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DIVISION 08 - DOORS & WINDOWS

SECTION 08110

STEEL DOORS AND FRAMES

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SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

This section covers the furnishing and installation of hollow metal construction, including doors, hollow metal panels, door and window frames, stops, and trim, indicated on the drawings as HM. This section also covers the furnishing and installation of new metal doors for the railroad underpass. Work also includes hollow metal frames for windows as shown. Door signs shall be as specified in SECTION: INTERIOR SIGNAGE.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A250.8	(1998) Steel Doors and Frames

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 236	(1989; R 1993) Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box
ASTM C 976	(1990; R 1996) Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box
ASTM D 2863	(1997) Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM E 90	(1997) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

DOOR AND HARDWARE INSTITUTE (DHI)

DHI A115.1G	(1994) Installation Guide for Doors and Hardware

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 862	(1987) Hollow Metal Manual; Section: Guide

	Specifications for Commercial Security Hollow Metal Doors and Frames
NAAMM HMMA 865	(1995) Hollow Metal Manual; Section: Guide Specifications for Swinging Sound Control Hollow Metal Doors and Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1999) Fire Doors and FireWindows
NFPA 80A	(1996) Protection of Buildings from Exterior Fire Exposures
NFPA 101	(1997; Errata 97-1; TIA-97.1) Life Safety Code
NFPA 252	(1995) Fire Tests of Door Assemblies

STEEL DOOR INSTITUTE (SDOI)

SDOI SDI-106	(1996) Standard Door Type Nomenclature
SDOI SDI-100	(1985) Standard Steel Doors and Frames
SDOI SDI-107	(1997) Hardware on Steel Doors (Reinforcement - Application)

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Steel Doors and Frames; GA.

Drawings using standard door type nomenclature in accordance with SDOI SDI-106 indicating the location of each door and frame, elevation of each model of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location of anchors for frames, and thicknesses of metal. Drawings shall include catalog cuts or descriptive data for the doors, frames, and weatherstripping including air infiltration data and manufacturers printed instructions. Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

1.3 DELIVERY AND STORAGE

During shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or shall be provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the ground and under a weathertight covering permitting air circulation. Doors and assembled frames shall be stored in an upright position in accordance with DHI A115.1G.

Abraded, scarred, or rusty areas shall be cleaned and touched up with matching finishes.

PART 2 PRODUCTS

2.1 DOORS AND FRAMES

Doors and frames shall be factory-fabricated conforming to SDOI 100, the grades shown on the door and door frame schedules, and the additional requirements specified herein. Exterior doors and frames shall be hot-dipped galvanized. Rubber silencers shall be installed on door frames. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under SECTION: BUILDERS' HARDWARE. Where frames are installed in plaster or masonry walls, plaster guards shall be provided on door frames at hinges and strikes.

2.2 Doors

Hollow metal doors shall meet the requirements of HMMA 862. Doors shall receive factory prime paint compatible with substrate and finish paint specified in SECTION: PAINTING, GENERAL. Exterior doors shall have top edges closed flush and sealed against water penetration.

2.2.1 Interior Doors

SDI-100, Grade II, heavy-duty, Model 2, minimum 18-gage cold-rolled sheet steel faces. Interior doors shall be phosphatized inside and outside.

2.2.2 Exterior Doors

SDI-100, Grade III, extra heavy-duty, Model 2, minumum 16-gage hot dipped galvanized steel faces. Exterior doors shall be insulated with polystyrene or polyisocyanurate insulation applied by spray in foam.

2.2.3 Fire Rated Doors

Fire rated door assemblies shall bear the listing identification label of a nationally recognized testing laboratory qualified to perform tests of fire door assemblies in accordance with NFPA 252 and having a listing for the tested assemblies. Listing identification labels shall be constructed and permanently fixed to the door.

2.3 Glass

Glass requirements are specified in SECTION: GLASS AND GLAZING. Removable glazing beads shall be screw-on or snap-on type.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with DHI A115.1G. Preparation for surface applied hardware shall be in accordance with SDOI SDI-107. Weatherstripping shall be installed at exterior door openings to provide a weathertight installation. Steel doors and frames shall be reinforced, drilled, and tapped to receive mortise hinges, locks, latches, flush bolts, and closers as required. Installation and operational characteristics of

fire doors shall be in accordance with NFPA 80, NFPA 80A and NFPA 101.

3.2 PAINTING

Galvanized doors and frames shall be prepared and painted as specified for "galvanized, aluminum and aluminum alloy surfaces" in SECTION: PAINTING, GENERAL.

-- End of Section --

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DIVISION 08 - DOORS & WINDOWS

SECTION 08210

WOOD DOORS

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SECTION 08210

WOOD DOORS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI-02	(1994) Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1995) Fire Doors and Windows
NFPA 101	(1997) Safety to Life from Fire in Buildings and Structures

NATIONAL WOOD WINDOW & DOOR ASSOCIATION (NWWDA)

NWWDA I.S. 1-A	(1993) Architectural Wood Flush Doors

1.2 GENERAL REQUIREMENTS

1.2.1 Standard Products

Doors shall be of the type, size, and design indicated on the drawings, and shall be the standard products of manufacturers regularly engaged in the manufacture of wood doors.

1.2.2 Marking

Each door shall bear a stamp, brand, or other identifying mark indicating quality and construction of the door. The identifying mark or a separate certification shall include identification of the standard on which construction of the door is based, identity of the manufacturing plant, identification of the standard under which preservative treatment, if used, was made, and identification of the doors having a Type I glue bond.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Wood Doors and Frames; GA.

Drawings indicating the location of each door, elevation of each type of door, details of construction, marks to be used to identify the doors, and location and extent of hardware blocking. Drawings shall include catalog cuts or descriptive data for doors, weatherstripping, flashing, and thresholds to be used. Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

1.4 STORAGE

Doors shall be stored in fully covered areas and protected from damage and from extremes in temperature and humidity. Doors shall be stored on supports to prevent warping or twisting, and to provide ventilation. Factory cartons or wrappers shall be kept intact until installation.

1.5 HARDWARE

Hardware, including weatherstripping and thresholds, is specified in Section 08700 BUILDERS' HARDWARE.

1.6 GLAZING

Glazing is specified in Section 08810 GLASS AND GLAZING.

PART 2 PRODUCTS

2.1 GENERAL FABRICATION REQUIREMENTS

2.1.1 Edge Sealing

Wood end-grain exposed at edges of doors shall be sealed prior to shipment.

2.1.2 Adhesives

Adhesives shall be in accordance with NWWDA I.S. 1-A, requirements for Type II Bond Doors (water-repellent) for interior doors. Adhesive for doors to receive a transparent finish shall be nonstaining. Adhesives shall contain no formaldehydes.

2.1.3 Prefitting

Doors shall be furnished prefitted or unfitted at the option of the Contractor.

2.2 FLUSH DOORS

Flush doors shall be solid core and shall conform to NWWDA I.S. 1-A. Wood doors shall be 5-ply or 7-ply construction with faces, stiles, and rails bonded to the cores.

2.2.1 Core Construction

Door construction shall conform to NWWDA I.S. 1-A.

2.2.2 Natural Finished Wood Veneer Doors

Veneer doors to receive natural finish shall be premium grade red oak veneer in accordance with NWWDA I.S. 1-A. Doors shall be prepared to receive stain as specified in SECTION: PAINTING, GENERAL.

2.3 WOOD FRAMES

Wood frames shall be provided where shown on the drawings. Wood frames shall be Premium Grade in species to match door face veneer species. For exterior door openings, frames shall be rabbeted from a solid board to provide an integral stop. For interior frames, applied stops are permitted unless otherwise indicated. Jamb sections shall be dadoed and screwed in place. Finish for frames and trim shall match the doors. Wood frames shall comply with AWI-02 Section 900.

