer with matching hardwood edges, factory standard core panels, and factory- or field-applied transparent finish.

1) Comply with AWS Section 9 or equivalent standard by WDMA I.S. 6-A, latest editions.

2) Specify higher level grade AA veneer and grain match when required by the Building Program.

3) Following are acceptable manufacturers.

a) Algoma Hardwoods Inc (pages 31 to 34) http://www.algomahardwoods.com/pdf/AlgomaDoors.pdf

Warranty (page 7-8) http://www.algomahardwoods.com/pdf/AlGCAT_GEN7_8.pdf

b) Eggers Industries, SCL type
http://www.eggersindustries.com/Portals/0/Technical%20Information/Brochures/Stile&Rail-201.pdf

Warranty http://www.eggersindustries.com/Portals/0/Technical%20Information/Warranty/278-DoorWarranty.pdf

c) The Maiman Company http://www.maiman.com/products/stile_rail_doors/index.php

Warranty (if lifetime warranted by Maiman)
http://www.maiman.com/Products/Stile_Rail_Doors/sr_warranty.php

2. Exterior Wood Doors

a. Recommended only for buildings of wood-framed construction.

b. Specify cut to exact size, machined for hardware and all surfaces sealed.

c. Specify all surfaces field painted with a high performance coating.

d. Specify minimum 2 year warranty.

G. COMPOSITE DOORS

1. Fiberglass Reinforced Polymer (FRP)

a. Use in corrosive environments where galvanized steel doors would deteriorate.

08 30 00 SPECIALTY DOORS AND FRAMES

A. COILING COUNTER DOORS

1. General
   a. Wherever possible, specify only in non-fire rated partitions.
      1) Specify manual push up operation for smaller size doors with easy access to operate.
   b. Specify powered operation for fire-rated doors and for non-fire rated large size doors or doors with difficult access to operate and test.
2. Non-Fire Rated
   a. Specify adjustable counterbalance mechanism for easy operation.
   b. Doors and frames may be steel, aluminum or wood.
3. Fire Rated
   a. Where use in fire rated partitions is unavoidable, specify steel doors that have the following features.
      1) Smoke and draft gaskets.
      2) Labeled door, frame and sill.
      3) Motor control that closes the door due to a general alarm or due to one or more detectors located on each side of the door in alarm.
      4) Battery backup to prevent door closing when power is interrupted
      5) Door automatically resets after the fire alarm is reset or power is restored
      6) Door reverses automatically when it slightly touches an obstruction.
   b. Specify the following acceptable product.
      1) Cookson FDO-B Auto-Test Fire Door System complete with Test-A-Fire control logic, battery backup and Featheredge sensing system (http://www.cooksondoor.com/pdfs/05FireBrochure.pdf).
      2) Approved Equivalent
   c. See also paragraphs under 28 31 00 P in FDM Part 2/Div 28 Electronic Safety And Security.pdf.

B. CLOSET DOORS

1. Specify swinging doors or, if space is not available, bypass sliding doors.
2. Specify heavy-duty hardware.

08 40 00 ENTRANCES, STOREFRONTS AND CURTAIN WALLS

A. ALUMINUM ENTRANCES AND STOREFRONTS

1. See 08 10 00C2 Aluminum Frames and 08 10 00E2 Aluminum Doors.

B. ALL-GLASS DOORS

1. Do not specify all-glass doors without written approval by the Owner's Representative.
   a. All-glass doors have proved to require more frequent adjustment, and be difficult to adjust and maintain in good working order because of excessive door weight and the type of hardware typically required for all-glass doors.
   b. The Owner's Representative will review the Design Professional's request to use all-glass doors with the Owner's door and hardware stakeholders.

08 50 00 WINDOWS

A. GENERAL

1. Specify submittals to show full size sections and glazing details.
2. Specify window supplier to provide all required hardware.

3. Specify windows to have factory-installed weather-strip.
4. Specify operable units in office locations where required by the Building Program.
5. For windows difficult to clean from the outside, specify windows that enable cleaning of both sides of the glass from inside the building using hardware operable only by maintenance personnel.
6. Specify windows with heavy or monumental sections except in residential or utility buildings.
7. Design to permit easy access for maintenance and repair.
8. Except for windows in residential type buildings, insect screens are not required.
    a. For residential window screens, specify non-corroding copper, aluminum or approved plastic.

