SECTION 05 51 00

PREFABRICATED STEEL STAIR SYSTEMS

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\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation; prefabricated steel stair systems.
This section is based on the products of Pacific Stair Corporation, which is located at:
8690 Stair Way N. E.
Salem, OR 97305-9623
Tel: 503-390-8305
Fax: 503-390-3864
Email: [request info (bcole@pacificstair.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=Pacific+Stair+Corporation&coid=44803&rep=&fax=503-390-3864&message=RE:%20Spec%20Question%20(05512pac):%20%20&mf=)
Web: <https://pacificstair.com>
 [ [Click Here](https://www.arcat.com/arcatcos/cos44/arc44803.html) ] for additional information.
Located in Salem, Oregon since 1989, Pacific Stair Corporation is North America's leader in advanced egress stair system technology. Our talented team of professionals are experts in design, engineering, manufacturing and the installation of commercial steel stair systems. Our mission is to provide great efficiencies, construction and design savings, control of quality and scheduling, and ensure clients receive the highest standard of care and trust.

1. GENERAL
	1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete paragraphs below which are not applicable.

* + 1. Prefabricated design-build steel stairs and landings including the following:
			1. Standard stair and rail assemblies.
			2. Steel framed stairs with steel treads.
			3. Steel framed landings.
			4. Stair railings.
			5. Wall rails.
			6. Exit control gates.
			7. Preassembled stacking stair systems.
			8. Luminous egress path marking system.
			9. Related supports and connections.
	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.
		2. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing.
		3. Section 05 50 00 - Metal Fabrications.
		4. Section 09 90 00 - Painting and Coating.
		5. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.
	1. REFERENCES

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

* + 1. ADAAG - Americans with Disabilities Act.
		2. American Institute of Steel Construction (AISC): AISC Manual of Practice.
		3. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
		4. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
		5. ATM International (ASTM):
			1. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
			2. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
			3. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
			4. ASTM A153/A153M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
			5. ASTM A307 - Standard Specification for Common Steel Bolts.
			6. ASTM A325/A325M - Standard Specification for Structural Bolts, Steel, Heat Treated.
			7. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
			8. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
			9. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
			10. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
			11. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy and Alloy Steel Floor Plates.
			12. ASTM A1008 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake harden able.
			13. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon Structural, High-Strength Low Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
			14. ASTM A1044/A1044M - Standard Specification for Steel Stud Assemblies for Shear Reinforcement of Concrete.
			15. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
		6. American Welding Society (AWS):
			1. AWS A2.4 - Standard Welding Symbols for Welding, Brazing, and Nondestructive Examination.
			2. AWS D1.1/D 1.1M - Structural Welding Code - Steel.
			3. AWS D1.3 - Structural Welding Code - Sheet Steel.
		7. Federal Specification RR-G-1602D - Grating, Metal, Other than Bar Type (Floor, Except for Naval Vessels).
		8. ICC International Building Code: Chapter 10: Means of Egress.
		9. International Code Council - International Building Code (IBC).
		10. National Association of Architectural Metal Manufacturers (NAAMM):
			1. SSPC-SP3 Power Tool Cleaning.
			2. SSPC-SP2 Hand Tool Cleaning.
		11. National Ornamental and Miscellaneous Metals Association: Weld Finish Type(s).
		12. Steel Structures Painting Council (SSPC):
			1. Paint 15 - Steel Joist Shop Primer.
			2. SP 2 - Hand Tool Cleaning.
		13. UL 1994 Luminous Egress Path Marking Systems.
		14. New York City Reference Standard for Photoluminescent Exit Path Markings:
			1. RS6-1
			2. RS6-1A
	1. DESIGN REQUIREMENTS

\*\* NOTE TO SPECIFIER \*\* Please note: The design criteria shown below complies with most jurisdictions, however due to some areas having more stringent codes please verify compliance.

* + 1. Stair systems are designed and fabricated to support a uniform live load of 100 lb/sf (4.8 kN/sq.m) and a concentrated load of 300 lbf (1.33 kN) with a deflection of stringer or landing framing not to exceed L/240 or 1/4 inch (6 mm) whichever is less.
		2. Handrail and guardrail systems are designed and fabricated to the following specifications:
			1. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
			2. Concentrated load of 200 lbf (0.89 kN) Applied in any direction.
			3. Uniform and concentrated loads are not assumed to act concurrently.
		3. Infills of guards are designed to withstand a load of 50 lbf/ft. (0.73 kN/m) applied horizontally on an area of one square foot. Infill loads and other loads are not assumed to act concurrently.

