DIVISION 8 - OPENINGS

SECTION 081000 - HOLLOW METAL DOORS AND FRAMES

1. General Requirements: A/E shall specify that door and frame sizes and details conform to industry stock standards wherever possible. Custom sizing and detailing shall only be used to match existing conditions or as required for program needs. A/E shall consider the following University requirements in preparing the specifications:

   1.1. Frame Construction: Steel frame construction shall comply with Steel Door Institute NCA standards ANSI/SDI 100, Grade II Type level for interior applications, Grade III for exterior applications, and as modified below.

      1.1.1. The face width of steel frames for doors, transoms, sidelights and borrowed lights shall be standard 2 inches to permit economical and timely matching for remodeling in the future. Other frame sizes allowed shall match existing condition or as required for program needs.

      1.1.2. Minimum gauges for doorframes shall be 16 gauge for interior frames and 14 gauge for exterior frames. Exterior frames shall be galvanized.

      1.1.3. Frames shall be one-piece unit types. Frame units too large for shipment shall be fabricated with concealed splice connections for welded field assembly after factory pre-assembly.

      1.1.4. Removable glazing stops shall be applied with cadmium-plated or stainless steel, small-head Jackson screws. Removable stops shall be located on the secure side of controlled-access openings.

      1.1.5. Frames shall be accurately formed to specified profiles and assembled with hairline joints. Faces shall be mitered at corners. Rabbet, soffit, and stop joints shall be tightly closed miter or butt joints.

      1.1.6. Corners shall be completely back-welded. Exposed welds shall be ground smooth.

      1.1.7. The final assembly shall be square and true, with no evidence of welds on exposed faces.

   1.2. Frame Mortises and Reinforcement: Frames shall be mortised, reinforced, drilled and tapped for all mortise hardware using templates that the hardware supplier provides. Steel reinforcements, welded to frames, shall be provided as follows:

      1.2.1. Hinge and pivot reinforcement: 3/16 inch by 1-1/2 inches by 9 inches

      1.2.2. Closer and holder: 12 gauge by 14 inches by frame width

      1.2.3. Floor clips: 16 gauge by 3-1/2 inches

      1.2.4. Specify mortar-tight, full-enclosure steel cover boxes over all mortises.

      1.2.5. Rough bucks and head reinforcement shall be 12-gauge steel.

1.2.6. Three rubber silencers shall be provided at the strike jamb for all doorframes (GJ-64 or of equal make).

1.2.7. Secure 1-inch rigid foam insulation at the head of the frame at the closure mounting prior to filling the frame with mortar, so the closures can be installed and maintained.

1.3. Frame Anchors: A minimum of three anchors shall be provided at each jamb. The maximum spacing shall not exceed 2 inches to 6 inches on center. Masonry anchors shall be adjustable, 18 gauge. Jamb anchors for frames in steel stud partitions shall be welded to frames wired, and twisted for masonry.

2. Door Construction: A/E shall specify the following;

2.1. Interior door construction shall comply with ANSI/SDI 100, Grade II – Heavy Duty, Model 3 - Seamless Hollow Steel.

2.2. Exterior door construction shall comply with ANSI/SDI 100, Grade III – Extra Heavy Duty, Model 3 - Seamless Hollow hot-dipped A60 galvanized steel.

2.3. To control heat loss, cores of exterior doors that are not located in vestibules may be constructed with face sheets laminated to a foam core. Such doors shall comply with ANSI/SDI 100, Grade III – Extra Heavy Duty, Model 4 - Seamless Composite.

2.4. Specify flush watertight top closures for all exterior doors.

2.5. Specify that stops for glass and louver opening for security doors shall be removable from the interior face (secure side) only.

3. Door Mortises and Reinforcement:

3.1. Doors shall be specified as mortised, reinforced, drilled and tapped for all mortise hardware using templates that the hardware supplier provides.

3.2. Steel reinforcements, welded to door, shall be provided as follows:

3.2.1. Hinge and pivot reinforcement: 3/16 inch by 1-1/2 inches by 9 inches

3.2.2. Closer and holder: 12 gauge by 3-1/2 inches by 14 inches.

3.2.3. Provide reinforcements as required to receive surface applied hardware.

3.2.4. Frame Erection: A/E shall specify that;

3.2.4.1. Frames in concrete and masonry construction shall be filled solid with grout or concrete.

3.2.4.2. Anchors for frames in steel stud partition systems shall be screwed, bolted or welded to both flanges of studs.

3.2.4.3. Floor clips shall be attached to the floor with two bolts or power driven anchors per clip. Conceal exposed fasteners in frames.

