DIVISION 08 – OPENINGS

08 11 00 METAL DOORS AND FRAMES

A. Design Considerations

1. The design and specification of metal doors and frames must take into account security, accessibility, safety, durability, code compliance, maintainability, and sustainability. In the case of exterior openings, issues of weather tightness and energy efficiency arise. Fire rated doors and frames are critical components of egress and building compartmentalization strategies. In certain applications, doors provide important acoustical separation, isolating noise and protecting privacy.

2. The design professional is responsible for selecting appropriate materials, configurations, dimensions, finishes, anchorages, and all related operating components, to meet the demands placed on each door and frame in the project.

B. Special Documentation Requirements

1. Each and every door and frame set shall have a unique identifier. The drawings shall include a door schedule which lists every door opening, in order, according to the identifier. The schedule must have, at a minimum, the following information: Opening identifier (door number); door type (corresponding to elevation drawings of each type); door opening width and height; single leaf vs. pair; door thickness; door material; frame type (corresponding to elevation drawings of each frame type); frame material, reference keys to head, jamb, and sill details, fire rating, hardware group, and remarks/notes.

2. Drawings shall include elevations of all door type and frame types, frame profile details, and details for head, jamb, and sill configuration, along with any intermediate mullion profiles. These details shall be keyed in appropriate places on the frame type elevations.

3. Glass, when used in doors, transoms, or sidelights, shall be called out by type on door and/or frame elevations on the door sheet.

C. Materials and Methods of Construction

1. Exterior hollow metal doors and frames shall be constructed of not less than 16-gauge metallic coated steel (galvannealed, A60). Exterior doors shall be thermally rated, with insulating cores, and shall have a minimum measured operable R-value of 2.6, per ASTM C1363. Consider thermal break hollow metal frames where higher R-values are desirable.

2. Interior doors shall be constructed of not less than 18 gauge steel.

3. All hollow metal door frames shall be constructed of not less than 16 gauge steel.

08 14 00 WOOD DOORS

A. Design Considerations

1. The majority of interior doors at the University will be of solid-core wood construction, and they must be constructed to withstand daily heavy use. Wood doors are prohibited for exterior openings, except when replacement of existing doors on historical buildings requires wood doors.

B. Special Documentation Requirements

1. Documentation for wood doors shall follow the same requirements as stated in Section 08 11 00, Metal Doors and Windows.

C. Materials and Methods of Construction

1. The A/E shall select and specify the appropriate core material, based on the performance requirements, including fire rating, of the doors. Consultant shall be aware of the fire rating limitations of each of the core types: high-density particleboard, structural composite lumber, staved lumber, and mineral core.

2. Wood doors which are to receive clear finish, with or without stain, shall be factory finished and pre-machined for hardware.

3. Doors to rooms storing high-value items shall have solid doors without vision panels or sidelights.

4. The A/E must review door manufacturer list early in the process and receive approval from the Owner's Project Manager.

08 41 00 ENTRANCES AND STOREFRONTS

1. Aluminum doors shall have minimum 5" stiles, 5" stop rail and 10" bottom rail (wide stile doors).

2. All hardware, with the exception of cylinders, shall be provided and installed by the aluminum door manufacturer. Cylinders shall be provided under finish hardware section of the Specifications.

3. Hardware: The following hardware shall be provided (No substitutions except those indicated):

ITEM	MANUFACTURER	MODEL NO.
Hinge	Roton Continuous or Stanley	FBB-199 US32D
Closer	LCN	4041 x CUSH x Alum.
Panic Device	Von Duprin or Precision	99 x 996L (RHRB Door) 1103 x 17 (RHRB Door) 1102 x 17 (LHRB Door)
Mullion	Von Duprin	KR-4954-SP28
Threshold	Reese, or Approved Equal	

Weather-strip by door manufacturer

4. All finish hardware shall be supplied US26D, with the exception of door closers which shall be sprayed aluminum finish.

5. Overhead concealed door closers, floor closers, pivot hung doors and door manufacturer's pull trims are not acceptable.

