SECTION 05 73 00.10

DECORATIVE METAL RAILINGS - KLEAR

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\*\* NOTE TO SPECIFIER \*\* Hollaender Mfg. Co.; decorative metal and glass railings.
This section is based on the products of Hollaender Mfg. Co., which is located at:10285 Wayne Ave., P. O. Box 156399Cincinnati, OH 45215-6399Toll Free Tel: 800-772-8800Tel: 513-772-8800Fax: 800-772-8806Email: [request info (sales@hollaender.com)](https://arcat.com/rfi?action=email&company=Hollaender%252BMfg.%252BCo.&message=RE%253A%2520Spec%2520Question%2520(05721hol)%253A%2520&coid=33096&spec=05721hol&rep=&fax=800-772-8806)
Web: <https://architecturalhandrail.hollaender.com> | <https://www.hollaender.com>
 [ [Click Here](https://arcat.com/company/hollaender-mfg-co-33096) ] for additional information.
With more than 75 years of American-made experience and superior manufacturing technology has resulted in the most reliable, durable, and high-quality products hand railing systems.
Our pipe fittings and handrail systems today can be found all over the world. From rocket launch pads to oil rigs, from Hollywood movie studios and modern amusement parks to the fixtures in your favorite retail stores, and from water treatment plants to powergen facilities around the globe.
Why? The reasons are simple:
- We manufacture handrail systems to meet any application.
- Our slip-on fittings are cost effective, easy to install, and reusable.
- We are vertically integrated: all our design, casting, and manufacturing is under one roof.
- Aluminum-magnesium alloy is strong, corrosion resistant, and usable with any metal pipe.
- We pursue innovative ideas in-house.

1. GENERAL
	1. SECTION INCLUDES
		1. Handrail System with offset glass infill, glass as top rail.
	2. RELATED SECTIONS

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

* + 1. Section 05 73 00.20 - Decorative Metal Railings - VUE.
		2. Section 05 73 00.30 - Decorative Metal Railings - VISION.
		3. Section 05 73 00.40 - Decorative Metal Railings - INTERNA RAIL 3-LINE.
		4. Section 05 73 00.50 - Decorative Metal Railings - INTERNA RAIL 2-LINE.
		5. Section 05 73 00.60 - Decorative Metal Railings - SPEED RAIL.
		6. Section 05 73 00.70 - Decorative Metal Railings - Structural Glass
		7. Section 05 73 00.80 - Decorative Metal Railings - Button Glass.
		8. Section 08 80 00 - Glazing: Glass panels for Infill Panels.
	1. REFERENCES

