



# WAYNE STATE UNIVERSITY

## RANDS HOUSE RENOVATION

5229 Cass Avenue  
Detroit, MI 48202

WSU Project No.: 028-321356

### ARCHITECT

Niagara Murano

2215 Cole Street  
Birmingham, MI 48009  
(248) 646-5765 (T)  
(248) 646-5813 (F)

NM Project No.: 18113.0

### ENGINEER

IMEG Engineers

26200 Town Center Drive  
NOVI, MI 48375  
(248) 313-6902 (T)  
(248) 344-1650 (F)

IMEG Project No.: 18004050.01

### OWNER

Wayne State University

5045 Cass Avenue  
Detroit, MI 48201  
(313) 577-4301 (T)  
(313) 577-1817 (F)

WSU Proj. No.: 028-321356

**ISSUED: FOR BIDS**

**DATE: DECEMBER 11, 2018**



**SECTION 10155  
TOILET COMPARTMENTS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel toilet compartment partitions for following applications:
  - a. Toilet enclosures.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed finish.

PART 2 - PRODUCTS

2.1 UNITS

- A. Bradley Corp. Floor Mounted (Series 400- Color to be selected by Architect).
- B. Bradley Corp. to provide all floor mounting supports and accessories for configurations.

2.2 SOLID COLOR REINFORCED COMPOSITE TOILET PARTITIONS

- A. Manufacturer: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturer: Subject to compliance with requirements, provide products by following:  
The Mills Company, Marion, OH 43302.
  1. Contact Information: (800)272-3539, fax (262)251-5817; Email [info@BradleyCorp.com](mailto:info@BradleyCorp.com); Website [www.bradleycorp.com](http://www.bradleycorp.com).
- C. Metallic Coated Steel Sheet: ASTM A 653/A 653M, galvanized commercial steel sheet suitable for exposed applications. Provide with mill phosphatized surface. Provide smooth material, without creases or ripples.

- D. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.
- E. Stainless Steel Sheet: ASTM A 240 or A 666, 300 series.
- F. Stainless Steel Castings: ASTM A 743/A 743M.
- G. Aluminum: ASTM B 221.

### 2.3 STEEL TOILET COMPARTMENTS

- A. Toilet Compartment Type:
  - 1. Overhead braced.
    - a. Basis of Design Product: Bradley, Mills Partitions, Sentinel, Series 400.
- B. Door, Panel, and Pilaster Construction, General: Form edges with interlock to provide watertight fit without crown molding. Braze corners and finish smooth.
  - 1. Provide exposed surfaces free of pitting, visible seams and fabrication marks, stains, telegraphing of core material, or other imperfections.
  - 2. Core Material: Manufacturer's standard sound-deadening, water resistant honeycomb in thickness required to provide finished thickness for doors, panels and pilasters.
- C. Door Construction: 1 inch (25 mm) thick, constructed from 0.0313 inch/22 ga (0.794 mm) galvanized steel.
  - 1. Provide each door with internal 0.0625 inch/16 ga (1.59 mm) and 0.0781 inch/14 ga (1.98 mm) welded reinforcements at top and bottom hinge locations, with factory installed concealed true gravity cam hinges.
- D. Panel Construction: 1 inch (25 mm) thick, constructed from 0.0313 inch/22 ga (0.794 mm) galvanized steel.
  - 1. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
- E. Pilaster Construction: 1 1/4 inch (32 mm) thick, constructed from [0.0375 inch/20 gauge (0.953 mm)] [0.048 inch/18 gauge (1.219 mm)] galvanized steel.
  - 1. Provide pilaster with internally welded bracket suitable to accept minimum 3 inch (76 mm) long, 5/16 inch (7.9 mm ) stainless steel hex bolt for leveling.
- F. Headrail: Extruded anodized aluminum headrail with anti-grip profile. Provide fasteners for attachment to pilaster and stainless steel brackets to secure to wall.
- G. Shoes: 4 inches (102 mm) high minimum, Type 304 stainless steel with No. 4 satin brushed finish. Secured to the inside face of the pilaster with stainless steel torx-head fasteners.

### 2.4 HARDWARE

- A. Hardware, Standard Duty: Manufacturer's standard chrome-plated zamac castings, including corrosion-resistant, tamper-resistant fasteners:

1. Hinges: Self-closing continuous spring-loaded type, adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
2. Latch and Keeper: Concealed slide latch with flat rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.
3. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors.
4. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  1. Maximum Clearances:
    - a. Pilasters and Panels: 3/8 inch.
    - b. Panels and Walls: 1/2 inch.
  2. Stirrup Brackets: Secure panels to walls and to pilasters with not less than two brackets attached near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.

### 3.2 FABRICATION

- A. Floor Mounted Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION10155

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**SECTION 012300  
ALTERNATES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

- A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 3. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.
  - 4. The cost or credit of each alternate includes the cost of premiums for Labor and Material Payment Bonds and Performance Bonds.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- B. Notification: Immediately following the award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other Work of this Contract.
- D. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS (NOT APPLICABLE TO THIS SECTION)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. DEDUCT Alternate No. 1: Carpet throughout first floor to remain
  - 1. Base Bid: New carpet throughout first floor
  - 2. Reference Drawings: A-20, A-201
  - 3. Field verify conditions prior to starting work.

END OF SECTION 012300

**SECTION 081100  
STEEL DOORS AND FRAMES**

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Steel Doors.
  - 2. Steel Door Frames.
- B. Related Sections include the following work:
  - 1. Division 4 Section “Unit Masonry Assemblies” for frames.
  - 1. Division 8 Section “Door Hardware” for door.
  - 2. Division 8 Section “Glazing” for doors.
  - 3. Division 9 Section “Painting” for field applied factory primed doors and frames.
  - 4. Division 16 Section “Electrical”.

**1.2 REFERENCES**

- A. National Fire Protection Associations (NFPA):
  - 1. NFPA 101-1999, "Life Safety Code"
  - 2. NFPA 80-1999, "Installation of Fire Doors and Windows"
- B. International Building Code – 2003 Edition
- C. Underwriters Laboratories Inc., for fire rate door and frame assemblies. (U.L.).

**1.4 SYSTEM DESCRIPTION**

- A. Design Requirements:
  - 1. Sheet Thicknesses: Thickness dimensions, including those referenced in ANSI A250.8 are minimums as defined in referenced ASTM standards for both uncoated steel sheet and uncoated base metal metallic-coated steel sheet.