6. Typical door schedule follows:
   A. Pair Aluminum Entry Doors:

      Each Leaf;
      1 - Hinge Roton 780-053HD X Alum.
      1 - Panic Device Von Duprin 99 X 996L X US26D
      1 - Door Closer LCN 4041 X CUSH X Alum.

      Per Pair;
      I - Removable Mullion KR-4956-SP28
      1 - Threshold Zero or Approved Equal.

B. Single Aluminum Entry Door

1 - Hinge Roton 780-053HD X Alum.
1 - Panic Device Von Duprin 99 X 996L X US26D
1 - Door Closer LCN 4041 X CUSH X Alum.
Threshold Zero or Approved Equal
Silencers GJ-64

08 50 00 WINDOWS

A. Design Considerations

1. Windows are a critically important part of the building envelope, and their size, placement, and detailing will impact building aesthetics, user comfort, and facility energy efficiency. Design effort must be commensurate with the window system's potential contributions to the overall success of the completed project.

2. Consider the following, at a minimum, in the design of window systems:

   Daylighting. In addition to providing views and a sense of connection to the outdoor environment, properly designed and placed windows can serve to reduce electric lighting demand. High windows, near the ceiling plane, arranged in continuous or nearly continuous rows, provide the best opportunity for interior daylighting. The potential is optimized with ceiling heights of 10 feet or more, and with open, transparent spaces arranged along north and south walls. Low sun angles on the east and west make solar control more difficult, so glazing should be minimized on these facades, if possible.

   Solar Control. Design window systems to balance considerations of daylighting and view with the need to control glare and solar heat gain. Proper orientation, glazing selection, and exterior and interior shading devices can all serve to mitigate the negative aspects of large amounts of glazing. Identical window configurations and glazing on all facades are to be avoided; rather, they should respond to the particulars of their orientation and interior functional and programmatic requirements.

   Ventilation. Some occupancies lend themselves to, and benefit from, natural ventilation via operable windows. Coordination with HVAC design, and integration with HVAC controls, can allow for natural ventilation while preventing excess demand on the

temperature and humidity control functions of building mechanical systems. Interlocks on operable windows can shut down HVAC operations in a specific zone or zones when windows are open. Such controls should be considered if designing University facilities with operable windows, particularly residential facilities.

Heat Loss. Window glass, metal frames and gaps at perimeters of operable sash and of window units all contribute to the loss of interior heat, and can result in drafts, condensation, and other issues of building performance and user comfort. Frame details, weatherstripping, glazing selection, and attention to perimeter detailing can all help to minimize heat loss at windows.

Maintenance and Cleaning. Incorporate features which will facilitate maintenance and cleaning of windows. Operable windows shall have robust operating hardware. Crank operators are prohibited. If feasible, operable windows which permit cleaning of both sides of the glass from the interior side are preferable.

B. Special Documentation Requirements

1. Specifications should follow the **"Performance Designation"** method. Include in the specification, at a minimum, the following required values:

    a. **Performance grade** and **performance class** (per AAMA/WDMA), selected for the calculated (by the A/E) *maximum* design wind pressures, negative and positive, for the largest window size in the project. Typically, the highest design pressures will occur at the corners of the building and the highest story. For the majority of construction at the University, **CW** and **AW** will be the appropriate Performance Classes. Performance Grades will vary from project to project, based on the calculated maximum design wind pressures.

    b. **Condensation-Resistance Factor (CRF),** coordinated with design indoor humidity levels, assuming 0 degree F outdoor temperature with 15 mile per hour wind, and 70 degree F indoor design temperature. Except for special situations, where wintertime indoor relative humidity will exceed 25%, consider 52 to be a suitable CRF.

c. **Solar Heat Gain Coefficient (SHGC),** whole window value per NFRC, 0.34 to 0.39, unless a higher value can be justified by a specific, detailed passive solar heating strategy. The sum of the products of window area times SHGC for the north and south facades should be greater than the sum of the products of window area times SHGC for the east and west facades. It may be prudent to specify windows with different SHGC values for different exposures, together with solar shading devices.

d. **Thermal Transmittance.** Select windows with a whole window "U" factor of 0.50 or less, per NFRC 102.