B. MATERIAL AND FINISH

1. Specify aluminum or aluminum-clad windows and frames.
2. Specify aluminum with an anodized finish or a high performance coating.
3. Specify galvanized steel with high performance coating if windows are integral with steel doors and frames.

08 60 00 CLERESTORY WINDOWS AND SKYLIGHTS

A. GENERAL

1. Clerestory windows are preferred over skylights for control of day light.
2. Insulating panels that diffuse light are preferred over clear glass.
3. Avoid curved designs that are difficult to seal and expensive to repair or replace.
4. Design to permit easy access for maintenance and repair.

08 71 00 DOOR HARDWARE

A. GENERAL

1. Determine requirements of door of hardware and keying with users and the Owner's Representative during Design Development.
2. Specify heavy-duty hardware for all doors to minimize adjustment, maintenance and repair.
3. Include hardware in the base bid, not as an allowance.
4. Specify that the hardware supplier provide templates to door and frame suppliers.
5. Specify ISU standard hardware finishes as follows or, if not available, closely matching finishes.
    a. Primary Standard: BHMA 626 Satin Chrome Plated (US26D)
    b. Alternate Standard: BHMA 612 Satin Bronze (US10)
    c. Alternate Standard: BHMA 613 Satin Oil-Rubbed Bronze (US10B)
    d. Alternate Standard: BHMA 630 Satin Stainless Steel (US32D)
    e. Alternate Standard: Aluminum and Dark Bronze for exit devices, closers and minor hardware
6. Verify new and existing finishes with the Owner's Representative.
7. For exit devices, locksets, closers and slow-opening power door openers, specify the following requirements.
    a. Hardware installers to have a minimum of two years experience.
    b. Before installation begins, provide training to hardware installers on installation procedures and adjustments by a qualified hardware supplier or factory representative.
    c. During installation, provide a qualified hardware supplier or factory representative to be available on a reasonable demand basis to answer questions from hardware installers.
    d. Prior to Substantial Completion, provide a qualified hardware supplier or factory field representative to check hardware operation and, at that time, submit to the Contractor and Owner’s Representative a written report of work and adjustments that need correction.

8. For seals or weather strip in slotted aluminum extrusions installed vertically, specify seals to be fully supported or fixed in place to prevent slipping out of position.
9. Do not specify vinyl seals or weatherstrip.

B. HINGES

1. Specify heavy weight concealed bearing for high frequency use and standard weight concealed bearing for medium and low frequency use.
2. Specify flat style pins that are non removable for exterior and interior doors that swing out; otherwise specify non-rising pins.
3. Specify hinge to require no maintenance or lubrication.
4. Specify hinge guaranteed for life of building if installed per manufacturer's recommendations.
5. Specify concealed bearing hinges from the following manufacturers.
   a. The Stanley Works, CB series (http://www.stanleycommercialhardware.com/index.asp?MODE=SAH008)
   b. McKinney Products Co., TCA series (http://www.mckinneyhinge.com/catalog/; enter TCA in the search box)
   c. Bommer Industries Inc, LB5000 series (https://www.bommer.com/bh/Default.asp?MyPage=Architectural%20Grade%20Basic%20Hinges)
6. At 1 hour rated corridors, specify spring hinges on access doors to mechanical chases and at pairs of doors on inactive leafs with manual or constant-latching flush bolts.
7. For interior doors in dry locations, specify plated steel hinges.
8. For exterior doors and for interior doors in humid or wet locations, specify plated non-ferrous or stainless steel hinges.