END OF SECTION 081000

082000 - WOOD AND PLASTIC DOORS

1. General: A/E shall specify that door and frame sizes and details conform to industry stock standards wherever possible. Custom sizing and detailing shall only be used to match existing conditions or as required for program needs. A/E shall consider the following University requirements in preparing the specifications:
   1.1. PROHIBITED: Exterior wood doors for new construction.
   1.2. PROHIBITED: Mineral core wood veneer faced doors due to poor hardware anchorage.
   1.3. Wood doors shall comply with the Architectural Woodwork Institute (AWI) “Architectural Woodwork Quality Standards,” Current Edition, Section 1300 as follows:
   1.4. General: Use AWI Veneer Grade AA Grade A for transparent finish, and Veneer Grade AA Grade A for paint-grade opaque finish, PC 5 construction and Type I glue.
   1.5. Rated Doors: Doors for rated openings shall bear UL or Warnock-Hersey labels.
   1.6. All non-solid wood core doors shall have internal blocking for surface mounted hardware, 5-1/2 inches top blocking for closers, and 10 inches lock blocking for lock sets and exit devices.
   1.7. Specify additional blocking required for other surface-mounted hardware.
   1.8. Specify that wood doors that do not contain asbestos materials are to be permanently marked on the locking side edge with ¼ inch high letters "NON ACM." This labeling system will minimize the need for asbestos testing of mineral core doors. If there is no label, the University is required to test mineral core doors for asbestos, regardless of the date of installation.
   1.9. Edge bands: Stile edge bands of doors with a transparent finish shall match the face veneer. Doors to be painted shall have hardwood edge bands.
   1.10. Face veneers: Plain sliced red oak is the standard veneer for doors to receive a transparent finish. Birch or MDO are the standard veneers for doors to receive opaque finish.
   1.11. Finish: Doors for new buildings or for major remodeling projects shall be factory finished in compliance with AWI Architectural Woodwork Quality Standards, Current Edition, Section 1500, System #TR-6 for transparent and System OP-6 for opaque.
2. Warranty: Interior doors shall be covered by a warranty. The manufacturer and the contractor must sign the warranty, as well as agree to repair or replace doors that have warped, have telegraphed core construction in face veneers or have not conformed to tolerance limitations of referenced quality standards. All such repair and replacement shall be done at no cost to the University for the life of the installation.
3. Exterior doors shall be covered by the same warranty as interior doors for five years.

END OF SECTION 082000

SECTION 083050 - ACCESS DOORS

1. General: A/E shall specify that door and frame sizes and details conform to industry stock standards wherever possible. Custom sizing and detailing shall only be used to match existing conditions or as required for program needs. A/E shall consider the following University requirements in preparing the specifications:

2. Wall and ceiling access door installations shall be unobtrusive, and set flush with adjacent surfaces. Assemblies shall be manufactured with continuous welds, ground smooth, and include integral galvanized steel drywall or plaster beads. All wet locations shall be all stainless steel assemblies.
3. Materials:
    3.1.1. Door frames shall be 16 gauge (0.0598 steel - 0.0625 S.S.)
    3.1.2. Door panels shall be 14 gauge non-rated (0.0747 steel - 0.0781 S.S.) 20 gauge fire-rated (0.0359 steel - 0.0312 S.S.)
    3.1.3. Hinges shall have a 175-degree opening, and be non-rated with concealed spring hinges and removable pins. Hinges also shall be fire-rated with continuous piano hinge and stainless steel pins, including self-closing/self-latching devices.
    3.1.4. Locks shall be operated by flush key, and self-latching at rated assemblies.
    3.1.5. Provide one lock per door panel. They shall be able to be released from the interior without a key or a special tool. Specify Best cylinders.
    3.1.6. The University Key Shop shall direct specify how the locks are master-keyed. The A/E shall specify the quantity of locks on each access panel.
    3.1.7. Provide a finish on steel doors by baking with a primer that contains a rust inhibitor.
4. Galvanized steel doors shall have a Class C coating with phosphate treatment. Stainless steel shall have a No. 4 finish.