2. Specifying by Performance Class and Grade does not absolve the A/E of responsibility for naming specific window manufacturers and models, and verifying that these products comply in all regards with the requirements of the specification.

3. Identify all window types on building elevation drawings. Provide larger scale window elevation drawings with all window unit dimensions, glass types, detail keys, and window operation, if applicable. Identify frame materials.

4. Provide detail drawings of window heads, jambs, and sills, intermediate mullions (vertical and horizontal), and operating sash heads, jambs, and sills. Draw details at a scale of 3" = 1'-0" or larger, to allow for a clear depiction of flashings in their respective positions relative to interfacing materials and systems. Show anchoring methods, sealants, air barriers, lintels, blocking and framing. Be aware of window system weep hole locations when locating sealant. Ensure that sealant occurs inboard of weep hole, so that water can freely drain to the building exterior.

5. Drawings must include basic wind speed, exposure class, building height, importance factor, internal pressure coefficient and design wind pressure.

C. Materials and Methods of Construction

1. Aluminum windows shall be AAMA certified and labeled. Aluminum framing members shall be anodized (Architectural Class I) per AAMA 611, or finished with a minimum 70% Hylar/Kynar fluoropolymer (polyvinylidene fluoride, or PVDF), AAMA 2605 coating. Specify a minimum 20-year finish warranty for the painted finish, and a 10-year warranty for anodized finishes

2. All aluminum window framing shall feature a thermal break, to eliminate the direct thermal path between the interior and exterior portions of the members. This break can take the form of a structural polyurethane "poured and debridged" system, or utilize glass-reinforced polyamide inserts ("thermal struts") which have been rolled or crimped into knurled cavities in the members. These thermal breaks shall be tested in accordance with AAMA 505 and AAMA TIR-A8.

3. A/E shall coordinate with the Office of Design and Construction Technology to determine the need for test of a representative sample of windows, on a project-by-project basis. Testing shall be in accordance with AAMA 502, Test Method B.

4. Insulating glass units shall be warranted against seal failure for a period of ten (10) years. Window units, including glazing, shall be warranted against failure of materials or workmanship for a period of ten (10) years. Warranty shall be non-prorated, and shall include on-site labor to repair, correct or replace units which exhibit any of the following: **(Failure to meet specified performance requirements, in general.):**

    a. Water infiltration;

    b. Excessive air infiltration or condensation;

    c. Excessive deflection;

    d. Deterioration of metal finish in excess of normal weathering;

    e. Defects in accessories, weatherstripping and other components of the work.

5. Insulating glass units shall feature warm-edge spacer technology, and be gas filled (IGCC certified for argon).

6. Exterior sills at all windows and clerestory units shall be designed to provide a 15 degree slope (minimum) to drain water away from the window frame.

08 56 56 SECURITY WINDOW SCREENS

1. All first floor and fire escape windows on dormitory buildings shall be equipped with "Security Shield" security screen as manufactured by "Exeter" in Wyoming, PA. 18644 or approved equal.

08 60 00 ROOF WINDOWS AND SKYLIGHTS

A. Design Considerations

1. Skylights should be avoided. Specific written permission for the use of skylights must be obtained from the Department of Planning, Development, and Design. Vertically glazed roof monitors can be an alternate means of providing top light, without some of the issues presented by skylights. If permitted, skylights shall address issues of solar heat gain (and heat loss in cold weather), glare, glass breakage, drainage to the exterior of condensation and water infiltration, and fall protection.

    a. Upon approval of the Department of Planning, Development, and Design, the A/E shall ensure that that skylight design incorporates screening that complies with 29 CFR 1910.23 (e) (8), or railings complying with 29 CFR 1910.23 (e) (1). Fall arrest systems (harnesses and anchoring points) are not an appropriate method of providing fall protection for skylights.

    a. The A/E may request a waiver from the screening and railing requirement cited above provided they submit test reports and a signed certification statement to the University Architect and REHS indicating that the specified product meets or exceeds OSHA's criteria in 29 CFR 1910.23 € (8). Upon receipt and approval of this documentation, a copy shall be maintained in the project files.

