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**ARCHITECTURE, ENGINEERING AND CONSTRUCTION**

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1. DIVISION 08 DOOR AND WINDOWS
	1. SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

THIS SECTION HAS BEEN PREPARED TO SUIT MOST PROJECTS AT U OF M. the AIA masterspec section of the same name and number CONTAINS ADDITIONAL INFORMATION CONCERNING VARIOUS OPTIONAL MATERIALS.

GLASS AND GLAZING CAN ALSO BE SPECIFIED IN THIS SECTION FOR SIMPLE PROJECTS.

* + 1. GENERAL
			1. SUMMARY
				1. This Section includes the following types of aluminum entrance and storefront work:

DELETE PRODUCT TYPES NOT REQUIRED FROM THE LIST BELOW.

Exterior entrance doors.

Vestibule doors matching entrance doors.

Interior doors.

Transoms.

Sidelights.

Frames for entrances.

Storefront-type framing system.

* + - * 1. Related Sections: The following sections contain requirements that relate to this Section:

usually retain below. very simple glazing requirements (i

Glazing requirements for aluminum entrances and storefront, including entrances specified to be factory glazed, are included in Division 8 Section "Glass and Glazing."

usually delete below. if hardware is included in "finish hardware" section, retain paragraph below

Door hardware, including exit devices, lock cylinders, closers and other items are included in Division 8 Section "Finish Hardware."

delete entire "system performance requirements" article below if no storefront framing, including sidelights and transoms, is included in project; or if entrances will be installed in building interiors only; or if air/water performance is not critical.

* + - 1. SYSTEM PERFORMANCE REQUIREMENTS
				1. General: Provide aluminum entrance and storefront assemblies that comply with performance characteristics specified, as demonstrated by testing the manufacturer's corresponding stock assemblies according to test methods indicated.
				2. Thermal Movement: Design the aluminum entrance and storefront framing systems to provide for expansion and contraction of the component materials. Entrance doors shall function normally over the specified temperature range.

The system shall be capable of withstanding a metal surface temperature range of 180 deg F (100 deg C) without buckling, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, stress on glass, or other detrimental effects.

* + - * 1. Design Requirements: Provide aluminum entrance and storefront systems that comply with structural performance, air infiltration, and water penetration requirements indicated.

WIND LOAD BELOW IS conservative for ground level conditions at um

Wind Loads: Provide aluminum entrance and storefront assemblies capable of withstanding wind pressures of 20 psf inward and 20 psf outward acting normal to the plane of the wall.

* + - * 1. Structural Performance: Conduct tests for structural performance in accordance with ASTM E 330. At the conclusion of the tests there shall be no glass breakage or permanent damage to fasteners, anchors, hardware or actuating mechanism. Framing members shall have no permanent deformation in excess of 0.2 percent of their clear span.

REVISE DEFLECTION IN THE NEXT PARAGRAPH TO 1/360 OF THE CLEAR SPAN WHEN A PLASTER SURFACE SUBJECT TO BENDING IS AFFECTED.

Deflection Normal to the Plane of the Wall: Test pressure required to measure deflection of framing members normal to the plane of the wall shall be equivalent to the wind load specified above. Deflection shall not exceed 1/175 of the clear span, when subjected to uniform load deflection test.

Deflection Parallel to the Plane of the Wall: Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch.

THE NEXT TWO PARAGRAPHS ARE INTENDED FOR FRAMING SYSTEMS ONLY, NOT ENTRANCE DOORS.

* + - * 1. Air Infiltration: Provide aluminum entrance and storefront framing system with an air infiltration rate of not more than 0.06 CFM per sq. ft. of fixed area (excluding operable door edges) when tested in accordance with ASTM E 283 at an inward test pressure differential of 1.57 psf.
				2. Water Penetration: Provide framing systems with no uncontrolled water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E 331 at an inward test pressure differential of 6.24 lbf per sq. ft.

RETAIN THE NEXT PARAGRAPH FOR SYSTEMS WITH THERMAL-BREAK FRAMES AND INSULATING GLASS.

* + - * 1. Condensation Resistance: Where framing systems are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of not less than 50.