\*\* NOTE TO SPECIFIER \*\* Download test results at http://www.pacificstair.com/story\_drift.html. Delete if not required.

* + 1. Seismic Performance Stair Systems: Stair systems shall be designed, tested and fabricated to resist seismic events in compliance with ASCE 7-02, Section 9.5.2.8, and IBC Section 1617.3 allowable story drift.
		2. Accessibility: Requirements: Comply with ADAAG and ANSI A117.1 in accordance with authority having jurisdiction.
	1. SUBMITTALS
		1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
		2. Product data: Submit specified products as follows:
			1. Manufacturer's product data.
			2. Manufacturer's installation instructions.
		3. Shop Drawings: Indicate information on shop drawings as follows:
			1. Stair plans, elevations, details, methods of installation and anchoring.
				1. Show members, sizes and thickness, anchorage locations and accessory items.
				2. Furnish setting diagrams for anchorage installation as required.
				3. Include calculations stamped by a structural engineer registered in the jurisdiction where the project the project is located.
		4. Samples: Submit as follows:
			1. Two samples of factory tread system 3 inches wide. "IF" tread specified is a manufacturer's System and not otherwise a common "Field Poured Concrete Pan or Common Checker / Smooth plate.
			2. If Photoluminescent Nosing is specified submit integral sample of complete nosing and tread system (3" wide) regardless of tread type.
		5. Submit manufacturer's Storage and Installation Instructions.
		6. Submit documentation verifying that components and materials specified in this section are from a single source manufacture approved by this specification.
		7. Qualification Statements: Submit Certificate that manufacturer is a Certified Fabricator with the American Institute of Steel Construction (AISC).
	2. QUALITY ASSURANCE
		1. Manufacturer to have experience in the design, engineering and fabrication of products specified.
			1. American Institute of Steel Construction (AISC) Certified Fabricator, having a minimum of 10 years' experience manufacturing components similar to or exceeding requirements specified in scope of project.
			2. Having sufficient capacity to produce and deliver required materials without causing delay in work.
			3. Installer: Acceptable and approved by Stair Manufacturer.
		2. Welding: Embedded weld connections to be welded by certified welders, and inspected by an independent testing laboratory.
	3. DELIVERY, STORAGE, AND HANDLING
		1. Delivery and Acceptance Requirements:
			1. Deliver material in accordance projects schedule and in accordance with manufacturer's instructions.
			2. Deliver materials in full truckload quantities in manufacturer's pre-bundled and banded lots with identification labels intact and in sizes to suit project hoisting equipment.
		2. Storage and Handling Requirements:
			1. Store materials on skids or appropriate planks so material is not in direct contact with the ground and at least 4" above grade. Ensure rain or snow runoff freely flows under material making no contact with product(s).
			2. Protect material from adverse conditions. If not stored under roof, tarp accordingly to keep material dry. Inspect material regularly to ensure water is not pooling in stair tread or landing pans, frames, railing, hardware or packaging, etc.
		3. Packaging Waste Management:
			1. Separate waste materials for refuse and recycling.
			2. Remove packaging materials from site and dispose of at appropriate facilities.
			3. Collect and separate for disposal paper, plastic, polystyrene, cardboard packing material in appropriate onsite bins for recycling.
			4. Fold metal and plastic banding; flatten and place in designated area for recycling.
	4. PROJECT SITE CONDITIONS
		1. Field Measurements: Field verify floor to floor and horizontal dimensions of spaces where stairs will be installed prior to fabrication of stairs under this section.
1. PRODUCTS
	1. MANUFACTURERS
		1. Acceptable Manufacturer: Pacific Stair Corporation, which is located at: 8690 Stair Way N. E.; Salem, OR 97305-9623; Tel: 503-390-8305; Fax: 503-390-3864; Email: [request info (bcole@pacificstair.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=Pacific+Stair+Corporation&coid=44803&rep=&fax=503-390-3864&message=RE:%20Spec%20Question%20(05512pac):%20%20&mf=); Web: <https://pacificstair.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: As approved per architect prior to bid date.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
	1. STANDARD STAIR AND RAIL ASSEMBLlES
		1. Standard Stair and Rail System:
			1. Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet risers, treads, landings and structural plate, channel or angle frames, stringers or connection devices with fasteners/supports and railings.
				1. Stringers:

Steel plate or channel with side mounted and/or top mounted railing frame attachment as detailed on drawings and/or in accordance with manufactures system recommendations.

Minimum thickness or weight as determined by structural design calculations, structural grade steel plate or channel.

* + - 1. Risers: Closed riser, minimum 14 gage (1.9mm) hot rolled mild steel sheet, sloped maximum 1-1/2 inches (38.1mm) and conforming to Americans with Disabilities Act (ADA) nosing requirements.
			2. Treads: Manufacturer's standard tread system, 14 gage (1.9mm) minimum hot rolled mild steel sheet or as determined by structural design calculations. All welds on the underside of tread assemblies to be exposed for proper inspection during the service life and/or after seismic, fire, flood, or potentially damaging event. Provide treads as indicated and noted on drawings for each stair scheduled.

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

* + - 1. Landings: A combination of structural plate, channel and angles for the frame with 1-1/2 inches B-36 Composite Floor Decking x 20 gage and 10 gage (minimum) bent sheet lateral pour stops. Decking to be attached to frame by plug welding or other mechanical means provided recommended and engineered by the stair manufacturer.
				1. Flight and landing assemblies fabricated by the stair manufacturer shall be connected by splined "Twist-Off" tension control bolts, grade to be A325 & A490 as engineered and specified by the stair manufacturer.
				2. All pre-tensioning methods are to be conformant to the AISC Steel Construction Manual, Chapter 16; Section #3 Bolted Parts. Subsection 3.2.1 "pre-tensioned joints and related sections noted thereafter".
			2. Additional Fastener and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be threaded rod type, size and grade as determined by stair manufacturer's structural design calculations.

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

* + - 1. Railings: Design style as shown on drawings for each stair, selected from manufacturer's standard pre-fabricated, pre-engineered rail styles.
			2. Stringer Rail Mounting:
				1. Structural Plate Stringer: Railings to be Side Mounted. Rail Frame: In-Line or Side assembly, see drawings.
				2. Structural Channel: Railing to be Top Mounted to channel flange or Side Mounted with railing post knife-blade steel plate connection extender to be received inside the channel flanges below the top flange. Rail Frame: In-Line or Side Assembly.
			3. Materials:
				1. Steel Shapes and Plates: To ASTM A36.
				2. Steel Pipe: To ASTM A53 Type E or S, Grade B.
				3. Steel Tubing:

Structural Use: To ASTM A500, Grade B or C.

Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).

* + - * 1. Steel Sheet:

Structural Use: To ASTM A1011 (hot rolled), Checker Plate ASTM A786.

Non-Structural Use: To ASTM A786, ASTM A1008.

* + - * 1. Fasteners: As recommended by manufacturer.
				2. Welding Rods: In accordance with AWS code and AWS filler metal specifications.
			1. Fabrication:
				1. Use same material finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.
				2. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.
				3. Construct stair and rails with all components necessary for support and anchorage, and for a complete installation.
			2. Finishes:
				1. Rails, flights, landings and other stair components: Remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from steel surface in accordance with SSPC-SP2 and/or SSPC-SP3.
				2. Shop Primer: Immediately after fabrication and cleaning, spray apply primer to dry film thickness recommended by the primer manufacturer, but not less than 2.0 mil thickness. Apply one coat High Solids Red Oxide Anticorrosive Primer meeting SSPC-15 Paint.
				3. Post Delivery: Primer coating offers minimal protection against rust and corrosion during transport and while stored at project site. Proper handling and care before during and after installation shall be taken to maintain effectiveness of primer coating prior to receiving final coats of finish paint.
		1. Stair assemblies shall include the following; metal framing, hangers, struts, railings, clips, brackets, bearing plates and other components necessary to support and anchor stairs and platforms to the supporting structure.
			1. Components will be joined by welding unless otherwise indicated.
			2. Connections will be used to maintain the structural value of joined pieces.
			3. Stairs will be assembled to the greatest possible extent.
			4. Cutting, drilling and punching to be done cleanly and accurately. Burrs and rough edges to be removed.
			5. Exposed connections shall be made with hairline joints, flush and smooth. Locate joints where least conspicuous.
		2. Embedded Weld Connections:
			1. Steel angle: Standard sizes, 3 inches by 2 inches by 1/4 inch (76 mm by 51 mm by 6 mm) , 4 inches by 4 inches by 1/4 inch (102 mm by 102 mm by 6 mm).
			2. Steel plate: Standard sizes, 4 inches by 10 inches by 1/4 inch (102 mm by 254 mm by 6 mm), 12 inches by 12 inches by 1/4 inch (305 mm by 305 mm by 6 mm).
			3. Headed weld studs: .500 inch diameter, by 4 inches (13 mm diameter by 102 mm).
			4. Attachment of studs to angle or plate: Specialized arc welding equipment.
			5. Embeds: All embeds are 100% Tested and Certified by independent third party inspection.
		3. Fasteners For Standard Applications:
			1. Concrete Anchor: Hilti Kwik Bolt TZ; 5/8 inch (16 mm) diameter by 6 inch (152 mm).
			2. CMU Anchor: Hilti Kwik Bolt KB3; 5/8 inch (16 mm) diameter by 6 inch (152 mm).
			3. Tension Control Bolts: 5/8 inch (16 mm) diameter by 1-1/2 inch (38 mm), in accordance with ASTM A325.
			4. Steel Bolts for Posts: 5/8 inch (16 mm) diameter by 4-1/2 inch (114 mm), in accordance with ASTM A307.
	1. STEEL FRAMED STAIRS WITH STEEL TREADS
		1. Risers are closed.
		2. Anchorage to stringers: Treads and Risers shall be welded to stringers to eliminate buckling.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 100 Series Concrete Filled Stair System is our most affordable standard stair system. These stairs are intended for use in conjunction with our Concrete Filled Landings. The pans are built to be filled with concrete after they are installed, thus creating an attractive and long-wearing surface. Delete stringer, treads and finishes not required.

* + 1. 100 Series Concrete Filled Stair System:
			1. Standard Stringers:
				1. Plate 1/4x10.
				2. Plate 1/4x12.
				3. Plate 3/8x10.
				4. Plate 3/8x12.
				5. MC10x8.4.
				6. MC12x10.6.
				7. C12x20.7.
			2. Standard Treads:
				1. 12 Gauge.
				2. 14 Gauge.
			3. Standard Finishes:
				1. Grey Primer.
				2. Red Primer.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 200 Series Checker Plate Stair System is used in conjunction with checker plate landings. The stairs and landings can be galvanized or primed in anticipation of the on-site application of a final finish coat of paint. This stair system requires no further work after installation. Delete stringer, treads and finishes not required.

* + 1. 200 Series Checker Plate Stair System:
			1. Standard Stringers:
				1. Plate 1/4x10.
				2. Plate 1/4x12.
				3. Plate 3/8x10.
				4. Plate 3/8x12.
				5. MC10x8.4.
				6. MC12x10.6.
				7. C12x20.7.
			2. Standard Treads:
				1. 12 Gauge.
				2. 14 Gauge.
			3. Standard Finishes:
				1. Galvanized at landing.
				2. Grey Primer.
				3. Red Primer.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 300 Series Quiet Tread Stair System is a revolutionary design that reduces noise levels commonly associated with normal foot traffic on checker plate steel stairs and landings. Our proprietary testing reports that Quiet Tread offers a checker plate stair system without the noise problem traditionally associated with checker plate stairs. Delete stringer, treads and finishes not required.

* + 1. 300 Series Quiet Tread Stair System:
			1. Standard Stringers:
				1. Plate 1/4x10.
				2. Plate 1/4x12.
				3. Plate 3/8x10.
				4. Plate 3/8x12.
				5. MC10x8.4.
				6. MC12x10.6.
				7. C12x20.7.
			2. Standard Treads:
				1. 11 Gauge.
				2. 12 Gauge.
				3. 14 Gauge.
			3. Standard Finishes:
				1. Grey Primer.
				2. Red Primer.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 400 Series Precast Stair System is a hassle-free and economical solution for apartment building stairs. We provide the engineered connections, stringers, platforms, and rails. The customer assembles the stair system onsite by installing third-party precast treads. Our customers have the freedom to purchase precast treads directly through us for the convenience of an all-in-one package or a la carte from third-party vendors. Delete stringer, treads and finishes not required.

* + 1. 400 Series Precast Stair System:
			1. Standard Stringers:
				1. Plate 1/4x10.
				2. Plate 1/4x12.
				3. Plate 3/8x10.
				4. Plate 3/8x12.
				5. MC10x8.4.
				6. MC12x10.6.
				7. C12x20.7.
			2. Standard Finishes:
				1. Galvanized.
				2. Grey Primer.
				3. Red Primer.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 500 Series Smooth Plate Stair System is used when a veneer of wood, stone, carpet, or other material is to be applied as the finished walking surface. Treads are designed to accommodate the finish thickness, providing a smooth transition from stair tread to finished floor. Delete stringer, treads and finishes not required.

* + 1. 500 Series Smooth Plate Stair System:
			1. Standard Stringers:
				1. Plate 1/4x10.
				2. Plate 1/4x12.
				3. Plate 3/8x10.
				4. Plate 3/8x12.
				5. MC10x8.4.
				6. MC12x10.6.
				7. C12x20.7.
			2. Standard Treads:
				1. 11 Gauge.
				2. 12 Gauge.
				3. 14 Gauge.
			3. Standard Finishes:
				1. Grey Primer.
				2. Red Primer.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 600 Series Grating Stair System is commonly used in mechanical areas such as machine rooms, as well as exterior locations such as roof stairs. Bar Grating stairs provide a slip-resistant walking surface. Our standard design includes checker plate nosing. For an added cost, riser closure plates can be added to block the gap between steps.

* + 1. 600 Series Grating Stair System:
			1. Refer to drawings for bar grate construction scheduled.

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

* 1. STEEL FRAMED LANDINGS

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 100 Series Concrete Filled Stair System is our most affordable standard stair system. These stairs are intended for use in conjunction with our Concrete Filled Landings. The pans are built to be filled with concrete after they are installed, thus creating an attractive and long-wearing surface.

* + 1. 100 Series Concrete Filled Landings:
			1. Structural framing supports: C6 by 8.2# channel with 1-1/2 inch (38 mm) BR decking and 10 ga. (3.4 mm) bent plate outside framing or greater as determined by structural design and/or calculations.
			2. Surfacing: Concrete fill as specified in other section.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 200 Series Checker Plate Stair System is used in conjunction with checker plate landings. The stairs and landings can be galvanized or primed in anticipation of the on-site application of a final finish coat of paint. This stair system requires no further work after installation.

* + 1. 200 Series Checker Plate Landings:
			1. Structural framing supports: C6 by 8.2# channel with 14 ga. (2 mm) bent plate supporting members or greater as determined by structural design and/or calculations.
			2. Surfacing: 1/8 inch (3 mm) checker plate sheeting with medium pattern.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 300 Series Quiet Tread Stair System is a revolutionary design that reduces noise levels commonly associated with normal foot traffic on checker plate steel stairs and landings. Our proprietary testing reports that Quiet Tread offers a checker plate stair system without the noise problem traditionally associated with checker plate stairs.

* + 1. 300 Series Quiet Tread Landings:

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 400 Series Precast Stair System is a hassle-free and economical solution for apartment building stairs. We provide the engineered connections, stringers, platforms, and rails. The customer assembles the stair system onsite by installing third-party precast treads. Our customers have the freedom to purchase precast treads directly through us for the convenience of an all-in-one package or a la carte from third-party vendors.

* + 1. 400 Series Precast Landings:

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 500 Series Smooth Plate Stair System is used when a veneer of wood, stone, carpet, or other material is to be applied as the finished walking surface. Treads are designed to accommodate the finish thickness, providing a smooth transition from stair tread to finished floor.

* + 1. 500 Series Smooth Plate Landings:

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 600 Series Grating Stair System is commonly used in mechanical areas such as machine rooms, as well as exterior locations such as roof stairs. Bar Grating stairs provide a slip-resistant walking surface. Our standard design includes checker plate nosing. For an added cost, riser closure plates can be added to block the gap between steps.

* + - 1. Thickness: 14 ga. standard minimum thickness (.075 inch) (2 mm) or as determined by structural design and/or calculations.
		1. 600 Series Grating Landings:

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

* 1. STAIR RAILINGS

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 100 Series Two-Line Rail is a rail system typically used in industrial, mechanical, barrier, and site rail applications. This style of rail provides customers a very economical solution when building code allows.

* + 1. SERIES 100 - TWO LINE (2-line):
			1. Stair Rail: (2) Lines of 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with mandrel bent hoop ends.
			2. Guards: (3) Lines of 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with 1/4 inch (6 mm) by 4 inches (102 mm) kick plate.
			3. Posts: Offset 1-1/4 inches (32 mm) pipe (side mount).

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 200 Series Pipe Rail is an affordable six-line rail without sacrifice of quality. Our Pipe Rail is an industry standard rail design.

* + 1. SERIES 200 - PIPE (6-line):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: Offset 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with dome caps both ends.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 300 Series Tube Rail provides inline tube steel infill, allowing for a more open stairway. Our Tube Rail is a design with appearance in mind, as both sides of the rail provide a matching profile due to the inline infill.

* + 1. SERIES 300 - TUBE (7-line):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: Inline 3/4 inch (19 mm) by 1-1/2 inches (38 mm) rectangular tube steel.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 500 Series Wire Mesh Rail provides an industrial design with ultimate protection. Our standard infill panels come with 2x2 mesh, though many other styles are available. Our Wire Mesh Rail is ideal for climbing protection and provides a more secure, sealed-off system.

* + 1. SERIES 400 - PICKET (3-line):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap, bottom cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: 1/2 inch (13 mm) square bar picket.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.
		2. SERIES 400a - MODIFIED PICKET (4-line):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: Offset 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with 1/2 inch (13 mm) square bar pickets.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 500 Series Wire Mesh Rail provides an industrial design with ultimate protection. Our standard infill panels come with 2x2 mesh, though many other styles are available. Our Wire Mesh Rail is ideal for climbing protection and provides a more secure, sealed-off system.

* + 1. SERIES 500 - WIRE MESH (Inset Panels):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap, bottom cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: 2 inches (51 mm) Intercrimp wire mesh inside 1 inch (25 mm) U-clip frame insert.
			5. Spacing: Minimum of 3.875 inches (98 mm) (Rail), 2 inches (51 mm) (Mesh).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 600 Series Cable Rail offers a custom appeal with high quality protection. Our Cable Rail contributes to a professional tone for your building.

* + 1. SERIES 600 - CABLE (8-line):
			1. Stair Rail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
			2. Guardrail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm) pipe, 1.66 inches (42 mm) O.D., offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: .187 inch (5 mm) Stainless Steel cable with polished Stainless Steel hardware.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 700 Series Rod Rail is a bold design with custom appeal. Our Rod Rail has a modern design and is typically used on exterior stairs.

* + 1. SERIES 700 - ROD (9-line):
			1. Stair Rail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
			2. Guardrail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
			3. Hand Grab: Continuous 1-1/4 inches (32 mm) pipe, 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
			4. Infill: 1/2 inch (13 mm) Minimum C.D. round rod.
			5. Spacing: Minimum of 3.875 inches (98 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's 800 Series Glass Rail offers an affordable solution to classy rail. Our mounting brackets provide flexibility as infill panels can be Tempered Glass, Plexiglas, Wood/Bamboo or even perforated panels. Our Glass Rail is typically used on public works projects, airports, hospitals and open walkways.

* + 1. SERIES 800 - GLASS (Inset Panels):
			1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall tube steel top cap, bottom cap and posts.
			2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall tube steel top cap and posts.
			3. Hand Grab: Continuous 1-1/2 inches (38 mm) O.D. Stainless Steel Tubing, offset by 1-1/2 inches (38 mm) with Stainless Steel Brackets.
			4. Infill: 3/8 inch (9.5 mm) tempered glass panels with Stainless Steel hardware.
			5. Spacing: Minimum of 1.5 inches (38 mm).
			6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

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

* 1. WALL RAILS
		1. Wall Rail: 1.25 inches I.D. pipe with pressed steel wall rail bracket with giving proper distance between face of wall and inside face of wall rail assembly.
		2. Hand Grabs: 1.25 inches I.D. pipe Code Conforming 34 inches to 38 inches above plane of nosings and wrapped continuously past space between flights with pre-formed bend(s) which shall be field fitted with weld prep to equal NOMMA #1.
		3. Mandrel bent 1-1/4 inches (32 mm) pipe (1.66 inches (42 mm) O.D.), with minimum 12 inches (305 mm) level-offs returning to wall.
		4. Offset 1-1/2 inches (38 mm) wall brackets evenly spaced with three mounting holes.

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

* 1. EXIT CONTROL GATES
		1. Design: Overlapping stop with bumper prevents opening in opposite direction of egress.
			1. Single swing.
			2. Double swing.
			3. Barrier Gates: Manufacturers standard swing gate assembly with steel spring hinges and rubber bumper between space that barrier gate and rail post termination intersect. Fabricated from Hollow Structural Steel (HSS) or pipe stock.
		2. Material: 1-1/4 inches (32 mm) schedule 40 pipe.

\*\* NOTE TO SPECIFIER \*\* Pacific Stair Corporation's Stack-A-Shaft is a stacking stair system that solves many problems commonly found in the construction industry. Stack-A-Shaft has been designed to solve access, elevation and tolerance issues. Stack-A-Shaft units are flown into place by crane and are ready for use typically in less than one hour, providing immediate access for crews. Stack-A-Shaft is designed for multiple building configurations and construction techniques. Each unit includes flights, landings, rail, and connections ready to tie into the building structure and next unit. Delete if not required.

* 1. PRE-ASSEMBLED STACKING STAIR SYSTEM
		1. Stack-A-Shaft stacking stair system:
		2. General Fabrication:
			1. Steel shall be ASTM A-36.
			2. Steel pipe material shall be ASTM A 53 Grade B.
			3. Open holes shall be 11/16 inch (17 mm) diameter U.N.O.
			4. Burrs shall be removed and edges ground smooth.
			5. Shop primer painting shall be accomplished after fabrication.
			6. Remove 2 inches (52 mm) from full height of angles and tubes after structure is in its final configuration and before shoring has been removed.
			7. Remove short section of bolt-on angle after structure is in final configuration and before shoring has been removed.

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

* + 1. Type: SAS-LG Light Gauge Steel Structures.
			1. Designed to connect directly to light gauge members.
			2. Self Supporting, no need for additional steel for stair openings or support.
		2. Type: SAS-WF Wood Framed Structures.
			1. SAS come with connections for wood joists or beams.
		3. Type: SAS-PT Concrete Post Tension Slab Structures.
			1. Installed BEFORE slab is poured, helps to confirm elevations.
		4. Type: SAS-HS Heavy Structural Steel Structures.
			1. Multiple attachments available, bolting or welding as required.
			2. Ability to set stairs without the need to have all decking in place.

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

* 1. LUMINOUS EGRESS PATH MARKING SYSTEM
		1. Safe-T-Nose Retrofit (STNR):

\*\* NOTE TO SPECIFIER \*\* STNR offers a universal, low-profile, design that can be applied to existing apartment complex stairs, commercial stairs, bleachers or any other high foot traffic stairway. STNR is a non-slip extruded aluminum safety stair nosing for indoor or outdoor stairs. STNR offers an absolute safety solution for property owners who must keep their stairways safe during all light conditions. STNR is installed on the edge of existing stair treads with the use of adhesive, screws or rivets. STNR can be knurled for additional slip resistance and painted to further designate stair steps. Finish options also provide a unique finished appeal.

* + - 1. Safe-T-Nose Retrofit (STNR):Photo-luminescent "Glow-in-the-dark" nosing, applied to existing stairways.

\*\* NOTE TO SPECIFIER \*\* Our glow-in-the-dark material is at the cutting edge of chemical phosphorescent technology and provides the brightest, long lasting, non-toxic glow that is available.

* + - 1. Safe-T-Nose: reduces tripping hazards and illuminates the walkway in the event of an emergency. Extruded from premium aluminum, Safe-T-Nose shall be durable and slip resistant.
		1. Safe-T-Nose Cast-In Place (STNC):

\*\* NOTE TO SPECIFIER \*\* STNC is the industry's only safety nosing with a construction cover included. Once the project is complete, the construction cover is simply snapped off and recycled to reveal the untarnished nosing extrusion and glow-in-the-dark striping. Several options allow STNC to be customized, providing further step designation and offering a unique finish appeal.

* + - 1. Safe-T-Nose Cast-In Place (STNC): Photo-luminescent "Glow-in-the-Dark" nosing designed to be pushed into any style of cast concrete at the time of forming. STNC embeds quickly and easily. A proprietary design forms the edge and fastens the nosing when setting in place.

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

* + - 1. Safe-T-Nose reduces tripping hazards and illuminates the walkway in the event of an emergency. Extruded from premium aluminum, Safe-T-Nose is durable and slip resistant. Our glow-in-the-dark material is at the cutting edge of chemical phosphorescent technology and provides the brightest, longest lasting non-toxic glow that is available.

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

* + - 1. Safe-T-Nose For Steel Stair Manufacturers (STNS): Safe-T-Nose For Steel Stair Manufacturers (STNS) is a photo-luminescent "Glow-in-the-Dark" nosing designed for stair fabricators. With proper design planning, STNS can be attached to a variety of tread types and materials at the time of manufacturing. STNS offers a simple solution when stairs must be fabricated with safety nosing incorporated into the design.

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

* + 1. Safe-T-Nose Photoluminescent Handrail Strips (STNH):
			1. Cut with scissors, an easy peel and stick application that requires no end caps. Activated by natural artificial light, Safe-T-Nose Handrail strips provide a steady glow to guide people in all lighting conditions. Glows for many hours after the lights go out. Unlimited recharging. The Brightest, Longest Lasting, Nontoxic, Nonradioactive Glow available. UV Light and Oxidation resistant. Smooth easy cleanable surface. Abrasion resistant. High-Impact plastic.

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

* + 1. Safe-T-Nose Photoluminescent Perimeter Strips (STNF):
	1. SHOP CLEANING AND FINISHING
		1. Rails and Stair Components: Remove all sharp edges and burrs. Clean surface of rust, scale, grease and all foreign material prior to finishing in accordance with "SP 2 - Hand Tool Cleaning."
		2. Shop Primer: Immediately after shop fabrication and cleaning, spray apply primer to a minimum dry film thickness as recommended by primer manufacture, but not less than 1.0 mils DFT. Do not prime surfaces in direct contact with concrete or where field welding shall occur.
		3. Prime Paint: Rodda Low HAP Shopcoat Primer: VOC Compliant Red Oxide #33954.
1. EXECUTION
	1. EXAMINATION
		1. Do not begin installation until substrates and adjacent construction have been properly constructed. Verify structural framing, enclosures, weld plates, blocking, and size and location of pockets.
		2. If unsatisfactory conditions are encountered, notify Architect in writing. Do not proceed until unsatisfactory conditions have been corrected.
		3. Notify Manufacturer of any detail, design or tolerance deviations as noted or drawn on stair shop drawing.
	2. STAIR INSTALLATION
		1. Install stair components in accordance with manufacturer's recommendations, approved submittals, and in proper relationship with adjacent construction.
		2. Install stair components plumb, level and accurately, free from distortion or defects.
		3. Provide hardware, hangers, fasteners and struts required to connect stairs to parent structure.
		4. Provide temporary bracing to maintain alignment until installation has been completed and connections are deemed permanent.
		5. Field welding shall be done in accordance with AWS D1.1.
		6. Field welding and bolting shall match shop work. Use concealed fasteners wherever possible.
		7. Joints shall be butted tight flush, with hairline joints. Welds shall be ground smooth and flush.
		8. Touch up paint after welding and grinding.
	3. RAIL INSTALLATION
		1. Railing to be installed plumb, and straight.
		2. Welded connections shall be used for permanent connections. All splices to be ground smooth, free from grinder marks and irregularities.
		3. Railing shall be welded to stair stringers per plans and specifications. Welds shall be clean and have good conformance to acceptable standards.
	4. ERECTION TOLERANCES
		1. Maximum Variation from Plumb: 1/4 inch (6 mm) per story.
		2. Maximum Offset from True Alignment: 1/4 inch (6 mm).
		3. Maximum Out of Position: 1/4 inch (6 mm).
	5. ADJUSTING AND CLEANING
		1. Touch-up field welds and abraded areas by application of same coating used for shop primer.
		2. Repair or replace damaged components.
		3. After stairs are completely installed, remove all construction debris and rubbish from area. Clean surface of exposed rail and stairs. Leave stair system ready for finish painting.

END OF SECTION