**1.5 SUBMITTALS**

- A. Product data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire resistance ratings,

and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door, door frame and hardware, as well as procedures and diagrams. Coordinate the final door Hardware Schedule with doors, frames and related work to ensure proper size, thickness, hand, function and finish of door hardware.
1. Initial submittal of the proposed " Steel Doors and Frames" in the following format:
    - a. Organized into "hardware sets", indicating complete designations of every item required for each door or opening. Include the following information for each item of finish hardware:
      - (1) Manufacturer
      - (2) Type- Elevation of doors and frames.
      - (3) Frame details for each frame type including dimensional profiles.
      - (4) Function
      - (5) Size
      - (6) Degree and direction of opening swing ("hand")
      - (7) Finish
      - (8) Fasteners: Details and locations of reinforcement and preparations for hardware.
      - (9) Location of hardware set cross-referenced to indications on floor plans, door, schedule, and frame schedule.
      - (10) Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
      - (11) Mounting heights and locations for hardware.
      - (12) Door and frame sizes and materials.
      - (13) Keying information.
      - (14) Coordination of glazing frames, stops with glass and glazing requirements.
    2. Submit Final Shop Drawings immediately following receipt of the Architect's approval of the initial submittal.
    3. Electrical equipment schedule: Riser and installation drawings for electrically-controlled or operated hardware equipment, including:
      - a. Relationship of related equipment;
      - b. Mounting locations;
      - c. Wire type and size;
      - d. Voltage and current requirements;
      - e. Function and operation characteristics of equipment.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Use skilled installers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section and have successful in service performance record.
- B. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.
- C. Fire Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled Underwriters Laboratories, Inc. (UL), FM Global, Factory Mutual (FM), or Intertek Testing service/ Warnock Hersey (WH), for fire protection ratings indicated on testing according to NFPA 252.

1. Test Pressure: Test at atmospheric pressure.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Product identification: Tag and mark each item separately in manufacturers unopened package, identifying it by product number and architectural opening number, as listed in the approved Finish Hardware Schedule.
- B. Include instructions, templates, and fasteners needed for installation.
- C. Deliver individually packaged hardware items on a vehicle operated by a direct employee of the Hardware Supplier. Contractor shall immediately inventory the contents of the delivery. Remove and replace damaged items that can not be repaired as directed.

#### 1.8 PROJECT CONDITIONS

- A. Provide a secure, dry storage area for the sole purpose of storing doors and frames. Prohibit access to all jobsite personnel, except those employed by the installing contractor.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each door and frame assembly item is indicated in the Door and Frame Schedule on drawings.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Amweld Building products, Inc.
  2. Ceco Door Products; a United Dominion Company.
  3. Curries Company.
  4. Kewanee Corporation.
  5. Pioneer Industries Inc.
  6. Steelcraft; a Division of Ingersoll Rand.

#### 2.2 MATERIALS

- A. Hot Rolled Steel Sheets: ASTM A 569, Commercial Steel (CS), Type B; free from scale, pitting, or surface defects; pickled and oiled
- B. Cold Rolled Steel Sheets: ASTM A 366, Commercial Steel (CS), or ASTM A 620, Drawing Steel (DS), Type B; Stretcher leveled standard of flatness.

#### 2.3 DOORS

- A. General: Provide 1-3/4 inches thick, of sizes and design indicated.

- B. Interior doors; Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical endurance level:
  - 1. Level 2 and physical performance Level B (Heavy Duty), Model 2 (Seamless), 16 gage face sheets, no seams on faces or vertical edges.

## 2.4 FRAMES

- A. General: Provide steel frames for doors, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.
- B. Frames of 14 gage thick steel sheet for:
  - 1. Interior Doors.
  - 2. Exterior Frames: Welded type, 0.067 inch (14 gage) galvanized sheet steel, mitered or coped corners.
- C. Door Silencers: Fabricate stops to receive three silencers on jamb strikes of single door frames and two silencers on the heads of double door frames.
- D. Plaster Guards: Provide 24 gage thick, steel sheet plaster guards or mortar boxes to close off interior openings; place at back of hardware cutouts where mortar or other materials may obstruct hardware operation.
- E. Supports and Anchors: Fabricated from not less than 16 gage thick, electrolytic zinc coated or metallic coated steel sheet.
- F. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc coated items are to be built into exterior walls, comply with ASTM A 153, Class C or D as applicable.

## 2.5 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle.
  - 1. Join door faces to vertical edges by continuous weld extending full height of door. Grind, fill and dress smooth all welds to make them invisible and provide smooth flush surfaces.
  - 2. Reinforce door frames and door edges to accommodate heavy use and hardware.
- B. Interior Door faces: Fabricate exposed faces of doors from the following material:
  - 1. Cold Rolled steel sheet.
- C. Interior Door Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.
- D. Clearances for Fire rated Doors: As required by NFPA 80.
- E. Single Acting, Door Edge profile: Square edge, unless bevel in indicated.
- F. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames".
- G. Fabricated concealed stiffeners, reinforcement, edge channels, from either cold or hot rolled steel sheet.
- H. Exposed fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and

bolts.

- I. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation hardware.
  - 1. The use of universal hinge preparations and adapter plates is not allowed, door hinge preparation must be hand specific.
  - 2. Undercut door to suit threshold. If no threshold is indicated, provide not more than 3/4 inch at bottom.
- J. Frame Construction: Fabricate frames to shape shown.
  - 1. Fabricate frames with mitered or coped welded corners and seamless faces joints.
  - 2. Provide welded frames with temporary spreader bars.
- K. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied hardware may be done at Project Site.
- L. Locate hardware as indicated on shop drawings or, if not indicated, according to ANSI A250.8.
- M. Glazing Stops: Manufacturer's standard, formed from 20 gage thick steel sheet.
  - 1. Provide non removable stops on secure side of interior doors.
  - 2. Provide glazing stops with tightly butted hairline joints at corners and secure to frame with countersunk screws.

## 2.6 FABRICATION

- A. Prime Finish: Manufacturer's standard, factory applied coat of rust inhibiting primer complying with ANSI A250.10 for acceptance criteria.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install steel doors, frames and accessories according to Shop Drawings, manufacturer's data and as specified
- B. Fabricate work to be rigid, neat and free from seams, defects, dents, warp, buckle, and exposed fasteners. Install doors and frames in compliance with SDI-100, NFPA 80, and requirements of authorities having jurisdiction.
- C. Provide thermally improved doors with maximum U-value of 0.24 BTU/hr.sq.ft.degree F (ASTM C 236) for all exterior doors and elsewhere as noted.
- D. Place Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, braced securely until permanent anchors are set. After wall construction in completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 1. Install fire rated frames according to NFPA 80.

E. Door Installation: Comply with ANSI A250.8. Fit hollow metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/ DHI A115.1.G.

1. Fire Rated Doors: Install within clearances specified in NFPA 80.

### 3.2 ADJUSTING AND CLEANING

A. Prime Coated Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air drying primer.

**END OF SECTION 081100**

**SECTION 081416  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Solid core veneer-faced doors with a transparent finish.
  - 2. Fire-resistance rated doors.
  - 3. Factory finishing.
  - 4. Glazing stops and preparation of flush doors to receive glazing; glazing specified elsewhere.
  - 5. Pre-fitting by manufacturer.
  - 6. Pre-machining by manufacturer.