PART 3 EXECUTION

3.1 INSTALLATION OF DOORS

3.1.1 General Use Doors

Doors shall be prepared to receive hardware specified in SECTION: BUILDERS HARDWARE. Doors shall be fit, hung, and trimmed as required. Door shall have a clearance of 1/8 inch at the sides and top and shall have a bottom clearance of 1/4 inch over thresholds and 1/2 inch at other locations unless otherwise shown. The lock edge or both edges of doors shall be beveled at the rate of 1/8 inchin 2 inches. Cuts made on the job shall be sealed immediately after cutting, using a clear varnish or sealer. Vertical edges of doors which have not been rounded or beveled at the factory shall be eased when the doors are installed.

3.1.2 Fire Doors

Installation, hardware, and operational characteristics shall conform to NFPA 80 and NFPA 101 and shall be in strict conformance with the manufacturer's printed instructions. Properly sized pilot holes shall be drilled for screws in door edges. Factory applied labels shall remain intact where installed. Labeled hinge stile edge and top edge of door shall not be trimmed. Lockstile edge and bottom edge may be trimmed only to the extent recommended by the door manufacturer.

3.2 INSTALLATION OF WOOD FRAMES

Frames shall be set plumb and square, and rigidly anchored in place securely seated to floor using finish type nails. Double wedge blocking shall be provided near the top, bottom, and mid-point of each jamb.

3.3 FIELD FINISHING

Doors to receive field finishing shall be factory primed or sealed, as required, and then shall be finished in accordance with Section 09900 PAINTING, GENERAL. Factory applied sealer shall not prevent doors from accepting field stain and finish. Field touch-up of factory finishes shall be in accordance with manufacturers instructions.

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DIVISION 08 - DOORS & WINDOWS

SECTION 08330

OVERHEAD COILING DOORS

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SECTION 08330

OVERHEAD COILING DOORS

PART 1 GENERAL

This section covers the furnishing and installation of overhead doors, including glazed panel sections as indicated and specified herein. Work also includes the furnishing and installation of electric operators as specified herein.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 653/A 653M	(1997) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process
ASTM E 84	(1997a) Surface Burning Characteristics of Building Materials
ASTM E 330	(1996) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE Fundament HDBK-IP	(1997) Handbook, Fundamentals I-P Edition
ASHRAE Fundament HDBK-SI	(1997) Handbook, Fundamentals SI Edition

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2	(1993) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993) Industrial Control and Systems Enclosures
NEMA MG 1	(1993; Rev 1, Rev 2, Rev 3) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code

NFPA 80 (1995) Fire Doors and Fire Windows

1.2 DESCRIPTION

Doors shall be spring counterbalanced, coiling type with interlocking slats, complete with guides, fastenings, hood brackets, and operating mechanisms, and shall be designed for use on exterior openings. Each door shall be provided with a permanent label showing the manufacturer's name and address and the model number of the door.

1.2.1 Wind Load Requirements

Doors and components shall be designed to withstand the minimum design wind load of 25 psf. Doors shall be constructed to sustain a superimposed load, both inward and outward, equal to 1-1/2 times the minimum design wind load. Design windload requirements for the door design shall be in accordance with the uniform static air pressure difference test procedures of ASTM E 330. Recovery shall be at least 3/4 of the maximum deflection within 24 hours after the test load is removed. Sound engineering principles may be used to interpolate or extrapolate test results to door sizes not specifically tested

1.2.2 Operational Cycle Life

All portions of the door and door operating mechanism that are subject to movement, wear, or stress fatigue shall be designed to operate through a minimum number of 50,000 cycles. One complete cycle of door operation is defined as when the door is in the closed position, moves to the full open position, and returns to the closed position.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Overhead Coiling Door Unit; FIO.

Manufacturer's catalog data, test data. A list of parts and supplies, with current unit prices and source of supply shall be submitted. A list of parts recommended by the manufacturer that require periodic maintenance and recommended maintenance schedules shall be submitted.

SD-04 Drawings

Overhead Coiling Door Unit; GA.

Drawings showing the location of each door including schedules. Drawings shall include elevations of each door type, details and method of anchorage, details of construction, location and installation of hardware, shape and thickness of materials, details of joints and connections, and details of guides, power operators, controls, and other fittings.

SD-06 Instructions

Overhead Coiling Door Unit; FIO.

Manufacturer's preprinted installation instructions.

SD-19 Operation and Maintenance Manuals

Operation Manual; FIO.

Complete copies of operation instructions provided by the manufacturer outlining the step-by-step procedures required for motorized door's operation shall be submitted. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features.

Maintenance and Repair Manual; FIO.

Complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and trouble-shooting guides shall be submitted. The instructions shall include simplified diagrams for the equipment as installed. A copy of the manufacturer's standard warranty shall be provided.

1.4 DELIVERY AND STORAGE

Doors shall be delivered to the jobsite wrapped in a protective covering with the brands and names clearly marked thereon. Doors shall be stored in a dry location that is adequately ventilated and free from dirt and dust, water, and other contaminants, and in a manner that permits easy access for inspection and handling.

PART 2 PRODUCTS

2.1 OVERHEAD COILING DOORS

Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to clear the opening. Exterior doors shall be mounted as indicated.

2.1.1 Curtains

The curtains shall coil up on a barrel supported at the head of opening on brackets, and shall be balanced by helical springs. Steel slats for doors less than 15 feet wide shall be minimum bare metal thickness of 0.0269 inches (22 gauge). Steel slats for doors from 15 feet wide to 21 feet wide shall be minimum bare metal thickness 0.0329 inches (20 gauge). Steel slats for doors 21 feet wide and wider shall be minimum bare metal thickness of 0.0438 inches (18 gauge). Slats shall be of the minimum bare metal decimal thickness required for the width indicated and the wind pressure specified above.

2.1.1.1 Insulated Curtains

The slat system shall supply a minimum R-value of 5 when calculated in accordance with ASHRAE Fundament HDBK-IP. Slats shall be of the flat type as standard with the manufacturer. Slats shall consist of a urethane or polystyrene core not less than 11/16 inch thick, completely enclosed within metal facings. Exterior face of slats shall be gauge as specified for curtains. Interior face shall be not lighter than 24 gauge. The insulated slat assembly shall have a flame spread rating of not more than

25 and a smoke development factor of not more than 50 when tested in accordance with ASTM E 84.

2.1.2 Endlocks and Windlocks

The ends of each alternate slat for interior doors shall have malleable endlocks of manufacturer's stock design. In addition to endlocks, exterior doors shall have the manufacturer's standard windlocks as required to withstand the wind load. Windlocks shall prevent the curtain from leaving guides because of deflection from specified wind pressure.

2.1.3 Bottom Bar

The curtain shall have a standard bottom bar consisting of two hot-dip galvanized steel angles for steel doors. A sensing edge shall be attached to the bottom bar of doors that are electric-power operated.

2.1.4 Guides

Guides shall be steel structural shapes or formed steel shapes, of a size and depth to provide proper clearance for operation and resistance under the design windload. Guides shall be attached to adjoining construction with fasteners recommended by the manufacturer. Spacing of fasteners shall be as required to meet the minimum design windload.

2.1.5 Barrel

The barrel shall be steel pipe or commercial welded steel tubing of proper diameter for the size of curtain. Deflection shall not exceed 0.03 inch per foot of span. Ends of the barrel shall be closed with metal plugs, machined to fit the pipe.