END OF SECTION 083050

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

1. General: A/E shall specify that door and frame sizes and details conform to industry stock standards wherever possible. Custom sizing and detailing shall only be used to match existing conditions or as required for program needs. A/E shall consider the following University requirements in preparing the specifications:
2. Entrance Types: Entrance doors and frames shall be heavy duty. Door stiles shall be a minimum of 4-inches wide. Bottom rails shall be a minimum of 10-inches high.

END OF SECTION 084113

085000 - METAL WINDOWS

1. General: A/E shall specify that window sizes and details conform to industry stock standards wherever possible. Custom sizing and detailing shall only be used to match existing conditions or as required for program needs. A/E shall consider the following University requirements in preparing the specifications:
2. Window Types:
    2.1. Operable windows shall be provided in all buildings especially those without central air conditioning.
    2.2. Specify operable windows with keyed sash locks for specific laboratory spaces particularly those labs with fume hoods.
    2.3. Windows and curtain wall systems shall facilitate window washing. For new construction, provide an exterior window washing system.
3. Window Materials: Window materials and curtain wall system materials shall be aluminum for minimal maintenance. See Division One – Historic Preservation for additional requirements.
4. Performance Standards:
    4.1. Window systems must be of thermally broken construction throughout.

4.2. Window and curtain wall systems shall meet the performance requirements of the American Architectural Manufacturers Association (AAMA) GS-001,"Voluntary Guide Specifications for Aluminum Architectural Windows.".

5. **S**ealant: Unless otherwise indicated for sealants required within fabricated window units, provide elastomeric type as recommended by window manufacturer for joint size and movement, to remain permanently elastic, non-shrinking and non-migrating.
6. Weather Protection: Provide means of drainage for water and condensation which may accumulate in members of window units.
7. Weather-stripping: Provide sliding weather-stripping for operating sash.
8. Insect Screens:
   1.1.1. Standard/Above grade fabric: 18 x 16 x 0.009 stainless steel mesh retained in screen frames with vinyl splines that permit easy replacement.
   1.1.2. Historic fabric: Bronze mesh retained in screen frames with vinyl splines that permit easy replacement. Frames: Extruded aluminum sections with corners mitered and crimped with corner gussets to match historic building patterns and profiles. Manufacturer's standard finish to match original design intent. See Division One - Historic Preservation for additional requirements.
   1.1.3. Standard Frames: Extruded aluminum sections with corners mitered and crimped with corner gussets. Manufacturer's standard finish to match window frame.
   1.1.4. At grade/vandal resistant fabric: Vandal resistant screens, fabric: 12 x 12 x 0.028 stainless steel security mesh retained in screen frames with ½", 90 degree bend at the edges to ensure tensile strength. Frames: Extruded security aluminum sections with corners mitered and crimped with corner gussets. Manufacturer's standard finish to match window frame.

8. Glazing and Caulking: To ensure single responsibility for performance, glazing and caulking of window and curtain wall systems shall be specified as part of the window installation.

9. Testing: The A/E shall specify window manufacturers that have had windows tested by an independent laboratory. As part of the submittal process, the university shall retain an independent testing laboratory to test units that are identical to those used on the project. The same testing shall be performed on 2 percent of window openings. The contractor shall be responsible for additional independent tests for each unit that does not pass the test the first time.

10. Warranty: The contractor/manufacturer/installer shall sign and furnish the university with a 10-year, written warranty for window systems from the date of Substantial Completion. The warranty shall state that the contractor/manufacturer/installer shall correct all deficiencies during the warranty period. The warranty shall cover removal and replacement of window systems, as well as labor for leaks, glass defects, hardware malfunctions, deterioration of finishes, and other deficiencies from defective materials and faulty workmanship, at no cost to the University.

END OF SECTION 085000

SECTION 086000 - WOOD AND PLASTIC WINDOWS

1. Wood Window Systems: A/E may specify metal clad wood window systems for use in hiostoric buildings or as required to meet the project program and location.
2. Plastic and fiberglass window systems are prohibited.
3. Wood Window Systems shall facilitate window washing. For existing structures, incorporate an operating or removable sash above the second story. For new construction, provide an exterior window washing system.