**1.02 REFERENCES**

- A. Architectural Woodwork Quality Standards; Architectural Woodwork Institute (AWI), 8th Edition Version 2.0; 2005.
- B. ASTM E 2074 -- Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies; 2000.
- C. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 2007.
- D. WDMA (HOW)-- How to Store, Handle, Finish, Install, and Maintain Wood Doors; Wood Flush Doors; National Wood Window and Door Association; 2004.
- E. WDMA I.S. 1A -- Architectural Wood Flush Doors; National Wood Window and Door Association; 2004.

**1.03 SUBMITTALS**

- A. Product Data: Submit detailed technical information for each distinct product specified in this section. Include complete data for factory finished doors.
- B. LEED Documentation: Submit information required by Section 01115 for the following targeted credits:
  - 1. Credit MR 4: Materials and Resources - Recycled Content.
  - 2. Credit MR 5: Materials and Resources - Regional Materials.
  - 3. Credit MR 7: Materials and Resources - Certified Wood.
  - 4. Credit EQ 4.1: Indoor Environmental Quality - Low-Emitting Materials - Adhesives and Sealants.
  - 5. Credit EQ 4.4: Indoor Environmental Quality - Low-Emitting Materials - Composite Wood and Agrifiber Products.
- C. Shop Drawings: Prepare and submit shop drawings showing relevant information, including:
  - 1. Construction details for each distinct product type.
  - 2. Dimensions and location of blocking for hardware.
  - 3. Fire ratings.
  - 4. Factory finishing details.
- D. Samples: Submit samples for the following:

1. Veneer verification samples: Minimum 8-1/2 by 11 inches.
2. Factory finishes:
3. Glazing assemblies: For each type and finish, provide minimum 12-inch-long sample.

E. Certificates:

1. Submit certification that manufacturer's construction standards and tested fire door assembly requirements comply with contract requirements indicated for doors, hardware, hardware templating, size of lights, and other design characteristics.
  - a. Clearly note any exceptions to certification, citing door number and hardware set. Exceptions shall be subject to the approval of the Architect.

#### 1.04 QUALITY ASSURANCE

- A. Manufacturer: Member of AWI Quality Certification Program (QCP).

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as required to prevent damage or deterioration. Conform to manufacturer's recommendations, requirements of referenced standard, and recommendations of WDMA I.S.1A, Appendix, "How to Store, Handle, Finish, Install, and Maintain Wood Doors."
- B. Clearly label each door with opening number where door will be installed. Use removable, temporary labels or mark on door surface which will be concealed from view after installation.
  1. Coordinate door identification with shop drawing designations.
- C. Environmental Requirements: Do not deliver, store, or install products of this section before building's design temperature and humidity levels have been achieved and will be maintained at those levels.

#### 1.06 WARRANTIES

- A. Manufacturer's Warranty (Interior Doors):
  1. Submit a written warranty signed by the manufacturer guaranteeing to correct failures in products which occur within the warranty period indicated below, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents. Failures are defined to include:
    - a. Faulty workmanship.
    - b. Delamination.
    - c. Stile, rail, or core show-through (telegraphing) visible to the naked eye to any degree when viewed from a horizontal distance of 3 to 4 feet.
    - d. Warp (including bow, cup, and twist) in excess of 1/4 inch when measured in accordance with WDMA I.S. 1A.
  2. Correction includes repair or replacement at the option of the Architect. Correct failures which occur within the following warranty periods after Substantial Completion:
    - a. Solid core interior doors: Life of original installation.
- B. If, for any reason, the Contractor's work results in nullification of manufacturer's warranty, the Contractor shall correct failures and pay for such correction.

### PART 2 PRODUCTS

#### 2.01 LEED REQUIREMENTS

- A. Materials and Resources - Recycled Content.

- B. Materials and Resources - Certified Wood: Provide wood-based materials and products which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria, for wood based building components.
- C. Indoor Environmental Quality - Low-Emitting Materials - Adhesives and Sealants.
  - 1. Multipurpose Construction Adhesives: 70 g/l.
- D. Indoor Environmental Quality - Low-Emitting Materials - Composite Wood & Agri-fiber Products.
  - 1. Composite Wood and Agri-fiber Products: Composite wood and agri-fiber products used on the inside of the building (inside of the weatherproofing system) shall contain no added urea formaldehyde resins.
    - a. Laminating adhesives used to fabricate on-site and shop applied composite wood and agri-fiber assemblies shall contain no added urea-formaldehyde resins.

## 2.02 WOOD DOORS - GENERAL REQUIREMENTS

- A. Flush Doors: Conform to the following, hereinafter referred to as referenced standard(s):
  - 1. "Architectural Woodwork Quality Standards" including Section 1300, "Architectural Flush Doors".
    - a. Where the AWI standard indicates requirements that conflict with WDMA standards, comply with AWI.
- B. Fire-Rated Doors:
  - 1. Provide doors that comply with NFPA 80 and that are precise duplicates of doors tested as part of fire-rated assemblies in accordance with requirements of ASTM E 2074 and without seals being visible when door is open.
  - 2. Acceptable testing and inspection agencies:
    - a. Underwriters Laboratories Inc.
    - b. Warnock Hersey International Inc.
  - 3. Construction: Conform to testing agency requirements for indicated fire rating.
    - a. Ratings of 45 minutes or more: Mineral core.
    - b. Ratings of 20 minutes: Particleboard core.
    - c. Temperature rise rating: For fire-rated doors in stairwell enclosures, provide door construction tested and certified to limit temperature rise in thirty minutes to 450 degrees, F.
  - 4. Edges: Laminated edge (stile) designed for use with mortise hinges and appropriate for indicated fire resistance rating.
  - 5. Rails and blocking: Laminated material designed for use as blocking or rails and appropriate for indicated fire resistance rating.
    - a. Provide the following for fire rated doors with 45-minute or greater rating:
    - b. All doors: Provide 5-inch-wide top and bottom rails; provide lock blocking.
    - c. Doors with exit devices: Provide lock blocking both sides or continuous intermediate rail.
    - d. Doors with flush or surface bolts: Provide blocking for bolts.
    - e. Doors, transoms, or side panels with strikes: Provide blocking for strikes.
  - 6. Acceptable products for edges, rails, and blocking:
    - a. "Firestop I" for blocking and rails, "Firestop II" for stiles; Georgia-Pacific.
    - b. "SLM" for blocking and rails, "SLM II" for stiles; Timberland Components.
    - c. "Triple-Ply"; Weyerhaeuser.