2.1.6 Springs

Oil tempered helical steel counter-balance torsion springs shall be installed within the barrel and shall be capable of producing sufficient torque to assure easy operation of the door curtain. Access shall be provided for spring tension adjustment from outside of the bracket without removing the hood.

2.1.7 Brackets

Brackets shall be of steel plates to close the ends of the roller-shaft housing, and to provide mounting surfaces for the hood. An operation bracket hub and shaft plugs shall have sealed prelubricated ball bearings.

2.1.8 Hoods

Hoods shall be steel with minimum bare metal thickness of 0.0209 inches (24 gauge) formed to fit contour of the end brackets, and shall be reinforced with steel rods, rolled beads, or flanges at top and bottom edges. Multiple segment and single piece hoods shall be provided with support brackets of the manufacturer's standard design as required for adequate support.

2.1.9 Weatherstripping

Exterior doors shall be fully weatherstripped. A compressible and replaceable weather seal shall be attached to the bottom bar. Weather seal

at door guides shall be continuous vinyl or neoprene, bulb or leaf type, or shall be nylon-brush type. A weather baffle shall be provided at the lintel or inside the hood. Weatherstripping shall be easily replaced without special tools.

2.1.10 Slat Openings

2.1.10.1 Vision Lites

Vision lites shall be those standard for the manufacturer. The lite assembly shall consist of 3 separate lites across and 5 slats high. Opening shall have manufacturer's standard acrylic coverings.

2.1.11 Operation

Doors shall be operated by means of electric power with auxiliary chain hoist.

2.1.11.1 Electric Power Operator With Auxiliary Chain Hoist Operation

Electric power operators shall be heavy-duty industrial type. The unit shall operate the door through the operational cycle life specified. The electric power operator shall be complete with electric motor, auxiliary operation, necessary means of reduction, brake, mounting brackets, push button controls, limit switches, magnetic reversing starter, and all other accessories necessary to operate components specified in other paragraphs of this section. The operator shall be so designed that the motor may be removed without disturbing the limit-switches settings and without affecting the emergency chain operator. Doors shall be provided with an auxiliary operator for immediate emergency manual operation of the door in case of electrical failure. The emergency manual operating mechanism shall be so arranged that it may be operated from the floor without affecting the settings of the limit switches. A mechanical device shall be included that will disconnect the motor from the drive operating mechanism when the auxiliary operator is used. Where control voltages differ from motor voltage, a control voltage transformer shall be provided in and as part of the electric power operator system. Control voltage shall not exceed 120 volts.

a. Motors: Drive motors shall conform to NEMA MG 1, shall be high-starting torque, reversible type, and shall be of sufficient horsepower and torque output to move the door in either direction from any position at a speed range of 6 to 8 inches per second without exceeding the rated capacity. Motors shall be suitable for operation on 208 volts, 60 hertz, 3-phase current and shall be suitable for across-the-line starting. Motors shall be designed to operate at full capacity over a supply voltage variation of plus or minus 10 percent of the motor voltage rating. Motors shall be provided with overload protection.

b. Controls: Control equipment shall conform to NEMA ICS 2. Enclosures shall conform to NEMA ICS 6, Type 12 (industrial use. Each control station shall be of the three position button or switch type, marked "OPEN," "CLOSE," and "STOP." The "OPEN" and "STOP" controls shall be of the momentary contact type with seal-in contact. The "CLOSE" control shall be of the momentary contact type. When the door is in motion and the "STOP" control is pressed, the door shall stop instantly and remain in the stop position; from the stop position, the door shall be operable in either direction by the "OPEN" or "CLOSE" controls. Controls shall be of the full-guarded type to prevent accidental operation. Readily adjustable

limit switches shall be provided to automatically stop the doors at their fully open and closed positions.

c. Sensing Edge Device: The bottom edge of electric power operated doors shall have an electric sensing edge that will reverse the door movement upon contact with an obstruction and cause the door to return to its full open position. The sensing edge shall not substitute for a limit switch. Exterior doors shall be provided with a combination compressible weather seal and sensing edge.

d. Electrical Work: Conduit and wiring necessary for proper operation shall be provided under Section 16416 LOCK ELECTRICAL WORK. Flexible connections between doors and fixed supports shall be made with flexible type SJO cable, except in hazardous locations where wiring shall conform to NFPA 70, as appropriate. The cable shall have a spring-loaded automatic take up reel or a coil cord equivalent device.

2.1.12 Inertia Brake

Overhead door shall have a mechanical inertia brake device which will stop the door from free fall in any position, should there be a failure in the motor operator brake or roller chain drive. The unit shall be capable of being reset with a back drive action.

2.1.13 Locking

Locking for motor operated doors shall consist of self-locking gearing and optional master keyed cylinder with electrical interlock.

2.1.14 Finish

Steel slats and hoods shall be hot-dip galvanized G60 in accordance with ASTM A 653/A 653M and shall be treated for paint adhesion and shall receive a factory baked-on prime coat for field finishing. The paint system shall withstand a minimum of 1500 hours without blistering, bubbling, or rust. Surfaces other than slats, hood, and faying surfaces shall be cleaned and treated to assure maximum paint adherence and shall be given a factory dip or spray coat of rust inhibitive metallic oxide or synthetic resin primer. Color shall be as selected by the Contracting Officer from the manufacturer's standard colors.

PART 3 EXECUTION

3.1 INSTALLATION

Doors shall be installed in accordance with approved detail drawings and manufacturer's instructions. Anchors and inserts for guides, brackets, motors, switches, hardware, and other accessories shall be accurately located. Upon completion, doors shall be free from warp, twist, or distortion. Doors shall be lubricated, properly adjusted, and demonstrated to operate freely.

3.2 FIELD PAINTED FINISH

Steel doors and frames shall be field painted in accordance with Section 09900 PAINTING, GENERAL. Weatherstrips shall be protected from paint. Finish shall be free of scratches or other blemishes.

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DIVISION 08 - DOORS & WINDOWS

SECTION 08371

FLOOD PANELS

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SECTION 08371

FLOOD PANELS

PART 1 GENERAL

This section covers the furnishing and installation of factory assembled flood panels, frames, and hardware for the downstream control stand as indicated and specified herein.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA ADM-1	(1994) Aluminum Design Manual - Specifications and Guidelines for Aluminum Structures

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME	Boiler & Pressure Vessels, Rules for Construction of Pressure Vessel Codes, Section VIII

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1996) Structural Welding Code Steel
AWS D1.2	(1990) Structural Welding Code Aluminum
AWS D1.2A	(1983) Commentary on Structural Welding Code - Aluminum

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221	(1996) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(1995) Minimum Design Loads for Buildings and Other Structures

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Flood Panel Details; GA.

Submit shop drawings for flood panels, including dimensioned plans and elevations, sections, connections and anchorage, and parts list.

SD-06 Instructions

Flood Panel Instructions; FIO.

Submit installation and maintenance instruction for flood panels.

1.3 DELIVERY AND STORAGE

Doors shall be delivered to the jobsite with the brands and names clearly marked thereon. Doors shall be stored in a dry location that is ventilated adequately and free from dust, water, and other contaminants, and in a manner that permits easy access for inspection and handling. Damaged items that cannot be restored to like-new condition shall be replaced.

PART 2 PRODUCTS

2.1 GENERAL

2.1.1 Standards

Materials, as applicable, shall comply with applicable provisions of the AWS D1.1, AWS D1.2, and AWS D1.2A.

2.1.2 Qualifications

The manufacturer of the flood panels shall have at least five years of successful experience in the design and fabrication of flood panels of the type selected.