4. Refer to Insect Screens in Section 085000 for additional requirements.
5. Testing: The A/E shall specify window manufacturers that have had an independent laboratory test their windows. As part of the submittal process, the university shall retain an independent testing laboratory to test units that are identical to those used on the project. The same testing shall be performed on 2 percent of window openings. The contractor shall be responsible for additional independent testing for each unit that does not pass the test the first time.
6. Warranty: The contractor/manufacturer/installer shall be required to sign and furnish the University with a 10-year, written warranty for window systems from the date of Substantial Completion. The warranty shall state that the contractor/manufacturer/installer shall correct all deficiencies during the warranty period. The warranty shall cover removal and replacement of window systems, as well as labor for leaks, glass defects, hardware malfunctions, deterioration of finishes, and other deficiencies from defective materials and faulty workmanship, at no cost to the University.

END OF SECTION 086000

SECTION 087111 - DOOR HARDWARE

1. General Requirements: The A/E shall include the following general University requirements for the minimum level of quality for building hardware:
   1.1. Design, specify and incorporate hardware that functions properly and is suitable and compatible to details and surrounding conditions.
   1.2. Finish hardware shall be rated for heavy-duty institutional use.
   1.3. All products shall be manufactured in the United States. Specify single source responsibility: furnish products of only one manufacturer for each type of hardware.
   1.4. Electronic Hardware: Provide a description of functions for the intended use. Multiple functions are usually required. Example: Daytime Mode:Night Mode. See Division 28 requirements.
   1.5. The A/E shall specify in the contract documents that the contractor shall advise the A/E of any items that will not remain permanently anchored prior to furnishing hardware.
   1.6. The A/E shall employ a certified AHC to prepare hardware specifications and review submittals.

2. Lock Cylinders, Keying, and Key Control: Refer to Division 28 Electronic Safety And Security - Centrally Managed Electronic Access Control, Video Surveillance, And Intrusion Alarm Systems for additional requirements.

3. To maintain strict security controls within new construction and renovation projects, all cylinders, cores, and keys shall be supplied at a cost to the project by the Locksmith Services unit within the Department of Central Security, 2221 University Avenue S.E.., Suite 335 UOP, Minneapolis, MN 55414. (612) 624-1750.

4. Product type shall be determined based upon security design criteria and specified by the Department of Central Security, in agreement with the end user.

5. For new buildings, specify seven-pin BEST, KEYMARK, or MEDECO M3 cylinders with interchangeable cores, provided by the Department of Central Security's Locksmith Services unit.

6. Internal lock cylinder set screws are prohibited. The contractor shall pay for removing internal lock cylinder set screws that have been installed.

7. The Department of Central Security Locksmith Services shall participate in the Design Development phase of the project to determine keying systems, schedules, and costs.

8. The A/E shall set up a planning meeting three months before a building is occupied to review final keying schedules. Keying schedules shall be agreed upon by the Department of Central Security and the end user.

9. The preliminary planning meeting shall include the A/E, a representative from the primary building occupant(s) and representative(s) from the Department of Central Security's Locksmith Services unit.

10. A Central Security representative will install the cores. At the contractor's request, Central Security shall install a limited number of temporary cores and provide temporary keys during construction with the appropriate cost to the contractor.

11. The CPM representative shall request all university keys for the contractor from the Department of Central Security 48 hours in advance of needing them. The contractor shall be charged for any keys that are not returned to the University when the project is completed. The charge will equal the cost of replacing all locks and keys relevant to the key code for those locks. A bond shall be required for new construction with the amount based upon facility size. Bonds for renovation projects shall be reviewed on a case by case basis depending upon the size and scope of the project.

12. For security purposes, construction cores will be used in the absence of existing permanent cores. At the end of the project, permanent cores will replace all construction cores.

13. Rekeying of all exterior doors is required upon completion of installation and testing. Three emergency bypass keys shall be created and distributed as follows to:

    13.1. Building Manager,

    13.2. Fire Department Lock Box, and

    13.3. Building Systems Automation Center.

    No additional bypass keys shall be cut.

14. Key Safes. New construction shall incorporate space for an electronic KEYTRAK key safe. The KEYTRAK will house emergency and service keys for the facility, incorporating one Series 8000 HD SM Panel and one Bio-Metric 8000 Reader. Location and necessary protective measures shall be specified by the Department of Central Security.