B. Special Documentation Requirements

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C. Materials and Methods of Construction

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08 71 00 HARDWARE

1. Specifying hardware by allowance is prohibited. Hardware sets shall be developed for each unique condition for the building.

2. The New Jersey Uniform Construction Code, Barrier Free Subcode requires that door handles be easily grasped by handicapped persons. This necessitates lever handles on virtually all doors in University buildings.

3. Delayed egress devices are prohibited unless approved in writing by the Office of Design and Construction Technology and the Construction Code Official, for the specific application and location.

4. Typical Door Schedules are as follows:

A.. Non-Public Toilet:
1-1/2 pr. Butts
1 - Stanley FBB179 X US26D
1 - Privacy Set Schlage L9040 LX03 X US26D
1 - Door Closer LCN 4041 X Alum.
Silencers GJ-64

B. Storage Room, Custodial Closets
Note: Same set shall apply to Mechanical and Electrical Rooms. However, lever trim shall not be used (knurled knob trim required).
1-1/2 pr. Butts Stanley FBB179 X US26D
1 Lockset Schlage L9080 LX03 X US26D
Silencers GJ-64

C. Office Doors
1-1/2 pr. Butts Stanley FBB179 X US26D
1 Lockset Schlage L9050 LX03 X US26D
1 Door Closer LCN 4041 X Alum. (optional)
Silencers GJ-64

D. Public Toilet
1-1/2 pr. Butts Stanley FBB179 X US26D
1 - Lockset Yale 313ST X US26S
1 Pull Plate Rockwood or approved equal
1 Push Plate Rockwood or approved equal
I Kickplate Rockwood or approved equal
1 Mop Plate Rockwood or approved equal
I Closer LCN 4041
Silencers GJ-64

E. Classrooms, Laboratories

1-1/2PR. Butts Stanley FBB179 X US26D
1 - Lockset Schlage L9056L X 03 X US26D
1 - Closer LCN 4041 (optional)
Silencers GJ-64

NOTE: When panic or fire exit hardware is required due to occupant load, provide Von Duprin 99L-2SI (double cylinder, security indicator).

5. Hardware: The following hardware for the types of buildings indicated shall be provided (No substitutes except those indicated in the table on the next page).

ITEM	MANUFACTURER	MODEL NO. ACADEMIC BUILDINGS	MODEL NO. HOUSING FACILITIES
Butts (Int.)	Stanley	FBB-179 4-1/2 USP or approved equal	FBB-179 4-1/2 USP
Butts (Ext.)	Stanley	FBB-199 4-1/2 US32D or Approved Equal	FBB-199 4-1/2 US32D
Hinges	Roton or Zero	Continuous (to suit application)	
Locksets & Latch Sets	Yale Schlage		CRR 8000 Series L9000 Series x 03 Trim
Key Cylinders		Yale	Russwin
Flush Bolts	Ives	457-B26D or Approved Equal	457-B26D
Panic Devices	Von Duprin or Precision	99x990NL x US26D 1103 x 17	99 Series 1100 Series
Removable Mullions	LCN	KR-4956—SP28	KR-4956—SP28
Door Closers	LCN	4041 x Sprayed Alum.	4041 Series
Door Stops / Holders	Glynn - Johnson	500 Series Non H. O.	500 Series Non H. O.

Wall Bumpers	Ives	407 - 1/2 x B26D or Approved Equal	407 - 1/2 x B26D
Push Plates	Rockwood	70 3-1/2 x 15 US26D	70 3-1/2 x 15 USD26D
Pull Plates	Rockwood	123 x 73 3-1/2 x 15	123 x 73 3-12 x 15
Mop Plates	Rockwood	18-8”	18-8”
Kick Plates	Rockwood or Approved Equal	18-12”	18’12”
Silencers	Glynn-Johnson or Approved Equal	No. 64	No. 64

6. Mop plates and kick plates shall be 1” less than width of door on hinge side, 1-1/2” less than width of door on stop side.