C. EXIT DEVICES AND CYLINDERS

1. Specify Von Duprin 99 series or (alternate ISU standard) 98 series.
2. Specify the Owner will furnish cylinders required for locking exit devices and associated keyed switches.
3. Do not specify thumb piece operation.
4. Specify hardware that avoids use of coordinators and automatic flush bolts wherever possible.
5. Avoid specifying vertical rod devices wherever possible.
   a. Where vertical rod devices must be used, do not specify wood doors.
      1) Provide Von Duprin Model RG-27 guards to protect lower rods and bottom latch bolts of exposed vertical rod devices where frequent movement of supplies or equipment on carts is anticipated, or specify less bottom rod if security is not an issue.
      2) Attach top and bottom shoes of exposed vertical rod devices with through-bolts.
   b. Where concealed vertical rod devices must be used, specify Von Duprin 9948 or 9948-F.
6. For an interior door or an exterior door required to latch when unlocked, specify Von Duprin 996L Breakaway trim with #03 or #17 lever handle.
7. For an exterior door not required to latch when unlocked, specify Von Duprin 990 wide escutcheon with #696 (angular design) or #697 (tubular design) exterior pull, whichever best matches lever design used.
   a. Specify straight pulls, not offset.

D. LATCHSETS, LOCKSETS AND CYLINDERS

1. New Construction
   a. Specify Yale CRL8800 series (Carmel CR lever and CN escutcheon), or Yale PBL8800 series (Pacific Beach PB lever and CN escutcheon).
      1) See http://extranet.assaabloydss.com/library/catalogs/Yale/pdf/42002.pdf.
   b. Consult with the Owner's Representative to determine appropriate security/access control products.
2. Remodeling
   a. Match existing series and finish where possible.
   b. Specify lever handles.
3. Yale Latch and Lock Functions
   a. Specify 8807 function for offices, research laboratories and custodial closets.
   b. Specify 8808 function for classrooms and classroom laboratories.
   c. Specify 8805 function for mechanical and electrical spaces.
   d. Specify 8801, 8802, 8805, 8807, 8808, 8817-2, 8828, 8830-2, and 8847 functions where required; other functions may be used for special conditions.
   e. Verify desired hardware functions and keying requirements with users and discuss with the Owner's Representative.
4. Specify the Owner will furnish cylinders for locksets.
5. Where electrified mortise locksets are required, specify Yale 8891FL with the ITS (Integrated Total Security) monitoring option (http://extranet.assaabloydss.com/library/catalogs/Yale/pdf/42002.pdf, pages 25 and 27).
6. Specify finish and trim style to match non-electrified locksets.

E. KEYING AND CYLINDERS

1. Specify the Owner will create the keying schedule, and furnish cut keys and pinned cylinders for the Project.
2. At the beginning of Construction Documents Phase, be prepared to participate in discussing hardware, keying and Program Requirements with stakeholders at a meeting scheduled by the Owner’s Representative.
3. At least 30 working days before Construction Documents are completed, discuss keying related hardware information required for the Specifications with stakeholders at a meeting scheduled by the Owner’s Representative.
4. Specify the keying instruction will be addressed by the Owner during construction by one of the following guidelines as appropriate for the Project.
   a. For existing keying systems, allow the Owner’s Representative a minimum of 30 working days to develop the keying instruction.
   b. For new keying systems for large projects, allow the Owner’s Representative a minimum of 60 working days to develop the keying instruction.
5. Specify the Contractor install Owner-furnished pinned cylinders and cylinder rings concurrent with locksets and door keyed switches.
6. Specify the Owner will furnish temporary locks to the Contractor to secure the Project during construction.
7. For information on keyed switches for elevators, consult with the Owner’s Representative.
8. For information on securing audio-video equipment and other cabinets, consult with the Owner’s Representative.

F. MAGNETIC LOCKS

1. Do not specify magnetic locks for primary door security.
2. Limit the use of magnetic locks to sequentially controlling doors through an "air lock" to a laboratory space.

G. FLUSH BOLTS

1. Avoid specifying automatic flush bolts wherever possible.
2. Where constant-latching flush bolts must be used on fire rated wood doors, specify Ives FB61P or FB62 (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C5) or approved equivalent
3. Where constant latching flush bolts must be used on fire rated hollow metal doors, specify Ives FB51P or FB52 (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C4)or approved equivalent.
4. Where manual flush bolts must be used, specify as follows.
    a. For labeled wood doors, Ives FB358 (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C8) or approved equivalent.
    b. For labeled metal doors, Ives FB458 (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C10) or approved equivalent.
    c. For non-labeled doors, Ives 262 (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C6) or approved equivalent.