15. Hinges:

    15.1. Hinge butts with plastic sleeve bushings and recessed pins are prohibited.

    15.2. Acceptable manufacturers are Bommer, Hager, McKinney and Stanley.

    15.3. Doors up to 7 feet, 6 inches high shall have three butts per leaf. Doors higher than 7 feet, 6 inches shall have four butts per leaf.

15.4. Hinge Sizes: 1-3/4 inch doors, butts shall be 4-1/2 inches by 4-1/2 inches minimum. Doors more than 36 inches wide and heavy doors shall have five inch or six inch high butts four, 4-1/2 inches, .180 butts. Hinges shall be wide enough to allow a door to swing fully open without striking the doorframe or adjacent wall.

15.5. Extra-heavy, stainless steel hinges with ball bearings and non-removable loose pins shall be used for exterior applications or where the hinges will be exposed to high humidity.

15.6. Wrought steel or stainless steel hinges with ball bearings and flat button tips with non-rising pins shall be used for interior applications. Provide hospital tips for healthcare facilities.

15.7. Provide ball bearing butts for heavy doors, exterior entrance doors, doors with closers and doors that are used frequently. Provide extra heavy duty, ball bearing butts for doors that are more than 36 inches wide.

15.8. Electric hinges: Refer to Division 27 Electronic Safety And Security - Centrally Managed Electronic Access Control, Video Surveillance, And Intrusion Alarm Systems for additional requirements.

16. Closers:

16.1. Pressure release valves are prohibited due to lack of safety.

16.2. Comply with ANSI A156.4-1994, Grade 1 Operational standard.

16.3. Barrier Free Capability: Provide fully adjustable sizing from 1-6. Comply with ADA and ANSI A117.1 requirements.

16.4. Acceptable Manufacturers and Products:

16.4.1. LCN: Series 4011/4111EDA

16.4.2. Norton: Series 7500/7500BF

16.4.3. Sargent: Series 281 (omit Pressure Relief Valve)

16.4.4. Yale: Series 4400/4400BF

16.5. The cylinder body shall be made of cast iron or cast aluminum.

16.6. The piston diameter shall be 1-1/2 inches.

16.7. The shaft diameter shall be 11/16 inch or greater with a full complement of bearings. The shaft shall be double-heat treated.

16.8. Provide a full rack and pinion mechanism with adjustable controls on sweep, latch and back-check speeds. Include a tamper-proof tool and an independent feature for adjusting the valve key.

17. Closer Arms:

17.1. PROHIBITED: Stamped arms.

17.2. Main arm and forearm shall be forged.

17.3. An extra heavy-duty parallel arm is required.

17.4. Hydraulic fluid shall be of flat viscosity and stable from 120 degrees F to - 30 degrees F. The fluid also shall meet the requirements of UL10C.

17.5. The powder coat finish shall exceed 100 hours of salt spray test.

17.6. The product shall carry a 10-year warranty for material replacement.

18. Closer Locations:

18.1. Labeled doors: When required by code

18.2. Exterior doors

18.3. Public toilet room doors

18.4. Heavily used doors that are normally closed

18.5. Other doors normally intended to be locked

19. Kick Plates and Armor Plates:

19.1. Specify a minimum 10-inch-high by 0.05-inch stainless steel kick plates on the stop side of doors with closers. Special height kick plates may be required in patient care areas of healthcare facilities.

19.2. Provide beveled edges where all four edges and fasteners are to be countersunk.

19.3. Stainless steel armor plates and door edgings may be required on doors that are subject to impact from food carts, stretchers or similar equipment.

20. Stops:

20.1. Review the placement of the floor stops with the University Facilities Management maintenance staff.

20.2. Specify stops to protect walls and doors.

20.3. Wall stops shall be concave or convex.

20.4. Specify blocking in stud walls for wall-mounted stops.

20.5. Where wall-mounted stops cannot be used, concealed overhead stops or closers with integral stops may be used.

21. Hold Open Devices: Hold open devices shall be wall-mounted and magnetic. Specify blocking in stud walls for wall-mounted hold open devices. Refer to Division 27 Electronic Safety And Security - Centrally Managed Electronic Access Control, Video Surveillance, And Intrusion Alarm Systems for additional requirements.