2.2 MATERIALS

Flood panels and storage brackets and all components shall be fabricated from aluminum plate, of alloy-temper 6061-T6, per ASTM B 221. Two wall-mounted storage brackets and one top latch shall be provided for each flood panel for storage when not in use.

a. Finish: Panel shall be abrasive finished anodized aluminum.

b. Gaskets shall be 25 durometer neoprene, molded, with full molded corners; miter joints will not be allowed.

c. Grab Handles shall be provided on top edge of panels for ease of handling.

2.3 DESIGN

Flood panels shall be designed with applicable safety factors in accordance with AA ADM-1, and shall provide an effective seal against the design flood level.

Frame shall have mounting holes for expansion anchors and bolts.

PART 3 EXECUTION

3.1 INSTALLATION

Install flood panels in accordance with manufacturers instructions and approved shop drawings.

3.2 INSPECTION AND TEST

All welds in the potential "leak path" shall be inspected in accordance ASME Boiler and Pressure Vessel Codes, Section VIII, Division 1, Appendix VIII.

Finished assembly, or assembly similar in design, shall be factory leak tested to verify that it will withstand the design hydrostatic pressure.

-- End of Section --

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DIVISION 08 - DOORS & WINDOWS

SECTION 08520

WINDOWS AND ALUMINUM DOORS

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SECTION 08520

WINDOWS AND ALUMINUM DOORS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

AAMA 101	(1997) Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors
AAMA 1503	(1998) Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E 330	(1997el Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM E 547	(1996) Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential

INSECT SCREENING WEAVERS ASSOCIATION (ISWA)

ISWA IWS 089	(1990) Recommended Standards and Specifications for Insect Wire Screening (Wire Fabric)

SCREEN MANUFACTURERS ASSOCIATION (SMA)

SMA ANSI/SMA 1004	(1987) Aluminum Tubular Frame Screens for Windows

1.2 WINDOW PERFORMANCE

Aluminum windows shall be designed to meet the following performance requirements. Testing requirements shall be performed by an independent testing laboratory or agency.

1.2.1 Structural Performance

Structural test pressures on window units shall be for positive load (inward) and negative load (outward) in accordance with ASTM E 330. After testing, there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms or any other damage which could cause window to be inoperable. There shall be no permanent deformation of any main frame, sash or ventilator member in excess of the requirements established by AAMA 101 for the window types and classification specified in this section.

1.2.2 Air Infiltration

Air infiltration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 283.

1.2.3 Water Penetration

Water penetration shall not exceed the amount established by AAMA 101 for each window type when tested in accordance with ASTM E 547.

1.2.4 Thermal Performance

Thermal transmittance for thermally broken aluminum windows with insulating glass shall not be less than an R-Value of R3.33 when tested in accordance with AAMA 1503.

1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Aluminum Windows; FIO.

Manufacturer's descriptive data and catalog cut sheets.

SD-04 Drawings

Aluminum Windows; GA.

Shop drawings shall indicate general construction configurations, elevations of all door and window framing units, thicknesses of metal, fastenings, methods of installation and anchorage, size and spacing of anchors, methods of glazing, details of installation, connections with other work, and schedules showing the location of each unit. In addition, shop drawings shall include a schedule showing the location of each door and elevations of each door and frame type. Additional shop drawing information for windows shall include locations of operating hardware, mullion details, method and material for weatherstripping, and method of attaching screens.

SD-06 Instructions

Aluminum Windows; FIO.

Manufacturer's preprinted installation instructions and cleaning instructions. Manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period shall be provided.

SD-13 Certificates

Aluminum Windows; FIO.

Certificates stating that the aluminum windows are AAMA certified conforming to requirements of this section. Labels or markings permanently affixed to the window will be accepted in lieu of certificates.

SD-14 Samples

Aluminum Windows; GA.

Manufacturer's standard color samples of the specified finishes.

1.4 QUALIFICATION

Manufacturer shall have the facilities capable of meeting contract requirements, single-source responsibility and warranty.

1.5 DELIVERY AND STORAGE

Materials shall be delivered to project site and stored in accordance with manufacturer's recommendations. Damaged windows or doors shall be replaced.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Swing type aluminum doors, fixed and operable aluminum windows, and aluminum framing system shall be provided at the locations indicated. Size and design of door, window, and framing shall be as shown on the drawings. All doors, windows, and frames shall be thermally broken type. Doors shall be furnished complete with trim and other accessories indicated and specified. Include aluminum screen doors as indicated. For glass and glazing of doors and windows, refer to SECTION: GLASS AND GLAZING.

2.2 ALUMINUM WINDOW TYPES

Aluminum windows shall consist of complete units including sash, glass, frame, weatherstripping, and hardware. Windows shall conform to AAMA 101 HC40 type. Windows shall be double-glazed and shall have a minimum condensation resistance factor of 56 when tested in accordance with AAMA 1503. Operable windows shall permit cleaning the outside glass from inside the building.

2.2.1 Casement Windows

Aluminum casement (C) windows shall conform to AAMA 101 Designation C-HC40 type with ventilators which swing on side jamb. Operators shall be roto-type. Locking devices shall be provided to secure ventilators tightly in the frame in the closed position.

2.2.2 Fixed Windows

Aluminum fixed (F) windows shall conform to AAMA 101 F-HC40 type, non-operable glazed frame, complete with provisions for reglazing in the field.

2.3 FABRICATION OF ALUMINUM FRAMING SYSTEM

Thermally broken door and window frames shall be fabricated of extruded aluminum shapes to contours as shown on the drawings. Shapes shown are representations of design, function, and required profile. Dimensions shown are minimum. Shapes of equivalent design may be submitted, subject to approval of samples. Minimum metal wall thickness shall be 0.107 inch, except glazing beads, moldings, and trim shall not be less than 0.050 inch. Frames that are to receive glass shall have removable glass stops and glazing beads, fastened with countersunk stainless steel screws at not more than 12 inches on centers. Joints in frame members shall be milled to a hairline watertight fit, reinforced, and secured mechanically by steel clip arrangement or by screw spline attachment. The framing system shall provide for a flush glazing appearance, with no projecting stops. Vertical and horizontal framing members shall have a nominal dimension of 2-1/2 inches by 5-3/4 inches.

a. The concealed vent windows shall be an integral part of the door and window framing system and, when installed, shall not add any additional metal sight line when viewed from the exterior. Vent rail extrusions shall be 0.125 inch typical wall.

b. Ventilators shall be factory-fabricated and assembled. Vent construction shall be screw spine joinery. All hardware shall be factory- applied to ventilator. Frame adapters shall be factory-fabricated. Frame hardware shall be field-applied. Glazing shall be two-sided structural. Exterior of glass shall have a continuous silicone weather seal around perimeter of glass. Glass pockets shall be weeped to provide positive drainage. The system shall incorporate pressure equalization to control water penetration and weep water to the exterior.

c. Vent shall be supported on a continuous integrally extruded hinge, for top-hinged outswing operation, completely concealed when window is closed.

d. Vent shall be equipped with one fixed cam handle or optional security handle to lock/unlock the vent. Multiple handles are not permitted. Vent shall be locked in the closed position with concealed multipoint locks actuated by a single handle. Exposed fasteners shall not be permitted. No other hardware of any type shall be visible when vent is in the locked position.

e. Hold-open device shall be supporting arms that limit and support the vent to an opening of 7-1/2 inches to 12-1/2 inches depending on height. Hold-open device shall be supporting arms that limit and support the vent at a minimum of 24 inches for emergency escape or ventilation (minimum vent height 48 inches).

2.4 PEDESTRIAN UNDERPASS WINDOWS

The existing underpass windows are steel. The existing window sashes shall be sandblasted and coated with cold galvanizing compound, and painted in corformance with Section 09900. Existing windows shall have opertors restored in working order. One new window shall be furnished to match the

existing windows. The new window shall have an operator as shown with a limit arm that will allow no more than 8 inches horizontal full opening. Glass shall be single layer tempered. All glass shall be secured with glazing compound.