H. CLOSERS AND CLOSER/HOLDERS

1. Specify LCN 4041 Series (http://www.lcnclosers.com/prod_4000.asp > 4040/4040XP Catalog Information).
2. Specify minimum 10-year warranty.
3. Specify extra duty arms at main entrance doors and at high frequency and high abuse doors.
4. Where a push side mounted closer is required and a wall stop cannot be used, specify parallel mounted closer with a spring stop option instead of specifying a separate overhead stop.
5. Where manual closers cannot be adjusted to properly close the door and comply with code-required opening resistance requirements, install slow-opening power door operators.

I. ELECTROMAGNETIC HOLDERS AND CLOSER-HOLDERS

1. Where fire rated doors are held open and released when in alarm, specify wall-mounted electromagnetic holders wherever possible.
    a. Where there are walls to mount door holders, specify Rixon model 996, 997, or 998, or approved equivalent (http://extranet.assaabloydss.com/library/catalogs/RIXSON/pdf/9-Electromagnetic_Door_Holder.pdf, pages 202 to 203).
        1) Do not specify floor mounted electromagnetic holders.
    b. Where there are no walls to mount door holders and single-point integral closer-holders must be used, specify LCN 4040 SE closer-holders (http://www.lcnclosers.com/prod_fire.asp > 4040SE Catalog Information).
        1) Do not specify integrated smoke detector/closer-holders.
    c. Where a fire door is likely to be propped open by occupants for their convenience, consider specifying magnetic holding devices or closers with swing-free arms which permit closing of fire doors when the fire detection system is in alarm.
        1) Where doors are held open in multiple positions with a swing-free arm, specify LCN 4310ME closer-holders (http://www.lcnclosers.com/prod_fire.asp > 4310 ME Catalog Information).
2. Specify 24 VDC or 120 VAC power source as determined by discussion with the Owner's Representative.

J. OVERHEAD STOPS AND HOLDER/STOPS

1. Specify Glynn-Johnson 90 series (http://www.glynn-johnson.com/pdf/inst90_4.pdf) or approved equivalent captive track type overhead stop.
2. Avoid specifying concealed overhead stops.

K. STOPS

1. Specify wall bumpers wherever possible in preference over any other type of stop.
   a. Specify resilient round dome style.
   b. Specify backup framing in hollow walls to provide solid anchorage for wall bumpers.
2. Do not specify floor stops.

L. COORDINATORS

1. Consult with the Owner's Representative to discuss alternative solutions to using coordinators.
2. Where coordinators must be used, specify as follows.
   a. For doors requiring frequent coordinator operation, CORG series (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C14) or approved equivalent.
   b. For doors with coordinators rarely operated or doors magnetically held open, Ives COR series (http://professional.iveshardware.com/ > Literature > C - Flush Bolts & Coordinators, page C12) or approved equivalent.

M. PULLS

1. For non-latching push-pull doors, specify straight pulls, not offset.

N. KICK PLATES

1. Use on push side of doors, and especially on wood doors.
2. Specify 1/8 inch plastic with beveled edges or specify stainless steel in areas requiring frequent cleaning.
3. Specify kick plates 16 inches high by width of door less 2 inches.
4. Specify the bottom edge located flush with the bottom of the door.
5. Specify centered within the width of the door.

O. SMOKE SEALS

1. Specify clad cellular foam designed to fit the door frame kerf.
2. At frames or mullions without a kerf, specify a durable press-on seal of appropriate type and size for the application, installed strictly following manufacturer's instructions.
3. At meeting stiles of pairs of doors with no overlapping astragal, specify type of smoke seal recommended by the door manufacturer.

P. AUTOMATIC DOOR BOTTOM SEALS

1. To block light or sound, specify automatic door bottoms for doors of very low frequency use.
2. For higher frequency use doors, consider specifying a suitable low threshold and sweep combination.

Q. WEATHERSTRIP

1. Specify clad cellular foam designed to fit the door frame kerf or, if the door is aluminum, specify the door manufacturer's standard weatherstrip.
2. For locations that require a mechanically attached weatherstrip, specify the following small angled nylon brush type or the polyurethane bulb type, both with recessed stainless steel screw heads to help prevent snagging skin and clothing.
   a. Brush type: Reese 934 (http://www.reeseusa.com/pdf/REESE2005.pdf, page 33) or approved equivalent
   b. Bulb type: Reese 769 (http://www.reeseusa.com/pdf/REESE2005.pdf, page 23) or approved equivalent
3. Specify weatherstrip at interior vestibule doors.

R. ASTRAGALS AND SWEEPS

1. At astragal locations, specify Reese 964 or approved equivalent.
2. At sweep locations, specify Reese 967 or approved equivalent.

3. See http://www.reeseusa.com/pdf/REESE2005.pdf, page 32.

S. THRESHOLDS

1. At non-weather protected entrances, specify the following threshold which is maximum 1/2 inch high with low slope ramps each side.
   a. Reese S206A (http://www.reeseusa.com/pdf/REESE2005.pdf, page 8) or approved equivalent
2. At weather protected entrances, specify the following threshold which is 1/4 inch high with low slope ramps each side.
   a. Reese S406A (http://www.reeseusa.com/pdf/REESE2005.pdf, page 6) or approved equivalent

T. DRIPS

1. At entrances not protected by overhangs, specify both of the following extruded aluminum full width drips, one mounted on the head frame above the door and the other mounted on the door above the sweep.
   a. Head: Reese R201 or approved equivalent
   b. Sweep: Reese R199 or approved equivalent
      1) Alternative: Specify Reese 354 combination sweep and drip or approved equivalent.
   c. See http://www.reeseusa.com/pdf/REESE2005.pdf, page 42.

U. HARDWARE LOCATIONS

1. Specify hardware locations that comply with ANSI/SDI A250.8-2003, Table 5 – Hardware Locations, and the following standards.
   a. Hinges
      1) For the top hinge, specify the manufacturer's standard range of 7 inches to 10 inches from rabbet section of frame to centerline of hinge, but not more than the bottom hinge location dimension.
      2) For the bottom hinge, specify the manufacturer's standard range of 9 inches to 13 inches from end of frame to centerline of hinge, but not less than the top hinge location dimension.
      3) For the center hinge or hinges, specify centerline of hinge equally spaced between centerlines of top and bottom hinges.
   b. Latch/Locksets and Exit Devices
      1) Specify the centerline of strike for latchsets and locksets at 40-5/16 inches from the end of frame.
      2) Specify the centerline of exit devices as specified by the manufacturer but no more than 40-5/16 inches from end of frame and no less than 39 inches from the end of frame.

V. SLOW-OPENING POWER DOOR OPERATORS

1. For normal frequency, specify: Ditec Entrematic HA9-101-39
2. For very high frequency or increased durability is required, specify: Ditec Entrematic HA9-951C
3. Consult the Owner's Representative where power door operators must interface with security requirements to allow access of persons with disabilities when the building is locked.

08 74 00 ACCESS CONTROL HARDWARE

A. GENERAL

1. Address security and accessibility issues early in Design Development.
2. See FDM Part 2/Div 28 Electronic Safety And Security.pdf.

08 80 00 GLAZING

A. GLASS

1. Do not specify wired glass for hazardous locations.
2. Where increased security or sound isolation is desired, specify thick laminated glass.

3. For exterior locations, specify low-E insulating glass units with warm edge spacers.
4. Discuss specifying reflective or tinted glass or the use of exterior shading devices with the Owner's Representative.
    a. Specify standard colors and coatings that will likely be available in the future for glass replacement.
    b. Specify submittals to clearly indicate glass type, tint and coating with respective installation locations.

B. MIRRORS

1. For restrooms, specify one large mirror instead of small individual mirrors above lavatories.
    a. Locate the mirror bottom edge no higher than 40 inches above the floor.
2. Specify vandal resistant concealed mounting.
3. Discuss specific requirements in residence type buildings with the Owner's Representative.
4. Comply with Americans With Disabilities Act Accessibility Guidelines and the State Building Code.

08 91 00 LOUVERS AND VENTS

A. SCREENS

1. To help prevent bird nesting, specify screens attached to the exterior face of louvers and vents, or specify products with integral screens.
    a. Specify non-corroding copper, aluminum or approved plastic screen.

END OF DIVISION 08
OPENINGS