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

* + 1. American Architectural Manufacturers Association (AAMA):
			1. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
			2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
		2. ASTM International (ASTM):
			1. ASTM A 167 - Stainless and heat resisting Chromium-Nickel steel plate, sheet and strip.
			2. ASTM A 269 - Stainless and heat resisting Chromium-Nickel steel plate, sheet and strip.
			3. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
			4. ASTM B 26 - Standard Specification for Aluminum-Alloy Sand Castings.
			5. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
			6. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
			7. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
			8. ASTM B 247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings.
			9. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
			10. ASTM C 1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
			11. ASTM E 935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
		3. Code of Federal Regulations (CFR):
			1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
		4. International Building code (IBC).
		5. Occupational Safety and health Administration (OSHA).
	1. 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. Railing, grout, anchoring cement and paint products.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Installation methods.
		3. Shop Drawings: Prior to fabrication submitted which include the following:
			1. Plan views showing location of handrail required for the project with all necessary dimensions.
			2. Detail drawings which show standard handrail elevations, typical railing connections, anchoring systems and expansion joints.
			3. Drawings shall be signed and sealed by a structural engineer indicating compliance with design loads specified.
		4. Samples for Initial Selection: For products involving selection of color, texture, or design.
		5. Verification Samples: For each finish product specified, two samples, minimum size 6 inch (152 mm) square, representing actual product, color, and patterns.
		6. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
		7. Qualification Data: For professional engineer.
		8. Product Test Reports: Supplier shall submit calculations and test reports for complete system. Test Data perASTM E 935.
	2. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
		2. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
		3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on 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: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
			1. Unless indicated otherwise on the Drawings, approximate size of mockup shall be 25 to 50 percent of full size required, using full size components.
			2. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
			3. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
			4. Retain mock-up during construction as a standard for comparison with completed work.
			5. Do not alter or remove mock-up until work is completed or removal is authorized.
			6. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
	1. PRE-INSTALLATION CONFERENCE
		1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
		2. Protect from damage due to weather, excessive temperature, and construction operations.
	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.
		2. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
		3. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
	4. COORDINATION AND SCHEDULING
		1. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to project site in time for installation.
		2. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.
	5. WARRANTY
		1. Manufacturer's Warranty: Provide manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Hollaender Mfg. Co., which is located at:10285 Wayne Ave., P. O. Box 156399Cincinnati, OH 45215-6399Toll Free Tel: 800-772-8800Tel: 513-772-8800Fax: 800-772-8806Email: [request info (sales@hollaender.com)](https://arcat.com/rfi?action=email&company=Hollaender%252BMfg.%252BCo.&message=RE%253A%2520Spec%2520Question%2520(05721hol)%253A%2520&coid=33096&spec=05721hol&rep=&fax=800-772-8806);Web: <https://architecturalhandrail.hollaender.com> | <https://www.hollaender.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. PERFORMANCE REQUIREMENTS
		1. Railing must conform to apply to pertinent sections of the following codes:
			1. Applicable state and local building codes, including IBC.
			2. ADAAG.
		2. Handrail for Ramps and Stairs:
			1. Ramps with a rise greater than 6 inch (152 mm) shall have handrails on both sides.
			2. Handrail Height: Installed height of 34 to 38 inch (864 to 965 mm) above ramp surface.
			3. A curb, rail, wall, or barrier shall be provided to serve as edge protection.
				1. Curb: 4 inch (102 mm) minimum height.
				2. Barrier: Constructed to prevent the passage of a 4 inch (102 mm) diameter sphere above ramp grade level.
			4. Circular Cross Section Handrails: Gripping surface diameter between 1-1/2 inch (38 mm) and 2 inch (51 mm).
			5. Clearance between Wall or Post Surface and Handrail: 1-1/2 inch (38 mm) minimum.
			6. At the top and bottoms of handrail sections that stop at a landing, handrail shall extend 12 inch (305 mm) horizontally beyond the top riser and 12 inch (305 mm) horizontally beyond the bottom tread.
			7. Ramps with 30 inch (762 mm) or more drop off to grade shall require guards.
			8. Handrail shall be continuous, without interruption by newel posts or other obstructions.
			9. Handrails shall return to a wall, guard or walking surface.
		3. Structural Performance: Railings capable of withstanding effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
			1. Handrails:
				1. Uniform load of 50 lbf per ft (729.7 N per m) applied in any direction.
				2. Concentrated load of 200 lbf (889.6 N) applied in any direction.
				3. Uniform and concentrated loads need not be assumed to act concurrently.
			2. Top Rails of Guards:
				1. Uniform load of 50 lbf per ft (729.7 N per m) applied in any direction.
				2. Concentrated load of 200 lbf (889.6 N) applied in any direction.
				3. Uniform and concentrated loads need not be assumed to act concurrently.
			3. Infill Area of Guards:
				1. Horizontal concentrated load of 50 lbf per sq ft (2394 N per sq m)
				2. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Load on infill area need not be assumed to act concurrently with loads on top rails.
				3. Glass infill panels shall have a safety factor of 4 included in the calculation.
		4. Thermal Movement: Exterior railings shall allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
			1. Temperature Change (Range): 120 degrees F (48.9 degrees C), ambient; 180 degrees F (82.2 degrees C), material surfaces.
		5. Corrosion Control: Prevent galvanic action and other corrosion types. Insulate metals and other materials from direct contact with incompatible materials.
	2. METALS
		1. Metals, General:
			1. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
			2. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

\*\* NOTE TO SPECIFIER \*\* Delete metal options not required.