2.5 FABRICATION OF ALUMINUM DOORS

2.2.1 Sizes, Clearances, and Edge Treatment

Doors shall not be less than 1-3/4 inches thick. Clearances shall be 1/16 inch at hinge stiles, 1/8 inch at lock stiles and top rails, and 3/16 inch at floors and thresholds. Single-acting doors shall be beveled 1/8 inch at lock and meeting stile edges.

2.4.2 Full-Glazed Stile and Rail Doors

Doors shall be thermally broken, and shall have medium stiles and rails as shown. Door stile and rail moldings forming the structure of the door shall be 1-3/4 inches in depth and tubular in cross-section with a nominal wall thickness of 1/8". Door corners shall be joined using mechanical clip fasteners and SIGMA deep penetration welds at four weld points per corner. Drill ½" diameter drain hole on hinge side of vertical stile to allow drainage of header.

Exposed portions of door cladding moldings shall be 3/32 inch thick. With cladding in place, door sections shall be 2-1/4 inches in depth with a total stile width of 2-21/32 inches.

PVC separators shall be applied to interior side of door structure with screws spaced not more than 9-3/4 inches on centers. Aluminum cladding shall be interlocked with PVC separators at both edges and mechanically secured to door without adhesives. There shall be no metal- to-metal contact, direct or indirect, between the cladding or the cladding attachments and the door structure. Glass is specified in SECTION: GLASS AND GLAZING.

2.6 WEATHERSTRIPPING

Weatherstripping for ventilating sections shall be of type designed to meet water penetration and air infiltration requirements specified in this section in accordance with AAMA 101, and shall be manufactured of material compatible with aluminum and resistant to weather. Weatherstrips shall be factory-applied and easily replaced in the field. Neoprene or polyvinylchloride weatherstripping are not acceptable where exposed to direct sunlight. Interior primary seal shall be a compression type weather seal.

2.7 STORM AND SCREEN DOORS

Prehung screen doors shall be provided at the downstream control stand. Prehung screen doors shall be provided without glazing and as indicated. Units shall be delivered factory-assembled and prehung ready for installation. Screen fabric shall be 18 by 14 mesh of 0.013 aluminum wire in black finish. The units shall have screened "panes" top and bottom, and the lower screen panel shall be protected with expanded metal fabric "guard." The bottom rail shall be reinforced as standard for the manufacturer to serve as a kickplate. Provide all fasteners, trim, and hardware as standard for the manufacturer for self-closing installation. All components shall have a natural aluminum finish, except the screen.

Insect screens shall be provided for all operable window units. Screens shall conform to AAMA 101, SMA ANSI/SMA 1004 and ISWA IWS 089. Screens shall be stationary inside-mounted type. Insect screens shall be designed for the type of window with which they will be used and shall be interchangeable with other units of the same size and type. Screens shall be provided with a black finish.

2.8 ACCESSORIES

2.8.1 Fasteners

Fastening devices shall be window manufacturer's standard design made from aluminum, stainless steel, cadmium-plated steel, nickel/chrome-plated steel in compliance with AAMA 101. Self-tapping sheet metal screws will not be acceptable for material thicker than 1/16 inch.

2.8.2 Hardware

Hardware for aluminum doors is specified in SECTION: BUILDERS HARDWARE. Doors and frames shall be cut, reinforced, drilled, and tapped at the factory to receive template hardware. Hardware reinforcements shall be stainless steel, or steel with a hot-dipped galvanized finish, and secured by welding or stainless steel screws. Doors to receive surface applied hardware shall be reinforced as required.

2.8.3 Window Anchors

Anchoring devices for installing windows shall be made of stainless steel or zinc-plated steel conforming to AAMA 101. Anchors shall be placed near top and bottom of each jamb and at intermediate points not more than 25 inches apart. Transom bars shall be anchored at ends, and mullions shall be anchored at head and sill. The bottom of each frame shall be anchored to the rough floor construction with 3/32 inch thick stainless steel angle clips secured to the back of each jamb and to floor construction. Stainless steel bolts and expansion rivets shall be used for fastening clip anchors.

2.9 GLASS AND GLAZING

Aluminum windows shall be designed for inside glazing, field glazing, and for glass types scheduled on drawings and specified in Section 08810 GLASS AND GLAZING. Units shall be complete with glass and glazing provisions to meet AAMA 101. Glazing material shall be compatible with aluminum, and shall not require painting.

2.10 FINISH

2.10.1 Anodized Aluminum Finish

All exposed-to-view aluminum parts shall receive a caustic etch followed by treatment to obtain an architectural Class II anodic coating with color conforming to AA-M12 C22 A31: Clear. All exposed surfaces of aluminum doors and framing members shall be free of scratches and other serious blemishes.

2.10.2 Welding and Fastening

Where possible, welds shall be located on unexposed surfaces. Welds

required on exposed surfaces shall be smoothly dressed. Welding shall produce a uniform texture and color in the finished work, free of flux and spatter. Exposed screws or bolts will be permitted only at inconspicuous locations and shall have heads countersunk. Concealed reinforcements for hardware shall be welded in place.

PART 3 EXECUTION

3.1 INSTALLATION

Aluminum windows shall be installed in accordance with approved shop drawings and manufacturer's published instructions. Frames and framing members shall be accurately set in position to receive doors and windows. Frames shall be plumb, square, level, and in alignment, and securely anchored to adjacent construction. Aluminum surfaces in contact with masonry, concrete, wood and dissimilar metals other than stainless steel, zinc, cadmium or small areas of white bronze, shall be protected from direct contact using protective materials recommended by AAMA 101. The completed window installation shall be watertight in accordance with Section 07900 JOINT SEALING. Glass and glazing shall be installed in accordance with requirements of this section and Section 08810 GLASS AND GLAZING.

3.2 ADJUSTMENTS AND CLEANING

3.2.1 Hardware Adjustments

Final operating adjustments shall be made after glazing work is complete. Operating sash or ventilators shall operate smoothly and shall be weathertight when in locked position.

3.2.2 Cleaning

Aluminum window finish and glass shall be cleaned on exterior and interior sides in accordance with window manufacturer's recommendations. Alkaline or abrasive agents shall not be used. Precautions shall be taken to avoid scratching or marring window finish and glass surfaces.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 08 - DOORS & WINDOWS

SECTION 08700

BUILDERS' HARDWARE

-- End of Section Table of Contents --

SECTION 08700

BUILDERS' HARDWARE

PART 1 GENERAL

This section covers the furnishing and installation of all finish hardware required for the completion of the work in accordance with the drawings and specifications. If the hardware for any location (or locations) is not described herein, such hardware shall be furnished and shall be like that for a similar location; if no similar locations are specified, such hardware shall be suitable and of consistent kind and quality to those items listed herein.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 283	(1991) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
ASTM F 883	(1997) Padlocks

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA L & R Directory	(Effective thru Jun 1999) Directory of Certified Locks & Latches
BHMA Closer Directory	(Effective thru Jul (1999) Directory of Certified Door Closers
BHMA Exit Devices Directory	(Effective thru Aug 1998) Directory of Certified Exit Devices
BHMA A156.1	(1997) Butts and Hinges
BHMA A156.2	(1996) Bored and Preassembled Locks and Latches
BHMA A156.3	(1994) Exit Devices
BHMA A156.4	(1992) Door Controls - Closers
BHMA A156.5	(1992) Auxiliary Locks & Associated Products
BHMA A156.6	(1994) Architectural Door Trim

BHMA A156.7	(1997) Template Hinge Dimensions
BHMA A156.8	(1994) Door Controls - Overhead Stops and Holders
BHMA A156.16	(1989) Auxiliary Hardware
BHMA A156.18	(1993) Materials and Finishes
BHMA A156.21	(1996) Thresholds

DOOR AND HARDWARE INSTITUTE (DHI)

DHI Keying Systems	(1989) Keying Systems and Nomenclature
DHI Locations for CSD	(1997) Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames
DHI Locations for SSD	(1990) Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames
DHI ANSI/DHI A115.1G	(1994) Installation Guide for Doors and Hardware
DHI ANSI/DHI A115-W	(Varies) Wood Door Hardware Standards (Incl All5-W1 thru A115-W9)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1999) Fire Doors and Fire Windows
NFPA 101	(1997; Errata 97-1; TIA-97-1) Life Safety Code

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Hardware and Accessories; FIO.

Manufacturer's descriptive data, technical literature, catalog cuts, and installation instructions. Spare parts data for locksets and closers. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

SD-07 Schedules

Hardware Schedule; FIO.

Hardware schedule listing all items to be furnished. The schedule shall include for each item: the quantities; manufacturer's name and catalog numbers; the ANSI number specified, sizes; detail information or catalog

cuts; finishes; door and frame size and materials; location and hardware set identification cross-references to drawings; corresponding reference standard type number or function number from manufacturer's catalog if not covered by ANSI or BHMA; and list of abbreviations and template numbers.

Keying Schedule; GA.

Keying schedule developed in accordance with DHI Keying Systems.

SD-13 Certificates

Hardware and Accessories; FIO.

The hardware manufacturer's certificates of compliance stating that the supplied material or hardware item meets specified requirements. Each certificate shall be signed by an official authorized to certify in behalf of the product manufacturer and shall identify quantity and date or dates of shipment or delivery to which the certificates apply. A statement that the proposed hardware items appear in BHMA L & R Directory, BHMA Closer Directory and BHMA Exit Devices Directory directories of certified products may be submitted in lieu of certificates.

1.3 DELIVERY, STORAGE, AND HANDLING

Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, and shall be properly marked or labeled to be readily identifiable with the approved hardware schedule. Each change key shall be tagged or otherwise identified with the door for which its cylinder is intended. Where double cylinder functions are used or where it is not obvious which is the key side of a door, appropriate instructions shall be included with the lock and on the hardware schedule. Manufacturer's printed installation instructions, fasteners, and special tools shall be included in each package.

1.4 SPECIAL TOOLS

Special tools, such as those supplied by the manufacturer, unique wrenches, and dogging keys, shall be provided as required to adjust hardware items.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

PART 2 PRODUCTS

2.1 GENERAL HARDWARE REQUIREMENTS

Hardware shall conform to the requirements specified herein and the HARDWARE SETS listing at the end of this section. Hardware set numbers correspond to the set numbers shown on the drawings.

2.2 TEMPLATES

Requirements for hardware to be mounted on metal doors or metal frames shall be coordinated between hardware manufacturer and door or frame manufacturer by use of templates and other information to establish

location, reinforcement required, size of holes, and similar details. Templates of hinges shall conform to BHMA A156.7.

2.3 HINGES

Hinges shall conform to BHMA A156.1. Hinges used on metal doors and frames shall also conform to BHMA A156.7. Except as otherwise specified, hinge sizes shall conform to the hinge manufacturer's printed recommendations.

2.3.1 Hinges for Reverse Bevel Doors

Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

2.3.2 Contractor's Option

Hinges with antifriction bearings may be furnished in lieu of ball bearing hinges, except where prohibited for fire doors by the requirements of NFPA 80.

2.4 LOCKS AND LATCHES

To the maximum extent possible, locksets, latchsets and deadlocks, shall be the products of a single manufacturer. Lock and latch sets trim (knobs, handles, roses, and escutcheons) shall be of a simple design in accordance with manufacturer's standard practice. Knob diameter shall be 2-1/8 to 2-1/4 inches.

2.4.1 Bored Lock and Latchsets

Bored lock, latchsets, and strikes shall be series 4000 and shall conform to BHMA A156.2, Grade 1. Bored type locks and latches for doors 1-3/8 inches thick and over shall have adjustable bevel fronts or otherwise conform to the shape of the door.

2.4.2 Auxiliary Locks and Associated Products

Narrow stile locks shall conform to ANSI A156.5. Strike boxes shall be furnished with deadbolt and latch strikes for Grade 3.

2.4.3 Lock Cylinders (Bored)

Lock cylinders shall comply with BHMA A156.5. Cylinders shall have key removable type cores compatible with existing. Provide a master-keying system integrated with existing keying.

2.4.4 Padlocks

Padlocks shall conform to ASTM F 883, type P01 and shall be by same manufacturer as cylinders for building locks to be compatible with keying system. Padlocks for fence gates are specified in SECTION: FENCING.

2.5 EXIT DEVICES AND EXIT DEVICE ACCESSORIES

Exit devices and exit device accessories shall conform to BHMA A156.3, Grade 1.

2.5.1 Door Coordinator

Door coordinator with carry bar shall be Type 21 and shall be provided for each pair of doors equipped with an overlapping astragal. The coordinator may be mechanically operated and shall be capable of holding the active door of a pair open until the inactive door has preceded it in the closing cycle. When used as fire exit hardware, the coordinator and carry bar shall be listed or labeled by a nationally recognized independent testing laboratory. Astragals shall be UL-listed and shall be aluminum with neoprene inserts applied to each door similar to Zero No. 328A, Pemco 297AV, or National Guard 115NGA.

2.6 KEYING

Locks shall be master-keyed to complement existing keying system. Locks shall be furnished with the manufacturer's standard construction key system. Change keys for locks shall be stamped with change number and the inscription "U.S. Property - Do Not Duplicate." Keys shall be supplied as follows:

Locks: two change keys each lock (minimum of 12 keys for each different lock type)

Master-keyed sets: two keys each set

The keys shall be furnished to the Contracting Officer's Representative, arranged in a container. For further information see DHI 03.

2.7 DOOR CLOSING DEVICES

Door closing devices shall conform to BHMA A156.4, Grade 1. Closing devices shall be products of one manufacturer for each type specified.

2.7.1 Surface Type Closers

Surface type closers shall be Grade 1, Series C02000 Standard Cover with options PT-4H and PT-4D. Except as otherwise specified, sizes shall conform to the manufacturer's published recommendations. Closers for outswinging exterior doors shall have parallel arms or shall be top jamb mounted. Closers for doors close to a wall shall be of narrow projection so as not to strike the wall at the 90-degree open position.

2.8 ARCHITECTURAL DOOR TRIM

Architectural door trim shall conform to BHMA A156.6.

2.8.1 Kick Plates

Kickplates and mop plates shall be 0.050 inch aluminum, 628 finish, and 2 inches less than door width. Kickplates shall be 16 inches high, and mop plates shall be 4 inches high.

2.8.2 Push Plates

Push plates shall be Category J300, aluminum, size 3-1/2 inches by 15 inches. Edges of metal plates shall be beveled.

2.8.3 Push and Pull Bars

Push and pull bars shall be C-17 Push and G-18 Pull, solid 1 inch diameter,

3 1/4 inch projection stainless steel handle. Edges of mounting plates shall be beveled.

2.8.4 Sectional Door Pulls for Metal Doors

Sectional door pulls for metal doors shall be Category J400, aluminum, of plain modern design. Through-bolted door pulls on plates for wood doors shall be Category J400, aluminum, with beveled edges.

