SECTION 05 73 00

ALUMINUM HANDRAILS AND RAILINGS

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\*\* NOTE TO SPECIFIER \*\* AMF Building Products; railings and shutters.
This section is based on the products of AMF Building Products, which is located at:
1501 53rd St.
Mangonia Park, FL 33407
Tel: 561-790-5799
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Email: [request info (sales@amfbp.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=AMF+Building+Products&coid=49669&rep=&fax=561-792-9281&message=RE:%20Spec%20Question%20(05720amf):%20%20&mf=)
Web: [www.amfbp.com](http://www.amfbp.com)
 [ [Click Here](http://www.arcat.com/arcatcos/cos49/arc49669.html) ] for additional information.
AMF offers Custom Designed, as well as Standard Picket, Glass and Lateral Rail Systems to the new construction and retrofit markets. In addition, we manufacture commercial grade aluminum trellises, louvers, vents and many other decorative aluminum elements designed for exterior application. All of our systems are welded construction, built to Florida Building Code and Miami-Dade protocol engineering requirements.
AMF also specializes in the manufacture of many types of aluminum hurricane impact and decorative shutters. Our shutter products include Bahama and colonial shutters, aluminum storm panels and accordion shutters.all that meet and exceed the most stringent requirements of the Florida Building Code and Miami - Dade code approval processes.
AMF Building Products is a name well known and respected in the fabricated aluminum building products industry. Our 50,000 square foot facility, located in West Palm Beach, Florida, accommodates fabrication, powder painting, engineering, sales and administration. This facility is staffed to meet all your aluminum building product needs, from design and price consultation, through fabrication and installation. AMF Building Products is best known for aluminum and glass railing systems as well as hurricane impact and decorative shutter products. In addition, we fabricate many types of custom decorative building elements including trellises, louvers, grilles and vents.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Aluminum handrails and guardrails of the following types:
			1. Picket railing systems.
			2. Lateral railing systems.
			3. Glass railing systems.
	1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
	1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. AAMA 603 - Voluntary Specification, Performance Requirements And Test Procedures For Pigmented Organic Coatings On Aluminum Extrusions And Panels.
		2. AAMA 605 - Voluntary Specification, Performance Requirements And Test Procedures For High Performance Organic Coatings On Aluminum Extrusions And Panels.
		3. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Laminated Flat Glass.
	1. SYSTEM DESCRIPTION
		1. General: Engineer handrail and railing systems to withstand structural loads indicated. Determine allowable design working stresses of railing materials based on the following:
			1. For Aluminum: The Aluminum Association's specification for Aluminum Structures.
		2. Structural Performance of Handrails and Railing Systems: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors, and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.
			1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
				1. Concentrated load of 200 pounds (90.6 kg) applied at any point and in any direction.
				2. Uniform load of 50 pounds per linear foot (74.3 kg/m) applied horizontally and concurrently with uniform load of 100 pounds per linear foot (148.6 kg/m) applied vertically downward.
				3. Concentrated load need not be assumed to act concurrently with uniform loads.
			2. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:
				1. Concentrated load of 200 pounds (90.6 kg) applied at any point and in any direction.
				2. Uniform load of 50 pounds per linear foot (74.3 kg/m) applied in any direction.
				3. Concentrated and uniform loads need not be assumed to act concurrently.
			3. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 pounds (90.6 kg) applied to 1 ft2 (0.1 m2) at any point in the system.
			4. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.
		3. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
		4. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of handrails and railings to prevent buckling, opening up of joints, overstressing of components, connections and other detrimental effects. Base design calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
			1. Temperature Change (Range): 100 degrees F ambient; 150 degrees F material surfaces.
	2. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product Data: Manufacturer's data sheets on each product to be used, including:
			1. Preparation instructions and recommendations.
			2. Storage and handling requirements and recommendations.
			3. Installation methods.
		3. Shop drawings showing Welding, Fabrication and Installation of handrails including all plans, typical elevations, sections, details of components, and attachment to other units of work.
			1. Where installed products are indicated to comply with certain design loadings, include structural computations, material properties and other information needed for structural analysis review by the design architect and/or engineer of record.
			2. Submit 6 prints of all shop drawing product data. Also submit calculations if specifically requested by architect.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples if colors have already been selected.

* + 1. Samples for initial selection purposes in the form of manufacturers color chart showing full range of colors available from factories standards: For custom color request minimum 2 inches x 2 inches (51 mm by 51 mm) color chip from customer for color matching purposes.
		2. Submit at least 2 chips of color match for approval by architect or owner.
		3. Submit at least 2 - 6 inches (152 mm) long samples of the top rail when its shape is other than standard rounds, squares or rectangles and when specifically requested by architect.
	1. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
		2. Installer Qualifications: Minimum 2 year experience installing similar products.
		3. Single Source Responsibility: Obtain handrails and railing systems from a single fabricator/manufacturer.
		4. Engineering Responsibility: Engineer hand railing and railing systems by the fabricator/manufacturer unless sizes and configurations are specifically called out on the drawings.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
			1. Finish areas designated by Architect.
			2. Do not proceed with remaining work until workmanship is approved by Architect.
			3. Refinish mock-up area as required to produce acceptable work.
	1. PRE-INSTALLATION MEETINGS
		1. Convene minimum two weeks prior to starting work of this section.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
		2. Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage.
		3. Handling: Handle materials to avoid damage.
	3. PROJECT CONDITIONS
		1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
	4. SEQUENCING
		1. Field Measurements: Where handrails and railings are indicated to fit to other construction, check actual dimensions of other construction by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.
			1. Where field measurements cannot be made without delaying the Work, obtain guaranteed dimensions in writing and proceed with fabrication of products without field measurements if specifically requested to do so by architect, owner or contractor.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: AMF Building Products, which is located at: 1501 53rd St.; Mangonia Park, FL 33407; Tel: 561-790-5799; Fax: 561-792-9281; Email: [request info (sales@amfbp.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=AMF+Building+Products&coid=49669&rep=&fax=561-792-9281&message=RE:%20Spec%20Question%20(05720amf):%20%20&mf=); Web: [www.amfbp.com](http://www.amfbp.com)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. MATERIALS
		1. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, with not less than the strength and durability properties of the alloy and temper designated below for each aluminum form required:
			1. Structural extrusions such as posts shall be 6061-T6 or 6005-T5 Alloy/Temper.
			2. All other extrusions such as Caps, Pickets, Mid and Bottom Rails shall be at least 6063-T5.
			3. Castings: To be high quality prime material or materials remelted from prime extrusions.

\*\* NOTE TO SPECIFIER \*\* Revise if a different glass is required. Delete if not required.

* + 1. Glass: ASTM C1048 clear tempered laminated glass with edges polished and eased.
	1. GROUT AND ANCHORING CEMENT
		1. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications.
		2. Erosion-Resistant Anchoring Cement: Factory-prepackaged, nonshrink, nonstaining, high strength cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure or provide a sealer or waterproof coating recommended for exterior use.
	2. WELDING MATERIALS, FASTENERS, AND ANCHORS
		1. Welding Electrodes and Filler/Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
		2. Fasteners for Anchoring Railings to Other Construction: Select fasteners of the type, grade, and class required to produce connections that are suitable for anchoring railing to other types of construction indicated and capable of withstanding design loadings.
			1. For aluminum railings in coastal environments provide fasteners fabricated from stainless steel or aluminum only.
		3. Fasteners for Interconnecting Railing Components: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
	3. FABRlCATlON
		1. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than those required to support structural loads.
		2. Preassemble railing systems in shop to greatest extent possible assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for field assembly and coordinated installation. Use connections that maintain structural value of joined pieces.
		3. Assembly shall be in a neat workmanlike manner using M.I.G. or T.I.G. Welding Processes as required. Horizontal channels shall be punched to receive pickets and welds in this application shall be concealed from view.
			1. Channels to receive a snap cover only when specifically required and noted on drawings.
			2. Posts shall be structurally welded to Top Rail and Mid and Lower Horizontal Members to assure fixed fastening for the life of the rail.
			3. Corners shall be hairline fitted by mitre and further welded as required to obtain maximum assurance of strength through the railing's useful life.
			4. Splices shall be accomplished by butting one Top Rail to the next with a structural sleeve insert extending from one Top Rail to the next and further secured by means of a Stainless Steel, Aluminum or other proper screw or pop-rivet.

\*\* NOTE TO SPECIFIER \*\* Butt splices to be either hairline fitted or properly gapped to provide for proper expansion and contraction movement. For expansion joints be sure that only one side of the sleeve insert is fastened to the top rail.

* + - 1. End connections required to fasten to the building structure require either a welded end clip or a separate slide clip.
			2. Provide weep holes when necessary to drain closed sections from pretreatment immersion and sprays also for moisture from condensation to escape.
	1. ALUMINUM FlNlSHES
		1. Aluminum railings to receive a baked-on painted finish over full pretreatment except when specified to be natural or mill finish or when anodizing is specified. Anodizing is not recommended for welded railings due to the likelihood of discoloration from:
			1. Dissimilar alloys.
			2. Dissimilar tempers.
			3. Oxidation.
			4. Welding Filler Metals.
			5. Weld heat zones.
			6. Marring caused during fabrication and handling.
		2. Pretreatment Process: A multi-stage pretreatment process is required prior to shop painting.
			1. The railing shall be dipped or sprayed in a concentrated alkaline cleaner then rinsed in clear water. This process provides cleaning, degreasing and deep etching on the surface.
			2. The product shall then be dipped or sprayed in a concentrated acidic treatment to deoxidize, desmut and neutralize the surface then rinsed in clear water.
			3. The product shall then be dipped or sprayed in an acidic conversion coating to act as a bonding coating for paint adhesion.
			4. The product shall be completely dried before painting.
		3. Painting:

\*\* NOTE TO SPECIFIER \*\* Delete finish not required.

* + - 1. E.S.P. applied thermosetting T.G.I.C. polyester powder paint over pretreatment bond coating. Paint to be 1.5 to 2.0 mills. D.F.T. Paint shall be baked on at approx. 400 degrees F for a minimum of 10 minutes duration. Paint to be similar to Nortek Powder Coating, polyester T.G.I.C. or Tiger Drylac Series 49.

\*\* NOTE TO SPECIFIER \*\* Powder coat available in AMF Standard colors & mfgrs. standard colors only. Color matches will be done with high solid polyester liquid paint similar to P.P.G. Polycron III. Meets AAMA 603.85 Specification.

* + - 1. E.S.P. applied thermosetting powder paint over pretreatment bond coating. TWO COAT SYSTEM with paint to a total minimum 3.5 mills. D.F.T. Paint shall be baked on at approx. 400 degrees F for a minimum of 10 minutes duration. Paint to be similar to TIGER DRYLAC SERIES 28. Note: This system available only in manufacturers standard colors. This system meets or exceeds the performance requirements of AAMA. 605.2-92 specification.
			2. E.S.P. applied thermosetting KYNAR 500 Fluoropolymer Resin Coating with inhibitive flash primer over conversion coating. Paint shall be baked to at least 450 degrees F. Paint to be similar to PPG DURANAR. Meets or exceeds AAMA 603.85 specification.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates have been properly prepared.
		2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.
	3. INSTALLATION GENERAL
		1. Fit exposed connections accurately together to form tight, hairline joints, except as required for expansion.
		2. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of handrails and railings. Set handrails and railings accurately in location, alignment, and elevation, measured from established lines and levels and free from rack.
			1. Set posts plumb within a tolerance of 1/16 inch to 12 inches (2 mm in 305 mm).
			2. Align rails so that variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/32 inch in 12 inches (1 mm in 305 mm).
		3. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of paint or epoxy.
		4. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing handrails and railings to in-place construction.
	4. ANCHORING POSTS
		1. Anchor post in concrete by means of preset sleeves into concrete. After posts have been inserted into sleeves, fill space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
		2. Anchor posts in concrete by core drilling holes not less than 3 inches (76 mm) deep and 1 inch (25 mm) greater than outside diameter of post. Clean holes of all loose material, insert posts, and fill space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
			1. Nonshrink, nonmetallic grout.
			2. Nonshrink, nonmetallic grout or anchoring cement.
		3. Leave anchoring material down approximately 1/2 inch (13 mm) to allow for final topping with a waterproof material matching the surrounding areas by others. Whenever possible fill hole with waterproof topping slightly higher than the adjacent surfaces and taper and taperaway from the post.
	5. CLEANING, PROTECTION AND TOUCH-UP PAINTING
		1. On delivery all railing will have protective cover over cap only. Immediately upon completion of installation of railing installer shall remove cap cover and clean all work for inspection and approval.
		2. After installation the General Contractor or Owner shall be responsible for protecting the railings during the balance of construction.
		3. Painted aluminum surfaces shall be cleaned with plain water containing a mild soap or detergent. No abrasive agents or harsh chemicals are to be used.

END OF SECTION