7. Hardware items, not set forth herein, shall be subject to verification by application, on a per project basis.

9. Floor type or overhead Concealed door closers are NOT acceptable.

10. Vertical Rod Type Panic Devices are NOT acceptable unless authorized by the Security tech. manager. Panic devices by manufacturers other than specified above are NOT acceptable. Panic devices by the specified manufacturers, shall be acceptable ONLY in the SERIES specified herein

11. Removable Mullions, as specified herein, shall be used on entry doors, where doors are paired.

12. As hardware applications may vary, due to special requirements, or code restrictions. These applications shall be considered on a per project basis.

13. At drywall or plaster walls, use closers with CUSH function. Wall bumpers on drywall or plaster are prohibited. Floor bumpers are prohibited.

14. Exterior doors which are not the main access point to the building shall be exit only, and shall be connected to the fire alarm system. Such doors shall be clearly marked on the inside that opening the door will sound an alarm.

08 71 13 AUTOMATIC DOOR OPERATORS

ITEM	MANUFACTURER	MODEL NO.
Hinge	Roton or Select Products Limited. No Substitution	
Automatic Operator	LCN, 4600 Series No Substitutions	
(*) Electric Strike	Von Duprin 6000 Series 24VDC Fail secure	Model to suit application. No Substitution
(*) Panic Device	Von Duprin	99NL-F x US26D No Substitutions
Threshold	Zero (or) Approved Equal.	
Weather Strip	Zero (or) Approved Equal	

NOTE: (*) May not be required depending on application.

1. Hinge and Panic Device shall be installed with thru-bolts. All exposed screw and bolt heads shall be spanner head.

2. Sufficient reinforcement shall be provided for overhead surface mounted door operators.

3. 120VAC power shall be supplied to each operator.

4. Door operator controls: A self-contained solid state circuit shall control the operations and switching of the swing power operator. The electronic control shall provide low voltage power supply for all means of actuation. No external or auxiliary low voltage power source will be allowed. The control shall also include time delay 1-60 seconds, for normal cycle, as well as the following built-in features:

    - Torque limiting for controlled forces on opening,
    - Acceleration control for smooth starts and recycle,
    - Special circuitry for reducing power to the motor when door is in “Hold-Open” mode, extending longevity and assuring reliability.

5. Safety Sensors: VISONPULSE: The swing door presence sensor shall be mounted to each side of the swing door approach and swing path and shall be complete in all respects consisting of the following:

   - Extruded Aluminum housing of 6063-T52 alloy sized to run full width of door, integral high impact, tinted acrylic lenses and injection molded end caps.

   - Solid state electronics interfaced to alternating rows of light emitting diodes and receivers contained within the extruded aluminum housing.

   - Long/short range switch and flexible cable.

   - Sensor shall be capable of operation within temperature ranges of -20F and 160F. Vision pulse shall detect presence not motion and shall not be restricted in application due to door design, construction, material or glass type. Ambient light and radio frequencies shall not interfere with the sensors performance.

08 74 00 ACCESS CONTROL HARDWARE

1. Card Access Control (CAC) systems, where required, shall meet the following criteria:

   The CAC system shall be low voltage, flexible and expandable. It shall employ state of the art digital and coding technologies, be designed and manufactured for high speed processing and maximum reliability. It shall be of modular design capable of interfacing with compatible type PC's. All CAC systems must be approved by the Security Tech. Manager.

   Software programs employed in the system(s) shall be capable of controlling from one (1) to eight hundred (800) access points per site. All access attempts are to be recorded, printed and/or displayed at the operators' option.

   The CAC system shall be designed to operate in automatic and command programming modes, respond to alarm generated reports and modify the data base configuration with all activities available to be stored, printed or displayed at the operators' option.

   Operator interface with the system shall be through a video display monitor and/or automatic printer and/or IBM or compatible type PC's. Monitor displays and printed information shall use clear, complete English

language descriptions and shall not require the operator to interpret numeric or coded data.

2. Main entrance doors to all dormitories shall be equipped with card access control systems. Generally, there shall be only one main entrance to a dormitory.

3. Elevators in dormitories shall be equipped with card key access control to restrict unauthorized use.

4. If a card key access control system is required for the building, specific specifications may be obtained from the Project Manager.

5. The card key system shall be coordinated with the Rutgers University Security Systems Manager from University Public Safety.

08 90 00 LOUVERS AND VENTS

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