2.9 MISCELLANEOUS

2.9.1 Automatic Door Bottoms

Automatic door bottom shall be heavy-duty mortise type for hollow metal doors. Unit shall consist of an extruded aluminum shell with a movable neoprene sealing strip. The movable part shall be actuated by closure of the door, and spring action shall retract the sealing strip into the shell upon opening the door. The unit shall be adjustable after installation to ensure proper seal.

2.9.2 Metal Thresholds

Thresholds shall conform to BHMA A156.21. Thresholds for exterior doors shall be extruded bronze of the type indicated and shall provide proper clearance and an effective seal with specified weather stripping.

2.9.3 Weatherstripping

Weatherstripping for head and jamb protection shall be an elastomeric type of synthetic rubber, vinyl, or neoprene. The weatherstripping shall be installed in accordance with the door frame manufacturer's recommendations. Weatherstripping for bottom of doors shall be of the mounted sweep type, consisting of 1/8 inch thick neoprene or spring tension type of bronze or corrosion-resisting steel on an extruded aluminum or bronze bar. Spring bronze shall not be less than 0.008 inch thick, and corrosion-resisting steel shall not be less than 0.005 inch thick. Weatherstripping for meeting stiles of double doors shall be surface-mounted neoprene seal type consisting of 1/8 inch thick neoprene in an extruded aluminum or bronze housing.

2.9.4 Aluminum-Housed Type Weatherseals

Weatherseals of the type specified shall consist of extruded aluminum retainers not less than 0.07 inch wall thickness with vinyl, neoprene, silicone rubber, polyurethane, or vinyl brush inserts. Aluminum shall be bronze-anodized. Weatherseal material shall be of an industrial/commercial grade. Seals shall remain functional through all weather and temperature conditions.

2.9.5 Gasketing

Gasketing shall be a compression type seal, silicon based, self-adhesive product for use on steel door frames with steel doors for 1-hour B-label. Color shall be bronze. Air leakage rate of weatherstripping shall not exceed 0.5 cubic feet per minute per lineal foot of crack when tested in accordance with ASTM E 283 at standard test conditions.

2.9.6 Door Stops

Wall stops, floor stops and combination stop and holders shall conform to BHMA A156.16. Overhead holders shall conform to BHMA A156.8.

2.10 FASTENINGS

Fastenings of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete or masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel.

2.11 FINISHES

Unless otherwise specified, finishes shall conform to those identified in BHMA A156.18. Where painting of primed surfaces is required, painting is specified in Section 09900 PAINTING, GENERAL.

a. Hinges shall have the following finishes:

Aluminum door hinges: 630
Interior door hinges: 626
Outswinging exterior door hinges: 626

b. Lock and door trim shall have the following finishes:

Aluminum door lock and trim: 630
Other door lock and trim: 626

c. Door closer finishes shall be 689.

d. Miscellaneous hardware shall have the following finish: 626.

2.12 HARDWARE FOR FIRE DOORS

Hardware for fire doors shall conform to the requirements of NFPA 80and NFPA 101.

PART 3 EXECUTION

3.1 APPLICATION

Hardware shall be located in accordance with DHI Locations for CSD and DHI Locations for SSD, except that deadlocks shall be mounted 48 inches above finish floor. When approved, slight variations in locations or dimensions will be permitted. Application shall be in accordance with DHI ANSI/DHI A115.1G or DHI ANSI/DHI A115-W. Door control devices for exterior doors such as closers and holders, shall be attached to doors with thru bolts and nuts or sex bolts.

3.1.1 Hardware for Fire Doors and Smoke-Control Door Assemblies

Hardware for fire doors shall be installed in accordance with the requirements of NFPA 80.

3.1.2 Door-Closing Devices

Door-closing devices shall be installed and adjusted in accordance with the templates and printed instructions supplied by the manufacturer of the

devices. Insofar as practicable, doors opening to or from halls and corridors shall have the closer mounted on the room side of the door.

3.1.3 Auxiliary Hardware

Lever extension flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. The bottom bolt shall operate into a dust-proof floor strike or threshold.

3.1.4 Thresholds

Exterior thresholds shall be installed in a bed of sealant with expansion anchors and stainless steel screws. Minimum screw size shall be No. 10, length dependent on job conditions, with a minimum of 3/4 inchthread engagement into the floor or anchoring device used.

3.1.5 Weatherseals

Weatherseals shall be located as indicated, snug to door face and fastened in place with color matched metal screws after door and frames have been finish painted. Screw spacing shall be as recommended by manufacturer.

3.1.6 Gasketing

Gasketing shall be installed at the inside edge of the hinge and head and latch sides of door frame. Frames shall be toleranced for a 1/8 inch clearance between door and frame. Frames shall be treated with tape primer prior to installation.

3.2 HARDWARE SETS

Hardware shall conform to the requirements specified herein and in TABLE 1: HARDWARE SETS. Hardware set numbers correspond to the set numbers shown on the drawings.

TABLE 1 : HARDWARE SETS:

HW-1:	2 pr	Hinges, A-5111
	1 ea	Lockset, Narrow Stile BHMA Type E0231 x Cylinder x Latch Handle x Strike
	1 ea	Pull, J400 Straight
	1 ea	Push Bar, J500
	1 ea	Closer, C02031 x PT-4C
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold, BHMA J36130, except bronze
	1 ea	Sweep Strip
HW-2:	1-1/2 pr	Hinges, A-5111
	1 ea	Lockset, F82-1
	1 ea	Closer, C02031 x PT-4C
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold, BHMA J600, except bronze-Weatherstrip Head and Jambs
	1 ea	Sweep Strip
	2 ea	Kickplates
HW-3:	1-1/2 pr	Hinges, A-8133
	1 ea	Lockset, F82-1
	1 ea	Kickplate

	1 ea	Mop Plate
	2 ea	Closer, C02031 x PT-4C
HW-4:	1-1/2 pr	Hinges, A-5111
	1 ea	Lockset, Narrow Stile BHMA Type E0231 x Cylinder x Latch Handle x Strike
	1 ea	Pull, C18
	1 ea	Push Bar, C17
	1 ea	Closer, C02031 x PT-4C
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold, BHMA J36130, except bronze
	1 ea	Sweep Strip
HW-5:	NOT USED	
HW-6:	1-1/2 pr	Hinges, A8112
	1 ea	Lockset, Classroom F84-1
	1 ea	Closer, C02011 x PT-4D
	1 ea	Stop, L22102 - Gasket per Code
	1 ea	Kickplate
	1 ea	Mop Plate
HW-7:	4 pr	Hinges, A8112
	1 ea	Lockset, F82-1
	2 ea	Closers, C02011 x PT-4C
	2 ea	Automatic Flush Bolts, L14081
	2 ea	Stops, L22102
	2 ea	Automatic Door Bottoms - Weatherstrip
	2 ea	Astragals (1 per door)
	1 ea	Door Coordinator FS FF-H-111, 1430C x 613
HW-8:	3 pr	Hinges, A-8133
	1 ea	Lockset, F82-1
	2 ea	Closers, C02091 x PT-4C
	2 ea	Automatic Flush Bolts, L14081
	2 ea	Stops, L22102
	4 ea	Kickplates
	2 ea	Astragals (1 per door)
	1 ea	Door Coordinator FS FF-H-111, 1430C x 613
HW-9:	1-1/2 pr	Hinges, A-8133
	1 ea	Lockset, F82-1
	1 ea	Closer, C02011 x PT-4C
	1 ea	Stop, L22102
	1 ea	Automatic Door Bottom
	1 ea	Kickplate
	1 ea	Mop Plate
HW-10:	1-1/2 pr	Hinges, A-8112
	1 ea	Push Plate, J300
	1 ea	Pull Plate, J400
	1 ea	Closer, C02011 x PT-4D
	1 ea	Kickplate
	1 ea	Mop Plate
HW-11:	1-1/2 pr	Hinges, A-8133
	1 ea	Lockset, F76-1
	1 ea	O.H. Stop, C57543
	2 ea	Mop Plates