- d. Other products acceptable to manufacturer, subject to the approval of the Architect.
- 7. Through-bolted hardware: Blocking specified in this section shall not relieve the requirement for through-bolted closers, exit devices, and similar hardware. Through-bolted closers, exit devices, and similar hardware specified shall not relieve the requirement for solid blocking. Provide through-bolted hardware and solid blocking.
- 8. Pairs of fire rated doors: Where required to meet fire rating, provide metal meeting edges at pairs of vertical rod exit devices, and astragals and metal edges elsewhere.
  - a. At veneered doors with transparent finish, cover metal with matching veneer.
  - b. At opaque field finished doors, provide metal primed for painting.
  - c. At doors with opaque factory finish (paint or HPDL), apply baked enamel factory finish to metal to match door finish.
- 9. Testing laboratory labels: Permanently affixed to hinge stile.
  - a. Construction labeling is not an acceptable to standard labeling unless requested in accordance with the substitution procedures specified in Division 1 and approved in writing by the Architect.

### 2.03 CONSTRUCTION

- A. Faces:
  - 1. Veneer species, cut, and grade for transparent finish (NWWDA, AWI, HPVA standards):
    - a. Red Oak, Rift Cut, Grade A.
- B. Construction: PC-5 or PC-7 (6 or 7 ply).
- C. Core, Non-Fire-Rated Doors: Particleboard, bonded to stiles and rails, sanded.
- D. Core, Fire Rated Doors: As specified above.
- E. Core, Glass Light Doors: Where stile width is less than 10 inches, or where glass height is over 1/2 of the height of the door, or where other required features do not qualify for manufacturer's standard construction, provide specially reinforced core construction utilizing laminated strand lumber or other materials approved by the Architect.
- F. Glue: Type I at exterior doors and at interior doors subject to wetness or humidity such as at toilets, kitchens, showers, etc. Type I or II at other interior doors.

### 2.04 ACCESSORIES

- A. Stops for Glazing: Provide flush style glazing stops.
  - 1. For non-fire-rated doors: Solid stock of species to match door face veneer; finish to match door.
  - 2. For fire rated doors 45 minutes and over: Cold-rolled sheet steel of gage approved by testing agency for installation in fire-rated doors indicated. Cover exposed surfaces of glazing stops with wood veneer to match door faces. Finish veneer to match door.
  - 3. For 20 minute fire-rated doors: Solid stock fire-retardant treated wood of species to match door face veneer; finish to match door.

### 2.05 FABRICATION

- A. General:
  - 1. Fabricate to provide consistent clearances as indicated.
  - 2. Hinge and lock edges:
    - a. Provide 1/8-inch standard bevel at edges, unless standard bevel would not precisely

match hardware bevel; provide proper bevel for hardware.

- b. Predrill pilot holes for hinges on fire doors with laminated hinge stiles.
  3. Make neat mortises and cutouts for door hardware indicated.
  4. Pre-fitting: Fabricate and trim doors to size at factory to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.
    - a. Provide non-standard clearances and tolerances indicated in Part 3.
  5. Pre-machining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedule, hardware templates, and door frame shop drawings.
- B. Openings: Cut, trim, and seal openings in doors at the factory.

## 2.06 FACTORY FINISHING

- A. Comply with AWI Section 1500, "Factory Finishing".
- B. Transparent Finish:
  1. Premium Grade Type (1500-T-11): Conversion varnish, catalyzed vinyl, catalyzed polyurethane, polyester, UV cured epoxy, UV cured polyester, or UV cured urethane.
  2. Satin sheen.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Inspect door frames and doors before beginning door installation.
  1. Verify that frames are properly installed and aligned and are capable of providing trouble free support for doors throughout range of door swing.
- B. Correct unsatisfactory conditions before installing products of this section. Commencement of installation indicates acceptance of conditions.

### 3.02 INSTALLATION

- A. Hardware Installation: Elsewhere in Division 8.
- B. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
  1. Fire-rated doors: Comply with NFPA 80 requirements.
- C. Pre-fit Doors: Minimize field fitting to those procedures which are necessary to complete work unfinished during factory pre-fitting and to provide trouble free operation.
  1. Accurately align and fit doors for trouble free operation throughout range of door swing.
- D. Pre-fitting Clearances:
  1. Door edge and head: 1/8 inch.
  2. Door edge and jamb: 1/8 inch.
  3. Door bottom edge and top surface of threshold: 1/4 inch.
  4. Door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8 inch.
  5. Meeting edges at pairs of doors: 1/8 inch total.
- E. Installation Clearances: Install doors so as to maintain pre-fitting clearances specified.
- F. Factory-Finished Doors: Before installing doors, restore finish at door edges cut during field

fitting.

### 3.03 ADJUSTING

- A. Adjust doors for proper operation; coordinate with hardware adjustment; replace doors that cannot be properly adjusted.
- B. Where door finishes are damaged during installation, restore in a manner that results in the door showing no evidence of the restoration. If refinished door cannot be made to match other doors, remove refinished door and replace with new conforming work at the Contractor's expense.
- C. Protect installed work.

END OF SECTION 081416

**SECTION 087100  
FINISH HARDWARE**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work included:
1. Furnish hardware required to complete the work as shown on the drawings and as specified herein;
  2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.
  3. Deliver to the job site those items of finish hardware scheduled to be installed at the job site; and delivered to other points of installation those items of finish hardware scheduled to be factory installed, including:
    - a. Butt Hinges
    - b. Continuous Hinges
    - c. Lock cylinders and keys
    - d. Lock and latch sets
    - e. Bolts
    - f. Power Supplies
    - g. Push/pull units
    - h. Closers
    - i. Miscellaneous door control devices
    - j. Door trim units
    - k. Protection plates
    - l. Weather-stripping (except where provided with aluminum entrance doors)
    - m. Thresholds
    - n. Security products
    - o. Wall or floor stops
- B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
  2. Section 08100: Metal doors and frames
  3. Section 08210: Wood doors
  4. Section 08800: Glazing
  5. Division 16: Electrical

1.02 REFERENCES

- A. National Fire Protection Associations (NFPA):
1. NFPA 101, "Life Safety Code"
  2. NFPA 80, "Installation of Fire Doors and Windows"
- B. Michigan Building Code – Refer to sheet T-1 for current code.
- C. American National Standards Institute (ANSI):
1. ANSI A 156 Standards series.
  2. ANSI A117.1 Accessible and Usable Buildings and Facilities
- D. National Electric Code – Refer to sheet T-1 for current code.

1.03 DEFINITIONS

- A. "Finish Hardware": Items required for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified under door and frame Sections of these Specifications.

#### 1.04 SYSTEM DESCRIPTION

- A. Design requirements:
  - 1. Review of hardware requirements:
    - a. Thoroughly review finish hardware schedule, comparing it with the floor plan, door schedule, and door details to verify hardware requirements, quantities, door swings, finishes, and sizes.
    - b. If an inconsistency or error in the proposed construction documents is suspected, the hardware supplier is to bring it immediately to the attention of the Architect. If the quantity of items is questioned, for bidding purposes, assume the higher quantity is required and price accordingly.
    - c. Architect's review of Submittals is for design concept only, and does not relieve the Contractor of the responsibility to furnish sufficient material and functions required for a complete, and code-worthy installation. Determination of all quantities is the responsibility of the Contractor.
- B. Performance requirements:
  - 1. Furnish finish hardware complying with the requirements of laws, codes, ordinances and guidelines of governmental authorities having jurisdiction:
    - a. NFPA 101, "Life Safety Code"
    - b. NFPA 80, "Installation of Fire Doors and Windows"
    - c. Michigan Building Code – Refer to sheet T-1 for current code.
    - d. ANSI A117.1 Accessible and Usable Buildings and Facilities

#### 1.02 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data:
  - 1. Initial submittal of the proposed "Finish Hardware Schedule" in the following format:
    - a. Vertically-typed, double-spaced;
    - b. Organized into "hardware sets", indicating complete designations of every item required for each door or opening. Include the following information for each item of finish hardware:
      - (1) Manufacturer
      - (2) Type
      - (3) Style
      - (4) Function
      - (5) Size
      - (6) Degree and direction of opening swing ("hand")
      - (7) Finish
      - (8) Fasteners
      - (9) Location of hardware set cross-referenced to indications on floor plans, door, schedule, and frame schedule.
      - (10) Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
      - (11) Mounting heights and locations for hardware.
      - (12) Door and frame sizes and materials.
      - (13) Keying information.
  - 2. Final Finish Hardware Schedule immediately following receipt of the Architect's approval of the initial submittal.
  - 3. Electrical equipment schedule: Riser and installation drawings for electrically-controlled or operated hardware equipment, including:
    - a. Relationship of related equipment;
    - b. Mounting locations;
    - c. Wire type and size;
    - d. Voltage and current requirements;
    - e. Function and operation characteristics of equipment.

- C. Samples:
  - 1. When requested by the Architect or Owner, submit one sample of each type of exposed hardware unit, finished as required, and tagged with a full description for coordination with schedule.
  - 2. Samples will be returned to the supplier.
  - 3. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be built into the Work, within limitations of keying coordination requirements.
- D. Templates: Furnish hardware templates with final submittal of Finish Hardware Schedule.
- E. Contract closeout submittals:
  - 1. Operation and maintenance data: Comply with pertinent provisions of Section 01730.
  - 2. Provide two complete sets of finish hardware schedules, and two complete copies of manufacturer's catalog cuts and maintenance instructions for each item furnished under the Work of this Section.

### 1.03 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section.
- B. Supplier qualifications:
  - 1. A recognized architectural finish hardware supplier with warehousing facilities within a 100 mile radius of the project site and a direct distributor of all products listed on the approved finish hardware schedule.
  - 2. Continuously in business of finish hardware supply for not less than 5 years.
- C. Provide the service of a qualified Architectural Hardware Specialist to:
  - 1. Be available for consultation with the Architect at no additional cost to the Owner during progress of construction, and:
    - a. Inspect installation of all finish hardware items;
    - b. Make all minor adjustments required; and
    - c. Report to the Architect on completeness of the installation.
  - 2. The hardware consultant may be an employee of the supplier.
- D. Installer qualifications: Employ a competent hardware installer with at least five (5) years experience installing commercial grade hardware similar to that proposed for the Work.
- E. Source limitations: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.
- F. Mandatory pre-construction meeting:
  - 1. Immediately following the Architect's final approval of the submittals, convene a mandatory pre-installation meeting to be attended by the Architect, Contractor, Installer, Supplier, and the Architect's hardware consultant.
  - 2. Proposed agenda to include review of:
    - a. The Contract Documents;
    - b. Installation schedule;
    - c. Hardware Specifications;
    - d. Hardware locations and opening descriptions;
    - e. Special installation instructions;
    - f. Other items of pertinence to the Work.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01620.
- B. Product identification:
  - 1. Tag and mark each item separately in manufacturers unopened package, identifying it by product number and architectural opening number, as listed in the approved Finish Hardware Schedule.
  - 2. Include instructions, templates, and fasteners needed for installation.
- C. Deliver individually packaged hardware items on a vehicle operated by a direct employee of the Hardware Supplier. Contractor shall immediately, and in the presence of the Hardware Supplier, inventory the contents of the delivery.
- D. Hardware supplier: Furnish finish hardware items directly to the factory or mill for factory-installation, where required.

1.05 PROJECT CONDITIONS

- A. Provide a secure, dry storage area for the sole purpose of storing finish hardware. Prohibit access to all jobsite personnel, except those employed by the installing contractor.

1.06 WARRANTY

- A. Manufacturer's warranty:
  - 1. Warrant all finish hardware items against defects in materials and workmanship for one year.
  - 2. Extended warranty: Extend the above warranty on certain items of finish hardware as follows:
    - a. Door closers: To ten years
    - b. Continuous hinges: To ten years
    - d. Locks and latch sets: To limited lifetime warranty
  - 3. Manufacturer agrees to promptly replace (including installation by a factory representative) defective products at no additional cost to the Owner, for the duration of the warranty period.
  - 4. The terms of such warranties extend from the Date of Substantial Completion as that date is defined by the General Conditions.
- B. Failures due to defective materials or workmanship is deemed to include, but not to be limited to:
  - 1. Failures in operation of any operating component;
  - 2. Defects which contribute to unsightly appearance, potential safety hazard, or potential untimely failure of the products furnished under this Section.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each finish hardware item are indicated in the Finish Hardware Schedule at the end of this Section.
- B. Product designations:
  - 1. One or more manufacturers are listed for each hardware type required. Provide the product designated or the comparable product listed in this Section.
- C. ANSI/BHMA designations:
  - 1. Used to describe hardware items, or to define quality or function. Provide products complying with these standards in addition to additional requirements of this Section.
- D. Hand of door: Drawings show direction of slide, swing ("hand") of door leafs.

- E. Hardware: Use hardware manufactured to conform to published templates and, generally, prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

## 2.02 MATERIALS

### A. Base metals:

1. Manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially-recognized) quality than that specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.
2. Do not furnish "optional" materials for those indicated, except as otherwise specified.

### B. Fasteners:

1. Furnish Phillips flat-head screws with each hardware item, unless otherwise indicated.
2. Exposed screws: Match finish of hardware (even where noted to be "prepared for paint").
3. Use concealed fasteners for hardware units which are exposed when door is closed, except where no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts where bolt head or nut on opposite face would be exposed.
5. Where adequate reinforcement is not feasible, thru-bolting would only be acceptable if through sleeves, or if sex-screw fasteners are used.

- C. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

## 2.03 MANUFACTURED UNITS, GENERAL

### A. Reference standards:

<u>Item:</u>	<u>Comply with:</u>
1. Butts and hinges:	ANSI A156.1-1988 (BHMA 101)
2. Locks and lock trim:	ANSI A156.2-1987 (BHMA 601)
3. Exit devices:	ANSI A156.3-1989, Grade 1 BHMA 701)
4. Door controls-closers:	ANSI A156.4-1986, Grade 1 BHMA 301)
5. Architectural door trim:	ANSI A156.6 (BHMA 1001)
6. Template hinge dimensions:	ANSI A156.7
7. Door controls-overhead holders:	ANSI A156.8 (BHMA 311)
8. Mortise locks and latches:	ANSI A156.13-1987, Grade 1
9. Auxiliary hardware:	ANSI A156.16-1989(BHMA 1201)

### B. Hardware finishes:

1. Materials and Finishes Standard: Comply with ANSI A156.18 (BHMA 1301). Finish designations used in schedules are listed, therein.
2. Provide US32D or US26D at all finish hardware exposed to view.
3. Provide matching finishes for hardware units at each door, unless otherwise indicated.
4. Match the color and texture of hardware items to manufacturer's standard finish for the latchset, lockset, or push-pull unit.
5. Provide quality of finish, including thickness of plating or coating, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than that specified or described by referenced standards.

### C. Hardware for fire-rated openings:

1. Comply with NFPA 80
2. Tested and listed by Underwriters Laboratory (UL), or Factory Mutual (FM) for type, size and use of door, and complying with requirements of door and door frame label.

3. Provide UL or FM label on door indicating "Fire door to be equipped with fire-exit hardware".
4. Provide UL or FM label on exit device indicating "Fire Exit Hardware".

## 2.04 PRODUCTS

### A. Hinges, butts and pivots:

1. General:
  - a. ANSI A156.1 - 1988 for commercial quality.
  - b. Provide only template-produced units.
  - c. All hinges to be concealed bearing-type.
  - d. Hinges at exterior doors shall be of non-ferrous material.
2. Screws:
  - a. At metal doors and frames: Machine screws.
  - b. At wood doors and frames: Phillips flat-head wood screws.
  - c. Finish screw heads to match surface of hinges or pivots.
3. Pins:
  - a. Steel hinges: Steel
  - b. Non-ferrous hinges: Stainless Steel
  - c. Hinges at exterior doors: Non-removable (NRP)
  - d. Hinges at out-swing corridor doors: Non-removable (NRP)
  - e. Hinges at interior doors: Non-rising
4. Tips:
  - a. Flat button with matching plug
  - b. Finish to match leaves, except where hospital tip (HT) indicated.
5. Number of hinges: Provide number of hinges indicated but not less than 3 hinges.
6. Hinge sizing:
  - a. According to hinge manufacturer's recommendation for door size and weight, unless otherwise specified.
  - b. Hinges for door widths 3 feet, or less: Standard-weight (.134)
  - c. Hinges for door widths over 3 feet: Heavy-weight (.180) hinges
7. Acceptable products:
  - a. For interior/exterior standard weight hinges:
    - (1) Stanley CB179/CB191\*
    - (2) Hager AB700/AB800
  - b. For interior/exterior heavy weight hinges:
    - (1) Stanley CB168/CB199\*
    - (2) Hager AB750/AB850

### B. Continuous Hinges:

1. Geared type Hinges
2. Fire-rating: "WHI-listed" and "UL-listed"
3. Capacity: Doors weighing up to 600 lbs.
4. Fasteners: As required by door and frame condition, and as recommended by hinge manufacturer.
5. Acceptable manufacturer's:
  - a. Stanley
  - b. Markar

### C. Lock Cylinders and Keying:

1. General:
  - a. All keying, keys and cylinders by owner

### D. Locksets:

1. Mortise Locks
  - a. Comply with ANSI A156.13 - 1987, Grade 1 criteria for mortise locks
  - b. Function: Lockset case shall have the capability to be multi-functional and

non-handed or manufacture will exchange case at no charge to the owner.

- c. Provide appropriate fasteners for lock and strike.
- d. Trim: 15H lever-type equal to Best Lock
- e. Acceptable products: Best 45H series

2. Electrified Mortise Locks

- a. Comply with ANSI A156.13 - 1987, Grade 1 criteria for mortise locks
- b. Function: Indicated in the hardware sets.
- c. Lockset case shall have the capability to be non-handed.
- d. Lockset shall have a RQE switch on both inside and outside lever hubs.
- f. Provide appropriate fasteners for lock and strike.
- g. Trim: 15H lever-type equal to Best Lock
- h. Acceptable products: Best 45H series / Schlage L9000 SDC MOD

3. Aluminum Door Deadlock:

- a. Adams-Rite MS1850S & 4710 Series with Armor faceplate to suit door edge.

E. Power Supplies:

1. General:

- a. Comply with ANSI A156.5, Grade 1 for products supplied.
  - b. All products to be stainless steel for corrosion resistance and strength.
  - c. All products shall be tamper resistant and provide horizontal keeper adjustment for door and frame misalignment.
  - d. At fire doors:
    - (1) Provide Labeled UL 10B, Fire Door Accessories, 3 hour.
2. Type: 12 or 24 V as required.
3. Function:
- a. Indicated in the hardware sets.
  - b. Provide failsafe, constant duty solenoids and fail-secure devices as required.
4. Acceptable products:
- a. Provide SDC 600 series Power Supply with required amp rating for load.

F. Push-pull bars:

1. General:

- a. ANSI A156.16 - 1989 Grade 1 criteria.
2. Description: 1-1/4" in diameter x length required by door width.
3. Mounting:
- a. Mount push-pull bars with thru-bolts and 12HD at free ends.
  - b. Mount offset pulls so as to avoid conflict with vertical rod, when used in conjunction with vertical rod exit devices.
4. Acceptable products:
- a. Rockwood RM251 x 2 ea. 12HD with 12" CTC 90 degree offset pulls.
  - b. Lanco
  - c. Baldwin

G. Door closers:

1. General:

- a. ANSI A156.4 - 1986 Grade 1 criteria.
- b. All closers shall be the products of one manufacturer.
- c. Description:
  - (1) Full rack-and-pinion type
  - (2) Cast aluminum R14 alloy or cast iron shell.
  - (3) Hydraulic fluid: Non-gumming and non-freezing.

- (4) Closer body: Non-handed, with sized-, or multi-size spring power adjustment to permit setting of spring power. (See hardware sets indicating when sized or multi-size closers are required.)
  - (5) With two non-critical valves and hex key adjustment to independently regulate sweep and latch speed.
  - (6) Provide mounting brackets necessary to clear sound seals and weatherstrip.
  - (7) Enclose in a full, molded cover.
  - (8) Provide drop plates or special brackets for proper mounting.
  - (9) Pressure Relief Valves will NOT be accepted on Door Closers.
- d. Acceptable products:
    - (1) Stanley D-4550 series
    - (2) LCN 4000 Series Smoothie
  - e. Provide drop brackets as required.
  - f. Provide BF (Barrier Free) closers only where scheduled.
  - g. Provide thru-bolts for closers mounting on fire-rated wood or metal doors unless doors are reinforced to receive wood or machine screws, in accordance with Section 08100 or Section 08210. In all cases, provide fasteners required to meet "UL" requirements.

H. Kick plates, mop plates and armor plates:

1. General: ANSI A156.16 - 1989 criteria.
2. Description:
  - a. Minimum .050" thick.
  - b. Dimensions:
    - (1) Width: 1-1/2" less than door width to which they are to be applied.
    - (2) Kick plate height: 10"
    - (3) Armor plates: 48" for non-labeled doors, unless scheduled otherwise.
3. Mounting:
  - a. **Install kick plates and armor plates flush to bottom edge of door.**
  - b. Notch armor plates for lock or exit device trim or active case.
  - c. When armor plate is used on doors with touch bar type exit devices, determine height of plate by measuring from bottom of door to 1" below bottom of touch bar, and notch for active case.
4. Acceptable manufacturers:
  - a. Rockwood
  - b. Baldwin

I. Stops:

1. General:
  - a. ANSI A156.16 - 1989 Grade 1 criteria.
  - b. Provide stops where scheduled, wall or floor, as opening conditions dictate, utilizing wall stops wherever possible.
2. Description:
  - a. Wall stops: Wrought brass, bronze or stainless steel
  - b. Floor stops: Cast brass or bronze, and plated as required.
  - c. Make selection of floor stop height based upon floor conditions and door undercut.
3. Acceptable products:
  - a. Rockwood 487

J. Thresholds:

1. General:
  - a. ANSI A156.21 - 1989, Grade 1 criteria.
  - b. Comply with A.D.A. requirements, unless otherwise scheduled.
2. Description:
  - a. Flat profile
  - b. Installation locations are scheduled.
  - c. Provide templates for thresholds to related door suppliers to coordinate proper undercut.
3. Acceptable products:

- a. Durable Products C-200 series.
- b. Reese

K. Door Seal:

- 1. General:
  - a. ANSI A156.21 - 1989, Grade 1 criteria.
- 2. Description:
  - a. Flat profile.
  - b. Dimensions: Appropriate to door opening size.
  - c. Installation locations are scheduled.
  - d. Provide templates for thresholds to related door suppliers to coordinate proper undercut.
- 3. Mounting:
  - a. Apply related hardware (closer, foot bracket, strike, etc.) on top of weatherstrip.
  - b. Do not notch or splice weather strip.
  - c. Adjust related template hardware locations, as required.
- 4. Acceptable products:
  - a. Durable Products 306 with vinyl insert for jamb and head
  - b. Reese
  - c. Zero

2.05 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.06 HARDWARE FINISHES

- A. General:
  - 1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible and except as otherwise indicated.
  - 2. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
  - 3. In general, match items to the manufacturer's standard finish for the latch and lock set (or push/pull units if no latch/lock sets) for color and texture.
  - 4. Provide finishes matching those established by BHMA or, if none established, match the Architect's sample.
  - 5. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than that specified for the applicable units of hardware by referenced standards.
  - 6. Finish designations used in schedules and elsewhere listed in ANSI A156.18 "Materials and Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
  
- B. Provide the following hardware finishes, unless otherwise scheduled:
  - 1. Hinge US26D - Satin Chrome or  
US32D - Satin Stainless Steel
  - 2. Exit device US32D - Satin Stainless Steel
  - 3. Lock US26D - Satin Chrome
  - 4. Cylinder To match surrounding hardware
  - 5. Closer AL - Sprayed Aluminum
  - 6. Push/pull bar US32D - Satin Stainless Steel
  - 7. Kick/mop/armor plate US32D - Satin Stainless Steel
  - 8. Wall stops US32D - Satin Stainless Steel

9.	Floor stops	US26D - Satin Chrome
10.	Heavy duty stops	US26D - Satin Chrome
11.	Overhead stops	US32D - Satin Stainless Steel
12.	Thresholds/door seals	AL - Anodized Aluminum

- C. Base material: Manufacturer's standard high-carbon steel, brass, or bronze.

### PART 3 - EXECUTION

#### 3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

#### 3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Coordinate all hardware with owner or owner's construction manager for any additional security tie-in prior to construction.

#### 3.03 INSTALLATION

- A. General:
1. Install each item in its proper location firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.
  2. Handing, hardware heights, locations, and degree of opening swing are indicated in the Drawings and Finish Hardware Schedule.
  3. Mount finish hardware units:
    - a. At recommended heights and locations as shown in approved finish hardware schedule, complying with requirements of the A.D.A., and pertinent provisions of the Building Code.
    - b. To function at proper degree of opening of doors as indicated on approved finish hardware schedule.
    - c. By manufacturer's template.
    - d. Prior to final finishing of the door. Remove hardware to allow finishing of door, and permanently reinstall hardware upon completion of finishing operation.
  3. Reinforce, where necessary, the substrate to assure proper attachment.
  4. Drill and countersink units which are not factory-prepared for anchorage fasteners.
  5. Space fasteners and anchors in accordance with industry standards.

B. Installing closers:

1. Mount closers per manufacturer's template, and secure the Architect's approval of the closer installation.
2. The Contractor will be required to **REPLACE** doors onto which closers are improperly mounted at no additional cost to the Owner. Repair or patching of such doors will not be acceptable.

- C. Installing thresholds at exterior doors: Set in full bed of butyl-rubber, or polyisobutylene mastic sealant.

#### 3.04 FIELD QUALITY CONTROL

- A. Inspection of final hardware installation: The Contractor, hardware suppliers, and Architectural Hardware Consultant (AHC) shall thoroughly check the quality of the installation and the functionality of each unit of finish hardware at all openings in the Work. The Hardware Supplier shall forward a detailed written report of all operational or installation deficiencies to the Architect and Contractor.

3.05 CLEANING AND ADJUSTING

- A. Check and adjust each item of hardware and each door upon completion of final installation. Verify proper function, and replace units which cannot be made to operate freely and smoothly, as intended for the application.
- B. Clean adjacent surfaces soiled by hardware installation.

3.06 FINISH HARDWARE SCHEDULE

Hardware Sets – **REFER TO DOOR SCHEDULE DRAWING**

**END SECTION 087100**

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**SECTION 088000  
GLAZING**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
1. Doors.
  2. Window Assembly.

1.2 DEFINITIONS

- A. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal movement and impact loads (where applicable) without failure, including glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
    - a. Specified Design Loads: As required by building code.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
  2. For laminated-glass lites, properties are based on products of construction indicated.

#### 1.4 SUBMITTALS

- A. Product Data: For glass product and glazing material indicated.
- B. Samples: 12-inch square, for glass product indicated.
- C. Glazing Schedule: Use same designations indicated on Drawings.

#### 1.5 QUALITY ASSURANCE

- A. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
- C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."

#### 1.6 WARRANTY

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following manufacturers:
  - 1. AGC Flat Glass North America.
  - 2. Guardian Industries Corp.
  - 3. Oldcastle Glass Group
  - 4. Viracon, Inc.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
  - 1. Products: Subject to compliance with requirements, provide one of the products specified.
  - 2. Product: Subject to compliance with requirements, provide product specified.
  - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

## 2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass (Tempered): ASTM C 1048; Type I (transparent flat glass)
  1. minimum thickness: 1/4"
- C. Pyrolytic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during initial manufacture, and complying with other requirements specified.
- D. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment and complying with other requirements specified.
- E. Mirrors: Silvering and protective coatings.

## 2.3 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
  1. Neoprene, ASTM C 864.
  2. EPDM, ASTM C 864.
  3. Silicone, ASTM C 1115.
  4. Thermoplastic polyolefin rubber, ASTM C 1115.
  5. Any material indicated above.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
  1. Neoprene.
  2. EPDM.
  3. Silicone.
  4. Thermoplastic polyolefin rubber.
  5. Any material indicated above.

## 2.4 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
  1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- a. Uses Related to Glazing Substrates: G, A, and, as applicable to glazing substrates indicated, O.
- C. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

## 2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:
1. Type 1, for glazing applications in which tape acts as the primary sealant.
  2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

- G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

## 2.7 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

## PART 3 - EXECUTION

### 3.1 GLAZING

- A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
  1. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
  2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
  3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
  4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
  5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
  6. Provide spacers for glass lites.
  7. Provide edge blocking where indicated or needed to prevent glass lites from moving.
- B. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
  1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
  2. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
  3. Apply heel bead of elastomeric sealant.

4. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
  5. Apply cap bead of elastomeric sealant over exposed edge of tape.
- C. Gasket Glazing: Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

### 3.2 CLEANING AND PROTECTION

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.
- B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

### 3.3 GLASS SCHEDULE:

- A. **Glass Type,** VNE1-63 1” Neutral Low-E Insulated Glass.
- a) Exterior Glass Ply: Clear Tempered
  - b) Ceramic Frit: None
  - c) Pattern: None
  - d) Orientation: None
  - e) Coating:
  - f) Airspace: 1/2 “airspace – mill finish
  - g) Silicone: Light Grey
  - h) Interior Glass Ply: 3/16” Clear Tempered

Performance Requirements not including the Interior Glass Interlayers.

- i) Visible Light transmittance 62%
- j) Ultraviolet: 5%
- k) Winter U Value: 0.29
- l) Summer U-Value 0.26
- m) Shading Coefficient: 0.33
- n) Solar Heat Gain Coefficient: 0.29
- o) Light to Solar Gain Ratio: 2.14

**END OF SECTION 088000**

**SECTION 124600**  
**WINDOW SHADE SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manually-operated window shades and accessories.

1.02 REFERENCES

- A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 1996 (Reapproved 2002).
- B. NFPA 70 - Fire Tests for Flame-Resistant Textiles; 2004.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's catalog data, product descriptions, installation instructions, detail sheets, and specifications for each type system specified.
- B. Samples for Verification: Shade fabric sample and paint finish as selected.
- C. Shop Drawings: Show dimensions and interface with other products.
  - 1. Room schedule including field-verified dimensions of each opening to receive window shade system.
  - 2. Indicate model number, operator, fabric selection, and mounting type.
  - 3. Indicate control type and provide zone schedule if necessary.
- D. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, and instructions for operating hardware and controls.
- E. Roller Shade Schedule: Use same room designations as indicated on Drawings and include opening sizes and key to typical mounting details.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience installing products comparable to those specified in this section.
- B. Mock-up: Provide a mock-up of each window shade system for evaluation of mounting, appearance and accessories.
  - 1. Mock-up may remain as part of the work.
  - 2. Locate mock-up in window designated by Architect.
  - 3. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.05 WARRANTY

- A. Roller shade hardware, chain and shade fabric: Manufacturer's standard warranty.

1.06 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for project when occupied for its intended use.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original cartons.
- B. Individually package and mark shades with room number and opening number.
- C. Inspect the materials upon delivery to assure that specified products have been received.
- D. Store and handle shades to prevent damage to fabrics, finishes, and operators prior to installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Mechoshade: [www.mechoshade.com](http://www.mechoshade.com).
- B. HunterDouglas. [www.hunterdouglasarchitectural.com](http://www.hunterdouglasarchitectural.com)

### 2.02 SHADE SYSTEMS

System 1: Manual window shade, Fabric 1, regular roll direction, mounted inside window frame, chain operated control.

### 2.03 FABRIC

- A. Fabric 1: Solar Control.
  - 1. Mechoshade, Classic Blackout:
  - 2. HunterDouglas, Avila Twilight:

### 2.04 MANUALLY OPERATED WINDOW SHADE SYSTEM

- A. Products:
  - 1. Mechoshade; M/5 System.
  - 2. HunterDouglas; RB 500 Roller Series.
- B. Chain Operation: Bi-directional wrap spring clutch shall allow for shade to stop and hold at any position.
- C. Chain Operator Position: Right-hand side, unless otherwise noted on drawings.
- D. Bead Chain: No. 10 stainless steel.
- E. Clutch mechanism: Fabricated from high carbon steel.
  - 1. Components fabricated from styrene based plastics, polyester or reinforced polyester are not acceptable.

### 2.05 SHADE COMPONENTS

- A. Rollers:
  - 1. Shade roller tube shall be extruded aluminum of diameter and wall thickness required to support shade fabric. Maximum allowable deflection  $L/700$ .
  - 2. Rollers shall be easy to remove from support brackets.
- B. Mounting Brackets: Stamped steel, custom fabricated as required for mounting style indicated.
- C. Hembar: Concealed.

### 2.06 ACCESSORIES

#### WINDOW SHADE SYSTEMS

- A. Finish for accessories, unless otherwise noted: Clear anodized aluminum.
- B. Fascia: L-shaped extruded aluminum shall conceal mounting hardware, roller tube, and fabric rolled on tube.
- C. Pocket: Extruded aluminum shall conceal mounting hardware, roller tube, and fabric rolled on tube.

## 2.07 SHADE FABRICATION

- A. Shades mounted inside window frame: Window shade system shall completely fill opening from head to sill. Provide 1/4 inch clearance between each side of the shade and jamb, unless indicated otherwise.
- B. Shade fabric shall hang flat without buckling or distortion and in the same direction.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify contractor of unsatisfactory preparation before proceeding.

### 3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Verify that blocking and framing necessary to carry shade assembly hardware is properly installed and secure.

### 3.03 INSTALLATION

- A. Install window shade systems level, plumb, square and true according to manufacturer's written instructions and these specifications.
- B. Adjust and balance roller shades to operate smoothly, safely and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- D. Installer to train owner's maintenance personnel to adjust, operate and maintain roller shade systems.

### 3.04 PROTECTION

- A. Protect installed products until completion of project.

### 3.05 SCHEDULE

- A. Install on all exterior windows but those in stair wells.

END OF SECTION

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