22. Finishes

23. Specify project finishes to meet program requirements and building contect. The following finishes are typical:

    23.1. Exterior Hinges: US32D (BHMA 630)

    23.2. Interior Hinges: US26D (BHMA 652)

    23.3. Flush Bolts: US26D (BHMA 626)

    23.4. Interior Locksets: US26D (BHMA 626)

    23.5. Exterior Locksets: US32D (BHMA 630)

    23.6. Exit Devices: US32D (BHMA 630), US26D (BHMA 626)

    23.7. Pulls, Push Plates/Bars: US32D (BHMA 630)

    23.8. Coordinators: USP on steel (BHMA 600)

    23.9. Closers: Powder Coat Aluminum (BHMA 689)

    23.10. Overhead Stops/Holders: US32D (BHMA 630)

    23.11. Kickplate: US32D (BHMA 630)

    23.12. Door Edge Guards: US32D (BHMA 630)

    23.13. Armor Plates: US32D (BHMA 630)

    23.14. Stops, Holders: US26D (BHMA 626)

    23.15. Thresholds: Mill on aluminum

    23.16. Miscellaneous: US26D on brass or bronze (BHMA 626)

    23.17. Satin Stainless Steel: US32D (BHMA 630)

    23.18. Satin Chromium Plated: US26D (BHMA 626)

    23.19. Match existing finishes that are predominate when remodeling.

    23.20. Special finishes will be required for historic buildings.

24. Schedule

24.1. Hardware groups: The A/E shall specify each item to be used in each opening.

24.2. The A/E shall employ a certified AHC to prepare hardware specifications and review submittals.

24.3. The doors and hardware at university facilities are subject to an inordinate level of high frequency use. Hence, the A/E shall specify which openings are considered heavy or of high frequency use. The A/E shall review conditions with University Facilities Management maintenance and operations staff.

24.4. The A/E shall provide in the applicable hardware group a written narrative of proposed functioning at openings with electronic controls or devices.

25. Special Consideration: In some cases, the differential air pressure can cause the closure function on doors to not function correctly. The A/E, AHC and mechanical engineer shall coordinate the design elements to ensure proper door function. END OF SECTION 087111

SECTION 087113 - AUTOMATIC DOOR OPERATORS

1. PROHIBITED: Touch-and-go operation.
2. Automatic door openers shall be low energy, swing type, electro-hydraulic or electro-mechanical units. The openers also shall have power open/spring close operation with hydraulic control features, enclosed in an aluminum cover. The unit manufacturer shall provide actuators. Openers shall be field adjustable.
3. Systems shall be hard-wired.
4. Acceptable Manufacturers:
   4.1. Besam
   4.2. LCN
   4.3. Gyro-tech
5. For safe maintenance, provide a means to disconnect electrical service to the power door operator directly adjacent to the power door operator.
6. Refer to Division 27 Electronic Safety And Security - Centrally Managed Electronic Access Control, Video Surveillance, And Intrusion Alarm Systems for additional requirements.

END OF SECTION 087113

088000 - GLASS AND GLAZING

1. Industry Standards: Glass sizes, glass types, glazing details and methods shall conform to the published recommendations of the glass manufacturer and the “Glazing Manual” and “Sealant Manual” of the Flat Glass Marketing Association. Each type of glass required shall be specified according to current ASTM standards.
2. Energy Conservation: Double-glazed insulating units with internal low-emission coatings and inert gas fill shall be used, except in non-insulated areas. Tinted glass and reflective glass shall be selected where appropriate to reduce energy use. Use of tinted glass in historic buildings is prohibited.
3. Glazing Compounds and Gaskets: Compounds, tapes and gasket materials shall have a minimum life expectancy of 20 years.
4. Warranty: A manufacturer’s signed warranty is required for insulating units. The warranty shall cover

replacement of units that are found defective within 10 years of the date of Substantial Completion.

Defects shall include failure of the hermetic seal, deterioration of internal glass coatings and other indications of seal failure or nonperformance, except where caused by breakage. Appearance of dirt, moisture, fogging or internal condensation at temperatures above -20 degrees F shall be considered conclusive evidence of defect. Replacement units shall be delivered to the project site without cost to the university.

END OF SECTION 088000