HW-12:	2 pr	Hinges, A-8133
	1 ea	Lockset, F82-1
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold, BHMA J32130, except bronze
	1 ea	Sweep Strip
	-	Weatherstrip Head and Jambs
	2 ea	Kickplates
HW-13:	1-1/2 pr	Hinges, A-8133
	1 ea	Lockset, F81-1
	1 ea	O.H. Stop, C57543
	2 ea	Mop Plates
HW-14:	1-1/2 pr	Hinges, A-8112
	1 ea	Lockset, F82-1
	1 ea	Closer, C02011 x PT-4D
	2 ea	Mop Plates
HW-15:	2 pr	Hinges, A-5111
	1 ea	Lockset, Narrow Style BHMA Type E0231 x Cylinder x Latch Handle x Strike
	1 ea	Pull, C18
	1 ea	Push Bar, C17
	1 ea	Closer, C02011 x PT-4C
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold, BHMA J36130
	1 ea	Sweep Strip
HW-16:	4 pr	Hinges, A-8133
	1 ea	Lockset, F82-1
	2 ea	Flush Bolts, L14081
	2 ea	Stops, L22102
HW-17:	5 pr	Hinges, A-8133
	1 ea	Lockset, F82-1, Optional outside locking
	6 ea	Manual Flush Bolts, mortise type
	1 ea	Closer for man door, C02051 x PT-4C
	1 ea	Sweep Strips
	1 ea	Weatherstrip
	2 ea	Kickplates x 30 inches high
	2 ea	Bumper Keepers, L01352
HW-18:	2 pr	Hinges, A-5133
	1 ea	Lockset, F82-1
	1 ea	Closer, C02031 x PT-4D
	1 ea	Sweep Strip
	1 ea	Weatherstrip
	2 ea	Kickplates x 30 inches high
	1 ea	O.H. Holder, BHMA C13611
	1 ea	Threshold

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DIVISION 08 - DOORS & WINDOWS

SECTION 08810

GLASS AND GLAZING

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SECTION 08810

GLASS AND GLAZING

PART 1 GENERAL

This section covers the furnishing and installation of glass and glazing throughout as required by the drawings and specifications, except for overhead rolling door windows specified in SECTION: OVERHEAD ROLLING DOORS.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1	(1984; R 1994) Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 1036	(1991; R 1997) Flat Glass
ASTM C 1048	(1997b) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
ASTM E 773	(1997) Accelerated Weathering of Sealed Insulating Glass Units
ASTM E 774	(1997) Classification of the Durability of Sealed Insulating Glass Units
ASTM E 1300	(1998) Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load

GLASS ASSOCIATION OF NORTH AMERICA (GANA)

GANA Glazing Manual	(1997) Glazing Manual
GANA Standards Manual	(1995) Engineering Standards Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1999) Fire Doors and Fire Windows

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The

following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Glass and Glazing Data; FIO.

Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

SD-13 Certificates

Glass; FIO.

Certificates stating that the glass meets the specified requirements. Labels or manufacturers marking affixed to the glass will be accepted in lieu of certificates.

1.3 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work. Glazed panels shall comply with the safety standards, as indicated in accordance with ANSI Z97.1. Glazed panels shall comply with indicated wind/snow loading in accordance with ASTM E 1300.

1.4 DELIVERY, STORAGE AND HANDLING

Glazing compounds shall be delivered to the site in the manufacturer's unopened containers. Glass shall be stored indoors in a safe, well ventilated dry location in accordance with manufacturer's instructions, and shall not be unpacked until needed for installation. Glass shall not be stored on site over 1 month.

1.5 PROJECT/SITE CONDITIONS

Glazing work shall not be started until outdoor temperature is above 40 degrees F and rising, unless procedures recommended by glass manufacturer and approved by Contracting Officer are made to warm the glass and rabbet surfaces. Ventilation shall be provided to prevent condensation of moisture on glazing work during installation. Glazing work shall not be performed during damp or raining weather.

1.6 WARRANTY

1.6.1 Insulating Glass

Manufacturer shall warrant the insulating glass to be free of fogging or film formation on the internal glass surfaces caused by failure of the hermetic seal for a period of 10 years from Date of Substantial Completion. Warranty shall be signed by manufacturer.

PART 2 PRODUCTS

2.1 GLASS

Glass shall conform to the requirements of ASTM C 1036, unless specified

otherwise.

2.1.1 Insulating Glass

Shall be formed of two pieces of Type I, Class I, Quality q3, 1/4-inch thick glass, separated by a ½-inch dehydrated air space, hermetically sealed. Exterior light of insulating units shall be tempered glass with a VE2-85 low emissivity coating and a base glass color of green as manufactured by Viracon or approved equal. Insulating glass units shall have polyisobutylene primary seal with two part silicone secondary seals. Aluminum spacer frame shall be desiccant filled with a mill finish and have bent or soldered corners. Insulating glass units shall conform to ASTM E 773 and ASTM E 774. Low emissivity coating shall be applied to second surface of insulating glass units. The insulating glass units shall have a maximum winter, nighttime U-value of 0.30, with a maximum shading coefficient of .43 and a maximum relative heat gain of 91".

2.1.2 Single Glass

Single glass shall be single thickness, as shown, and shall conform to ASTM C 1036, Type I, Class 1 (clear), Quality q4. Where shown as 1/4" thick, provide float glass.

2.1.3 Tempered Glass

Tempered glass shall be Kind FT (fully tempered transparent), Type 1 (flat), Class 1-clear, Condition A uncoated surface, conforming to ASTM C 1048 and GANA Standards Manual. Color shall be clear.

Fire protection and human impact safety rated glazing shall be Type 1, Class 1, Quality q4, 1/4 inch thick glass. Appearance shall be clear, wireless, with unobstructed vision and 83% light transmission as manufactured by Safety and Fire Technology, Inc. or approved equal. Performance shall meet ANSI Z97.1 Safety Glazing Standards (Class I & II).

2.1.4 Wire Glass

Wire glass shall be clear and polished both sides, and shall conform to NFPA 80.

2.2 GLAZING ACCESSORIES

2.2.1 Glazing Compound and Preformed Glazing Sealants

Suitable type approved for the application and in accordance with applicable portions of the FGMA Glazing Manual. Materials used with aluminum frames shall be colored, as selected, nonstaining, and not require painting. Other materials which will be exposed to view and unpainted shall be selected color from manufacturer's standard colors.

2.2.2 Glazing Accessories

As required to supplement the accessories provided with the items to be glazed and to provide a complete installation, including glazing points, clips, shims, angles, beads, setting blocks, and spacer strips. Ferrous metal accessories which will be exposed in the finished work shall be a finish that will not corrode or stain while in service.

PART 3 EXECUTION

3.1 PREPARATION AND INSTALLATION

Openings and framing systems scheduled to receive glass shall be examined for compliance with GANA Glazing Manual and glass manufacturer's approved installation instructions. Glazing surfaces shall be dry and free of frost.

3.2 CLEANING

Upon completion of project, outside surfaces of glass shall be washed clean and the inside surfaces of glass shall be washed and polished in accordance with glass manufacturer's recommendations.

3.3 PROTECTION

Glass work shall be protected immediately after installation. Glass units which are broken, chipped, cracked, abraded, or otherwise damaged during construction activities shall be removed and replaced with new units.

-- End of Section --