* + 1. Aluminum:
			1. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
			2. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52, 6005-T5.
			3. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6061-T6. Provide 1.90 inch (48 mm) OD Standard Weight, Schedule 40 pipe for rails, Schedule 80 for posts, unless otherwise indicated.
			4. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832
			5. Plate and Sheet: ASTM B 209, Alloy 6061-T6
			6. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6
			7. Base Flange Castings: ASTM B 26/B 26M, Alloy Almag 535
			8. Structural Fittings and Panel Clips: Alloy 6063-T6.
		2. Stainless Steel:

\*\* NOTE TO SPECIFIER \*\* Type 304 is standard. Type 316 is a higher cost option for coastal applications, highly corrosive environments, or difficult exteriors. Delete type option not required.

* + - 1. Type: 304.
			2. Type: 316.
			3. Stainless and heat resisting Chromium-Nickel steel plate, sheet and strip,ASTM A 167.
			4. Seamless and welded austenitic stainless steel tubing for general service,ASTM A 269.
			5. Seamless and welded austenitic stainless steel pipe,ASTM A312.
	1. HANDRAIL SYSTEM WITH OFFSET GLASS INFILL, GLASS AS TOP RAIL
		1. Basis of Design: KLEAR Railing System as manufactured and assembled by Hollaender Manufacturing.
		2. Interconnecting Railing Components:
			1. Post, Handrail/Grabrail Connection: Hollaender 87-8 post brackets using anodized aluminum tubular rivet nuts and stainless steel socket head cap screws, size 5/16-18 UNC. This combination prevents loosening of system due to temperature change or vibration.
			2. Hollaender 87-8 Post Brackets: 6063-T6 aluminum alloy.
			3. Systems that are welded, or use pop rivets or adhesives are not acceptable.
			4. Post Spacing: 48 inch (1219 mm) maximum.
		3. Glass Panel Attachment: Secured to rails using Hollaender 244-8 two piece glass panel clips using anodized aluminum tubular rivet nuts and stainless steel socket head cap screws, size 5/16-18 UNC. Support bottom of glass using Hollaender 244B-8 glass support clips.
			1. No holes will be drilled in the glass except at corner or end post conditions.
			2. Glass Panel Clips, No. 244-8: 6063-T6 aluminum alloy.
		4. Flanges and Anchors:
			1. Anchors: Concrete adhesive anchors where indicated or necessary.

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

* + - 1. Flanges For Level Railing: Hollaender 142-8 internal cast flanges with 4 holes. Capped with Hollaender 242-8 anodized aluminum escutcheon plate.
			2. Flanges for Raked Railing on Steel Stringers: Hollaender 146I-8 internal spud with integral cover plate.
			3. Flanges for Side Mount: Hollaender 52E-8 flange.
		1. Glass Infill Panels for Railings:
			1. Tempered Glass: ASTM C 1048, Fully Tempered, Condition A, Type 1 (Transparent Flat Glass), Quality Q3.
				1. Comply with properties indicated for class, thickness, and manufacturing process that have been tested for surface and edge compression according to ASTM C1048 and for impact strength according to16 CFR 1201for category 2 materials.

\*\* NOTE TO SPECIFIER \*\* Delete glass thickness not required.

* + - * 1. Glass Type: 3/8 inch (10 mm) tempered.
				2. Glass Type: 7/16 inch (11 mm) tempered and laminated.

\*\* NOTE TO SPECIFIER \*\* Delete lamination type not required.

Lamination: PVG interlayer; for interior work.

Lamination: SGP interlayer; for exterior work.

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

* + - * 1. Frosted Glass: Velour frosted glass, frosted one side only, by Oldcastle, or approved equivalent.
		1. Finishes:

\*\* NOTE TO SPECIFIER \*\* Delete post and rail options not required.

* + - 1. Posts and Rails: Anodized perAA-M10C22A41; Architectural Class I, .7 mil (0.018 mm) thickness or greater.

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

* + - * 1. Color: Clear.
				2. Color: Dark Bronze.
			1. Posts and Rails: TGIC polyester powder coat perAAMA 2603minimum.

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

* + - * 1. Color: To be selected from the manufacturer's available color palette.
				2. Color: As specified in the finish schedules of the Contract Documents.
			1. Posts and Rails: Kynar 500 Fluoropolymer coating perAAMA 2605minimum.

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

* + - * 1. Color: To be selected from the manufacturer's available color palette.
				2. Color: As specified in the finish schedules of the Contract Documents.

\*\* NOTE TO SPECIFIER \*\* Delete fitting option not required.