CONSIDER DELETING THE NEXT PARAGRAPH. IT LIMITS ACCEPTABLE PRODUCTS TO UNITS USING INSULATING GLASS.

* + - * 1. Thermal Transmittance: Provide framing systems that have an overall U-value of not more than 0.65 BTU/(hr. x sq. ft. x deg. F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.
			1. SUBMITTALS
				1. Product data for each aluminum entrance and storefront system required, including:

Manufacturer's standard details and fabrication methods.

Data on finishing, hardware and accessories.

Recommendations for maintenance and cleaning of exterior surfaces.

* + - * 1. Shop drawings for each aluminum entrance and storefront system required, including:

Layout and installation details, including relationship to adjacent work.

Plans at 1/4-inch scale.

Elevations at 1/4-inch scale.

Detail sections of typical composite members.

Anchors and reinforcement.

Hardware mounting heights.

Provisions for expansion and contraction.

Glazing details.

delete below if hardware is scheduled in "finish hardware" section

* + - * 1. Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

delete below if "System performance requirements" article above was deleted

* + - * 1. Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that aluminum entrance and storefront systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated.
			1. QUALITY ASSURANCE
				1. Single Source Responsibility: Obtain aluminum entrance and storefront systems from one source and from a single manufacturer.
				2. Design Criteria: The drawings indicate the size, profile, and dimensional requirements of aluminum entrance and storefront work required and are based on specific types and models. Aluminum entrance and storefront by listed approved manufacturers will be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.
			2. PROJECT CONDITIONS
				1. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.

Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

* + 1. PRODUCTS
			1. MANUFACTURERS
				1. Manufacturer: Subject to compliance with requirements, provide entrance and storefront systems manufactured by one of the following:

usually retain all manufacturers listed in each applicable category below. Delete inapplicable categories.

Entrances, Doors, and Storefronts:

Arch Amarlite Aluminum & Glass LC.

Cross Aluminum Products, Inc.

Curtainwall Systems, Inc.; Div. Gordon Aluminum Industries Inc.

EFCO Corporation.

Kawneer Company, Inc.

Tubelite Architectural Products.

International Aluminum Corporation; U.S. Aluminum.

Vistawall Corp.

Wausau Metals Corporation

Flush Panel FRP Aluminum Doors:

Corrim Company

Extrudart Co.

Special-Lite, Inc.

Warminster Co.

Tubular Aluminum Extrusion Flush Panel Doors:

Cross Aluminum Products

Heritage Door and Entrance, Inc.

Thompson Aluminum Door Company

* + - 1. MATERIALS

DELETE MATERIALS NOT REQUIRED FOR FABRICATION OR INSTALLATION FROM THIS ARTICLE.

* + - * 1. Aluminum Members: Alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for aluminum extrusions, ASTM B 209 for aluminum sheet or plate, and ASTM B 211 for aluminum bars, rods and wire.

usually delete below for systems with less than 12 feet vertically unsupported

* + - * 1. Carbon steel reinforcement of aluminum framing members shall comply with ASTM A 36 for structural shapes, plates and bars, ASTM A 611 for cold rolled sheet and strip, or ASTM A 570 for hot rolled sheet and strip.
				2. Glass and Glazing Materials: Comply with requirements of Division 8 Section "Glass and Glazing."

usually retain Above, except where glass specified below is sufficient

usually delete below, except for simple projects without insulating, coated, or non-tempered glass

* + - * 1. Glass and Glazing Materials: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class and, if applicable, form, finish, and pattern.

Uncoated Clear Heat-Treated Float Glass: Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), Kind FT (fully tempered).

select above, below, or both to suit project. generally, if more types are required, use section 08800 - "glass and glazing"

Uncoated Tinted Heat-Treated Float Glass: Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select), with tint color and performance characteristics for 1/4 inch thick glass matching those indicated for non-heat-treated float glass; Kind FT (fully tempered).

Bronze: Manufacturer's standard tint, with visible light transmittance of 50-52 percent and shading coefficient of 0.69-0.71 for 1/4 inch thick glass.

* + - * 1. Panel Core Material: Rigid, closed-cell polyurethane insulation.
				2. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, zinc plated steel, or other material warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.

Reinforcement: Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

Exposed Fasteners: Do not use exposed fasteners except for application of hardware. For application of hardware, use Phillips flat-head machine screws that match the finish of member or hardware being fastened.

* + - * 1. Concealed Flashing: 0.0179-inch (26 gage) minimum dead-soft stainless steel, or 0.026-inch-thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.
				2. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.
				3. Concrete and Masonry Inserts: Provide cast iron, malleable iron, or hot-dip galvanized steel inserts complying with ASTM A 123.
				4. Compression Weatherstripping: Manufacturer's standard replaceable compressible weatherstripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.
				5. Sliding Weatherstripping: Manufacturer's standard replaceable weatherstripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.
			1. HARDWARE
				1. General: Provide heavy-duty hardware units as indicated, scheduled, or required for operation of each door. Include, unless otherwise required, the following items of sizes, number, and type recommended by manufacturer for service required; finish to match door.

continuous type hinge below is preferred by plant maintenance. usually avoid other types, including concealed pivot/floor closer types

* + - * 1. Continuous Gear Hinges: Provide units designed for heavy-duty, high-traffic use in new applications. Fabricate units of Class I anodized, 6063 T6 aluminum alloy with polyacetal thrust bearings.

Color: Clear anodized

Color: Dark bronze anodized.

below is standard. Also available are retrofit units that cover butt cut outs on existing frames, and a variety of full- and half-surface units - see product catalogs

Product/Manufacturer: SL-11HD; Select Products Limited, or equivalent products of Roton or Pemko.

below are typical concealed closers

* + - * 1. Provide closers tested in accordance with ANSI A156.4, and complying with manufacturer's recommendations for closer size, depending on door size, exposure to weather and anticipated frequency of use.

below is a typical surface mounted closer. concealed closers are difficult for plant to maintain, and ther use is discouraged.

Surface-Mounted Overhead Closers: Provide units designed for push side installation on door, and complete with cover, extra duty (EDA) parallel arms, cush shoe support, and blade stop spacer, as applicable to indicated door and frame type. Provide LCN model only, with indicated features and as follows:

below is standard appearance closer for aluminum entrance application. Closer body mounts to top rail of door. delete "cush-n-stop" feature if not required.

Series No.: 4110.

Usually retain Arm type below with built-in stop, but without hold open feature.

Heavy Duty Spring Cush Arm: Spring Cush (3077SC).

arm type below requires separate wall or floor mounted door bumper stops.

Heavy Duty Arm: 3077EDA.

Arm type below has both built-in stop and hold-open feature - usually delete. Hold-opens are generally not desireable on exterior doors.

Spring H-cush Arm: Spring Cush with hold-open feature (3049SC).

* + - * 1. Door Bumper Stop: Provide rubber exposed resilient parts; size and mount units to comply with mfr's recommendations for the exposure condition. Reinforce the substrate as recommended.

Color of Resilient Parts: Black.

SELECT ONE above or below.

Color of Resilient Parts: Gray.

Manufacturer/Model of Stops: Rockwood model indicated, or equivalent products of Brookline, Builder's Brass Works, Glynn-Johnson, Stanley.

SELECT ONE OF THE FOLLOWING TO SUIT PROJECT AND SUBSTRATE. consider snow removal interference with floor stops.

Model No.: 442 (floor mounted).

Model No.: 409 (wall mounted, hollow wall expansion anchor).

Model No.: 410 (wall mounted, plastic).

Model No.: 411 (wall mounted, expansion shield).

include the following cylinder.

* + - * 1. Cylinders: Best Co., only, for keying by Owner's Key Office. Contact University of Michigan Key Office for cylinder information.

rim type units and applications are preferred by plant maintenance. Mortise type is acceptable, but may require wide stile doors. Avoid both concealed and unconcealed rod types whenever possible by providing removable mullions at double doors.

Units below are for exterior exit use. if fire rated units are required, select from catalog

Note: provide pull trim only - do not provide lever handles on building exteriors. Key function should be set to permit key turn to retract latch, but not hold it in open position (latch should return to closed position automatically when key is retracted).

* + - * 1. Panic Hardware: Provide panic exit device complying with UL 305, and including trim and strike as indicated, or if not indicated, as recommended by manufacturer for application indicated:

below is conventional tube-type crash bar for single or double (with mullion), medium style, doors.

Rim type units activated by a full-width crash bar. Equip units with hex-keyed dogging device to hold the push bar down and the latch bolt in the open position.

it is strongly recommended that you select appropriate units and trim from catalog. use choices below only for very simple projects.

Below is unit with outside key cylinder retracting latch bolt, and with stadanrd pull Handle.

Manufacturer/Model of Exit Devices: Von Duprin model 55NL with 550DT x 110MD trim; or equivalent products of Sargent only.

Below is unit with no exterior cylinder, but with pull handle. Include below in conjunction with above where doors are in pairs or series, but only one requires key operation.

Manufacturer/Model of Exit Devices: Von Duprin model 55DT with 550DT trim; or equivalent products of Sargent only.

below is newer touch-pad unit for single or double (with mullion), medium style, doors.

Rim type units activated by a partial-width touch-bar. Equip units with 7-pin removable core type cylinder dogging device mounted in touch pad to hold the touch-bar depressed and the latch bolt in the open position.

it is strongly recommended that you select appropriate units and trim from catalog. use choices below only for very simple projects.

Below is unit with outside key cylinder retracting latch bolt, and with optional pull Handle.

Manufacturer/Model of Exit Devices: Von Duprin model 35NL-OP with 3308NL trim; or equivalent products of Sargent only.

Below is unit with no exterior cylinder, but with pull handle. Include below in conjunction with above where doors are in pairs or series, but only one requires key operation.

Manufacturer/Model of Exit Devices: Von Duprin model 35DT with 3308DT trim; or equivalent products of Sargent only.

below is special mortise exit dead latch unit that can be installed in a medium stile door and is intended for use in building interiors in applications where a panic device is not required. Benefits include less restrictive lock function and less intrusive size and design.

* + - * 1. Exit Dead Latch: Provide mortise exit dead latch, including trim and strike as indicated, or if not indicated, as recommended by manufacturer for application indicated. Include the following:

select one of the following controls.

Lever handle.

Paddle.

always include below.

7-pin removable core type cylinder (Best Co., only).

it is strongly recommended that you select appropriate units and trim from catalog. use choice below only for very simple projects.

Manufacturer/Model of Exit Devices: Adams-Rite model 4510 with the following:

Model 4560 lever (3-1/2 inch long).

Model 4565 lever (1-1/2 inch long).

Model 4590 paddle.

pulls and handles below are for interior doors without locks or latches. Do not specify offset pulls.

* + - * 1. Pull Handles: Manufacturer's standard pull handles complying with requirements of the Americans with Disabilities Act. Through-bolt all pulls.
				2. Push Bars: Manufacturer's standard full-door-width single-bar push bar.

consider removable mullions below where fixed mullions cannot be provided.

* + - * 1. Removable Mullions: Removable mullion with weatherstripping, stabilizer set, and indicated door strikes.

Provide aluminum units in 313AN (dark bronze anodized) finish, and as follows:

Manufacturer/Model of Removable Mullion: Von Duprin model 5754.

Usually delete below. unit has no weatherstripping for infiltration/noise reduction

Provide steel units with keyed mechanism for quick removal of mullion; mortised cylinder; in SP313 (dark bronze painted) finish; and as follows:

Manufacturer/Model of Removable Mullion: Von Duprin model KR4954, with 154 stabilizer set.

* + - * 1. Stabilizers: Two-piece interlocking clips mounted to door and to mullion or jamb. Von Duprin model 154 or equivalent.
				2. Thresholds: Extruded aluminum threshold of size and design indicated in mill finish, complete with anchors and clips.
			1. COMPONENTS

THE FRAMING SYSTEM IN THE NEXT PARAGRAPH MAY BE USED FOR BOTH STOREFRONT AND ENTRANCE FRAMES. EXTERIOR GLAZING IS MORE COMMON BECAUSE REGLAZING FROM THE INTERIOR IS DIFFICULT AFTER THE BUILDING IS COMPLETED.

* + - * 1. Storefront Framing System: Provide storefront and entrance framing systems fabricated from extruded aluminum members of size and profile indicated. Include subframes and other reinforcing members of the type indicated. Provide for flush glazing storefront from the exterior on all sides without projecting stops. Shop-fabricate and preassemble frame components where possible. Provide storefront frame sections without exposed seams.

Mullion Configurations: Provide pockets at the inside glazing face to receive resilient elastomeric glazing. Mullions and horizontals shall be one piece. Make provisions to drain moisture accumulation to the exterior.

DELETE THE NEXT PARAGRAPH IF INFILL PANELS ARE NOT REQUIRED IN THE STOREFRONT.

Infill Panels: Provide flush-laminated infill panels of thickness indicated, fabricated with panel core material laminated with waterproof glue between two sheets of aluminum.

Avoid designing double doors without either a fixed or removable mullion.

* + - * 1. Entrance Door Frames: Provide tubular and channel frame entrance door frame assemblies, as indicated, with welded or mechanical joints in accordance with manufacturer's standards. Reinforce as necessary to support required loads. Provide units with applied, weatherstripped stops; blade stops are not acceptable.

DELETE THE NEXT PARAGRAPH IF STILE-AND-RAIL TYPE DOORS ARE NOT REQUIRED. generally, doors are constructed without thermal breaks, but efco has a proprietary thermal break system that permits different finishes on inside and outside faces

* + - * 1. Stile-and-Rail Type Entrance Doors: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts.

below is a requirement of the michigan barrier free code. do not delete.

Kick Surface: Provide an insulated-core, flush aluminum panel, extending the full width of the door and up 10 inches from the bottom of the door. Fabricate panel from not less than 0.125-inch thick aluminum sheet and finish to match door framing members.

Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for nonremoval.

Medium stile (3-1/2-inch nominal width).

Wide stile (over 4 inches wide).

Center panel (door glazed with 2 or 3 lights).

flush panel doors are preferred by housing for many applications. manufacturer is special-lite

* + - * 1. Flush Panel-Type FRP Skin Aluminum Doors: Provide flush panel-type doors fabricated with tubular frame members with reinforced mechanical or welded joints; limit frame exposure to 1/2-inch maximum width on door faces. Fill core with foamed-in-place urethane.

delete below if no aluminum face sheets. plastic laminate sheets are also available for interior faces if desired

Face Sheets: Provide minimum 0.062-inch-thick 5005 aluminum alloy face sheets, mechanically interlocked with frame members and laminated to framing with waterproof glue.

below is optional for added vandal resistance

Provide aluminum face sheets laminated to 1/4-inch thick hardboard panels.

select one of the surface textures below - smooth sheets show damage more readily than others

Aluminum Sheet Surface Texture: Smooth.

Aluminum Sheet Surface Texture: Embossed in manufacturer's standard random (stucco) pattern.

Aluminum Sheet Surface Texture: Manufacturer's standard fluted pattern.

delete below if no FRP face sheets

Face Sheets: Provide 0.120-inch thick fiberglass reinforced polyester (FRP) face sheets with mechanically interlocked with frame members and laminated to framing with waterproof glue.

below is optional for added vandal resistance

Provide FRP face sheets laminated to 1/4-inch thick hardboard panels.

FRP Sheet Surface Texture: Embossed in manufacturer's standard random (stucco) pattern.

select color below: special-lite standard colors include white, black, light gray, dark gray, beige, blue, and green

Face Sheet Color: Dark Bronze.

DELETE THE NEXT PARAGRAPH IF NO LIGHTS ARE INCLUDED IN THE DESIGN.

Lights: Provide glazed openings as indicated, with aluminum moldings and stops. Provide nonremovable stops on the exterior.

below is tubular section flush aluminum type door for heavy-duty use. manufacturers are cross and thompson

* + - * 1. Tubular Aluminum Extrusion Flush Panel Doors: Provide flush panel-type doors fabricated from tubular aluminum extruded sections mechanically interlocked and tied together with steel rods. Fabricate doors of 6063-T5 aluminum alloy tubes of minimum 0.100-inch thickness at exposed faces, and 0.187-inch thick at hinge and lock stiles.

Exterior Doors: Fill tube cores with 1-1/2-inch thick isocyanurate board insulation. Provide units with maximum air infiltration of 0.04 cfm when tested in accordance with ASTM E 283; and no water penetration when tested at 6.24 psf in accordance with ASTM E 331.

DELETE THE NEXT PARAGRAPH IF NO LIGHTS ARE INCLUDED IN THE DESIGN. Remember that 12 inches from bottom of doors must be solid.

Lights: Provide glazed openings as indicated, with aluminum moldings and stops. Provide nonremovable stops on the exterior.

select one of the following surfaces.

Surface Texture: Smooth.

Surface Texture: Fluted.

* + - 1. FABRICATION
				1. General: Fabricate aluminum entrance and storefront components to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes and profile requirements are indicated on the drawings. Variable dimensions are indicated, with maximum and minimum dimensions required, to achieve design requirements and coordination with other work.

below is standard thermal break system - This language does not imply a poured-and-debridged resin-based system. Most systems are two-piece pressure bar type, with fasteners conducting cold to interior. The system also allows different interior and exterior colors.

Thermally Improved Construction: Fabricate storefront framing system with an integrally concealed, low-conductance thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.

* + - * 1. Prefabrication: Complete fabrication, assembly, finishing, hardware application, and other work to the greatest extent possible before shipment to the Project site. Disassemble components only as necessary for shipment and installation.

Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.

Do not drill and tap for surface-mounted hardware items until time of installation at project site.

DELETE THE NEXT PARAGRAPH IF ONLY LARGE GLASS SIZES ARE REQUIRED.

Preglaze door and frame units to greatest extent possible.

* + - * 1. Welding: Comply with AWS recommendations. Grind exposed welds smooth to remove weld spatter and welding oxides. Restore mechanical finish.

Welding behind finished surfaces shall be performed in such a manner as to minimize distortion and discoloration on the finished surface.

* + - * 1. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.
				2. Dissimilar Metals: Separate dissimilar metals with bituminous paint, or a suitable sealant, or a nonabsorptive plastic or elastomeric tape, or a gasket between the surfaces. Do not use coatings containing lead.
				3. Continuity: Maintain accurate relation of planes and angles with hairline fit of contacting members.

Uniformity of Metal Finish: Abutting extruded aluminum members shall not have an integral color or texture variation greater than half the range indicated in the sample pair submittal.

* + - * 1. Fasteners: Conceal fasteners wherever possible.
				2. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops. At other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.

delete sweep strip below for easier door operation

Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

delete below if no interior or vestibule doors

At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.

* + - 1. FINISHES
				1. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
				2. Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.
				3. Finish aluminum entrance and storefront to match other adjacent glazed aluminum curtain wall components. Refer to "Glazed Aluminum Curtain Wall" Section for finish requirements.

Delete the next two parargraphs if anodized finish is not desired

* + - * 1. Class I Clear Anodized Finish: AA-M12C22A41 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film thicker than 0.7 mil) complying with AAMA 607.1.

RETAIN THE PARAGRAPH ABOVE IF CLEAR FINISH IS REQUIRED, OR THE PARAGRAPH BELOW IF A COLOR ANODIZED FINISH IS DESIRED.

* + - * 1. Class I Color Anodized Finish: AA-M12C22A42/A44 (Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, film thicker than 0.7 mil with integral color or electrolytically deposited color) complying with AAMA 606.1 or AAMA 608.1.

Color: Dark bronze.

Color: Black.

Delete below if "Kynar" based organic coating is not sselected

* + - * 1. High Performance Organic Coating: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's instructions.

usually specify 3-coat system below for entrance framing and doors in contact with public. include less expensive 2-coat system (from section 08525 - aluminum architectural windows) for framing elements not in contact with public

Fluorocarbon 3-Coat Coating System: Manufacturer's standard 3-coat thermo-cured system, composed of specially formulated inhibitive primer and fluorocarbon color coat, and clear fluorocarbon topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; comply with AAMA 605.2.

UNIVERSITY PROJECTS USUALLY REQUIRE A COLOR SIMILAR TO DARK BRONZE. REVISE IN COORDINATION WITH PRODUCT LITERATURE FOR BRILLIANT COLORS AND METALLIC FINISHES.

Color: Non-metallic solid color, equal to PPG No. UC 51602 XL "Dark Bronze No. 313."

Gloss: ASTM D-523-80, "medium" (25-35).

Field Touch-up Materials: Fluorocarbon coating produced specifically for field touch-up work by same manufacturer as shop applied coating.

Products: Subject to compliance with requirements, provide one of the following:

Duranar; PPG Industries.

Fluoroceram; Morton International, Group.

Fluropon; Valspar Corp.

Trinar; Akzo Nobel.

* + 1. EXECUTION
			1. EXAMINATION
				1. Examine substrates and supports, with the Installer present, for compliance with requirements indicated, installation tolerances, and other conditions that affect installation of aluminum entrances and storefronts. Correct unsatisfactory conditions before proceeding with the installation.

Do not proceed with installation until unsatisfactory conditions are corrected.

* + - 1. INSTALLATION
				1. Comply with manufacturer's instructions and recommendations for installation.
				2. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Install components in proper alignment and relation to established lines and grades indicated. Provide proper support and anchor securely in place.
				3. Construction Tolerances: Install aluminum entrance and storefront to comply with the following tolerances:

Variation from Plane: Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.

Offset from Alignment: The maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.

Diagonal Measurements: The maximum difference in diagonal measurements shall not exceed 1/8 inch.

Offset at Corners: The maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.

* + - * 1. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

Zinc or cadmium plate steel anchors and other unexposed fasteners after fabrication.

Paint dissimilar metals where drainage from them passes over aluminum.

Paint aluminum surfaces in contact with mortar, concrete or other masonry with alkali resistant coating.

Paint wood and similar absorptive material in contact with aluminum and exposed to the elements or otherwise subject to wetting, with two coats of aluminum house paint. Seal joints between the materials with sealant.

* + - * 1. Drill and tap frames and doors and apply surface-mounted hardware items. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
				2. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.
				3. Install thresholds by field scribing around frame members, including door stops, to provide a continuous surface between across the full width of each opening from jamb to jamb.
				4. Refer to "Glass and Glazing" Section of Division 8 for installation of glass and other panels indicated to be glazed into doors and framing, and not preglazed by manufacturer.
			1. ADJUSTING
				1. Adjust operating hardware to function properly, for smooth operation without binding, and for weathertight closure.
			2. CLEANING
				1. Clean the completed system, inside and out, promptly after installation, exercising care to avoid damage to coatings.
				2. Clean glass surfaces after installation, complying with requirements contained in the "Glass and Glazing" Section for cleaning and maintenance. Remove excess glazing and sealant compounds, dirt and other substances from aluminum surfaces.
			3. PROTECTION
				1. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.
			4. HARDWARE SCHEDULE

below is sample single-door exterior entrance - modify to suit project.

* + - * 1. Set No. A1:

Rim exit device with night latch function

Continuous gear hinge

Closer

Threshold

below is sample single-door(s) used in conjunction with above - modify to suit project.

* + - * 1. Set No. A1:

Rim exit device with dummy trim

Continuous gear hinge

Closer

Threshold

below is sample double-door exterior entrance with REMOVABLE mullion - modify to suit project (USUALLY SCHEDULE AS SINGLE DOORS IF MULLION IS FIXED).

* + - * 1. Set No. A2:

Removable mullion

Threshold

Active Door(1st of pair) Active Door (2nd of pair)

Rim exit device with night latch fn. Rim exit device with dummy trim.

Continuous gear hinge Continuous gear hinge

Closer Closer

below is sample single-door vestibule entrance - modify to suit project.

* + - * 1. Set No. A3:

Push bar

Pull handle

Continuous gear hinge

Closer

below is sample double-door interior entrance - modify to suit project.

* + - * 1. Set No. A4:

Push bar per leaf

Pull handle per leaf

Continuous gear hinge per leaf

Concealed closer per leaf

END OF SECTION 08410