* + - 1. Fittings: Anodized.

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

* + - * 1. Color: Clear.
				2. Color: Dark Bronze.
			1. Fittings: TGIC polyester powder coat per AAMA 2603 minimum.

\*\* NOTE TO SPECIFIER \*\* Delete color not required

* + - * 1. Color: To be selected from the manufacturer's available color palette.
				2. Color: As specified in the finish schedules of the Contract Documents.
	1. FASTENERS
		1. Aluminum and Stainless Steel Railings: Type 304 stainless-steel fasteners.
		2. Fasteners Anchoring Railings to Other Construction: Select type, grade, and class required to produce connections suitable for anchoring railings to construction types indicated and capable of withstanding design loads.
			1. Pop rivets or adhesives are not acceptable.
		3. Anchors: Provide concrete adhesive anchors where indicated or necessary.
	2. FABRICATION
		1. Railing Fabrication: Comply with requirements for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
			1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (0.8 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
			2. Form work true to line and level with accurate angles and surfaces.
			3. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
			4. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
			5. Connections: Fabricate railings with non-welded connections, unless otherwise indicated.
			6. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
			7. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
			8. Fabricate anchorage devices capable of withstanding loads imposed by railings.
			9. Coordinate anchorage devices with supporting structure.
		2. Railing Assembly: Shop assemble to greatest extent possible minimizing field splicing and assembly.
			1. Disassemble only as necessary for shipping and handling.
			2. Clearly mark units for reassembly and coordinated installation.
			3. Use connections that maintain structural value of joined pieces.
			4. Non-welded Connections: Connect members with concealed mechanical fasteners and fittings.
				1. Fittings to be internal double tang type activated by a reverse knurl cup point set screw ensuring screw does not come loose under vibration.

Plain cup point screws will not be accepted.

* + - * 1. Fittings fastened to pipe using 5/16-18 UNC inch tubular rivet nuts and stainless steel socket head cap screws.
			1. Form Changes in Direction: Use flush bends or prefabricated flush-elbow fittings.
			2. Form Simple and Compound Curves: Bend members in jigs producing uniform curvature for each repetitive configuration required.
				1. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
			3. Exposed Ends of Railing Members: Close using prefabricated end fittings.
			4. Wall Returns: Provide at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
			5. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
				1. External Flanges: Sand cast aluminum alloy 535 with anodized finish fastened directly to posts by two reverse knurl cup point set screws.
				2. Internal Flanges: Sand cast aluminum alloy 535. Cover flanges with escutcheon plates.
			6. Railing Toe Plates: Provide when adjacent to or above and open to stair system, floor or grade below and in accordance with the following:
				1. Size: 4 inch (102 mm) high extruded section.
				2. Toe Plate Bottom Clearance Above Top of Walking Surface: 1/8 inch (3 mm) minimum and 1/4 inch (6 mm) maximum. Notch plates as required at railing posts and post base plates.
				3. Attach to each rail post with clamps; allowing for temperature expansion and contraction between posts.
				4. Expansion Joints: Provide toeboard at railing expansion joints.
				5. Provide pre-manufactured corners for field installation.
	1. FINISHES
		1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
		2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
		3. Appearance of Finished Work:
			1. Acceptable Variations: Appearance of abutting or adjacent pieces must be within one-half of the range of approved samples.
				1. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.
			2. Noticeable Variations: In same piece is not acceptable.
			3. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
1. EXECUTION
	1. EXAMINATION
		1. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for installer. Locate reinforcements and mark locations if not already done.
		2. Do not begin installation until substrates have been properly constructed and prepared.
		3. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
	3. INSTALLATION
		1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
		2. Fit exposed connections together to form tight, hairline joints.
			1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
			2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (1.6 mm in 1 m).
			3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.6 m).
		3. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
		4. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2 inch (38 mm) clearance from inside face of handrail and finished wall surface.
		5. Once installed, all handrails must be in compliance with the requirements of applicable federal, state and local building codes.
	4. CLEANING AND PROTECTION
		1. Protect installed products until completion of project.
		2. Remove all stains, dirt, grease, or other substances by washing all railings thoroughly using clean water and soap; rinse with clean water.
		3. Do not use acid solutions, steel wool, and other harsh abrasives.
		4. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION