SECTION 05 51 00

METAL STAIRS, LADDERS, HANDRAILS, AND GUARD RAILS

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\*\* NOTE TO SPECIFIER \*\* Panel Built Inc.; In-plant Offices, Mezzanine Platforms, Security Booths, Ballistic Rated Buildings and Cleanrooms.  
This section is based on the products of Panel Built Inc., which is located at:302 Beasley St., P. O. Box 2658 Blairsville, GA 30514Toll Free Tel: 800-636-3873 Tel: 706-745-6540 Fax: 800-594-3245 Email: [request info (info@panelbuilt.com)](https://arcat.com/rfi?action=email&company=Panel%252BBuilt%252BInc.&message=RE%253A%2520Spec%2520Question%2520(05510pbi)%253A%2520&coid=45639&spec=05510pbi&rep=&fax=800-594-3245%2520)  
Web: <https://www.panelbuilt.com>   
 [ [Click Here](https://arcat.com/company/panel-built-inc-45639) ] for additional information.  
Panel Built was founded in 1995 by brothers Pat and Mike Kiernan and began with the construction of pre-manufactured buildings. Today, Panel Built offers a complete line of custom modular offices, mezzanines, security booths, pre-assembled exterior buildings, and cleanrooms. All our multiple product lines are produced on-site, in four state-of-the-art manufacturing facilities. We offer "A Better Way to Create Space" for all of your building projects.

1. GENERAL
   1. SECTION INCLUDES

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

* + 1. Metal Stairs:
       1. Stairs with concrete treads.
       2. Stairs with grating treads.
       3. Stairs with metal treads.
       4. Structural steel stair framing and supports.
    2. Handrails and rail guards.
    3. Ladders
  1. RELATED SECTIONS

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

* + 1. Section [5-digit section no.] - [Section Title in initial caps].
    2. Section [5-digit section no.] - [Section Title].

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

* 1. REFERENCE STANDARDS
     1. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
     2. ASTM International (ASTM):
        1. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; current edition.
        2. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; current edition.
        3. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; current edition.
        4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; current edition.
        5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; current edition.
        6. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip; current edition.
        7. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; current edition.
        8. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; current edition.
        9. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); current edition.
        10. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates; current edition.
     3. American Welding Society(AWS):
        1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; current edition.
        2. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; current edition.
     4. International Accreditation Service (IAS):
        1. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; current edition.
     5. National Association of Architectural Metal Manufacturers (NAAM):
        1. NAAMM AMP 510 - Metal Stairs Manual; The National Association of Architectural Metal Manufacturers; current edition.
        2. NAAMM MBG 531 - Metal Bar Grating Manual; The National Association of Architectural Metal Manufacturers; current edition.
        3. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual; current edition (ANSI/NAAMM MBG 532).
     6. Society for Protective Coatings (SSPC):
        1. SSPC-Paint 15: Steel Joist Shop Primer; Society for Protective Coatings; current edition.
        2. SSPC-SP 2: Hand Tool Cleaning; Society for Protective Coatings; current edition.
  2. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.
     3. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
        1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
     4. Welders' Certificates.
  3. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
     2. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
     3. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
     4. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).
     5. 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. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
       3. Retain mock-up during construction as a standard for comparison with completed work.
       4. Do not alter or remove mock-up until work is completed or removal is authorized.
  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.
  4. WARRANTY
     1. Manufacturer's standard limited warranty unless indicated otherwise.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Panel Built Inc., which is located at:302 Beasley St., P. O. Box 2658 Blairsville, GA 30514Toll Free Tel: 800-636-3873 Tel: 706-745-6540 Fax: 800-594-3245 Email: [request info (info@panelbuilt.com)](https://arcat.com/rfi?action=email&company=Panel%252BBuilt%252BInc.&message=RE%253A%2520Spec%2520Question%2520(05510pbi)%253A%2520&coid=45639&spec=05510pbi&rep=&fax=800-594-3245%2520);Web: <https://www.panelbuilt.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 AND DESIGN REQUIREMENTS
     1. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 - Quality Requirements "Quality Requirements," to design the following:
        1. Metal stairs.
        2. Metal ladders.
        3. Railings and guard rails.
     2. Structural Performance for Railings and Guard Rails: Including attachment to building construction, withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
        1. Handrails and Guard Top Rails:
           1. Uniform Load: 50 lbf/ft (0.73 kN/m) in any direction.
           2. Concentrated Load: 200 lbf (0.89 kN) in any direction.
           3. Uniform and Concentrated Loads: Need not be assumed to act concurrently.
        2. Guard Infill:
           1. Concentrated Load: 50 lbf (0.22 kN) applied horizontally on area of 1 sq ft (0.093 sq m).
           2. Infill and Other Loads: Need not be assumed to act concurrently.
     3. Provide items, of design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
        1. Regulatory Requirements: Complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
        2. Dimensions: As indicated on drawings.
        3. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
        4. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
        5. Separate dissimilar metals using paint or permanent tape.
     4. Metal Jointing and Finish Quality Levels:
        1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
           1. Welded Joints: Continuously welded and ground smooth and flush.
           2. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
           3. Exposed Edges and Corners: Eased to small uniform radius.
        2. Industrial: All joints made neatly.
           1. Welded Joints: Welded on back side wherever possible.
           2. Welds Exposed to Touch: Ground smooth.
           3. Bolts Exposed to Touch in Travel Area: No nuts or screw threads exposed to touch.
     5. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
     6. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

\*\* NOTE TO SPECIFIER \*\* Delete article not required or delete stair tread paragraphs not required.

* 1. METAIL STAIRS
     1. Metal Stairs with Concrete Treads:
        1. Jointing and Finish Quality Level: Industrial.

\*\* NOTE TO SPECIFIER \*\* Delete risers, treads, and tread attachments options not required.

* + - 1. Risers: Closed.
      2. Risers: Open.
      3. Treads: Abrasive-Surface Metal Floor Plate: Abrasive materials adhered to surface.
      4. Treads: Abrasive-Surface Metal Floor Plate: Abrasive materials metallically bonded to steel.
      5. Treads: Checkered steel tread plate.
      6. Tread Attachments: Bolted.
      7. Tread Attachments: Welded.
      8. Nosing: Galvanized checkered plate.
      9. Nosing Width: 1-1/4 inch (31 mm), minimum.
      10. Stringers: Rolled steel channels.
          1. Stringer Depth: 1O inches (250 mm).
          2. End Closure: Sheet steel of same thickness as risers welded across ends.
      11. Railings: Galvanized steel pipe and tube railings.
    1. Metal Stairs with Concrete Treads:
       1. Jointing and Finish Quality Level: Industrial.
       2. Risers: Closed.
       3. Treads: Metal pan with field-installed concrete fill.
          1. Concrete Depth: 1-1/2 inches (38 mm), minimum.
          2. Tread Pan Material: Steel sheet.
          3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch (1.9 mm) minimum.
          4. Concrete Reinforcement: None.
          5. Concrete Finish: For resilient floor covering.
       4. Risers: Same material and thickness as tread pans.
          1. Nosing Depth: Not more than 1-1/2 inch (38 mm) overhang.
          2. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch (12 mm) wide.
       5. Stringers: Galvanized rolled steel channels.
          1. Stringer Depth: 1O inches (250 mm).
          2. End Closure: Sheet steel of same thickness as risers welded across ends.
       6. Railings: Galvanized steel pipe and tube railings.
    2. Metal Stairs with Grating Treads:
       1. Jointing and Finish Quality Level: Industrial.
       2. Risers: Open.
       3. Treads: Galvanized steel bar grating.
          1. Grating Type: Welded.
          2. Bearing Bar Depth: 3/4 inch (19 mm), minimum.
          3. Top Surface: Standard.
          4. Nosing: Galvanized checkered plate.
          5. Nosing Width: 1-1/4 inch (31 mm), minimum.
          6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.
       4. Stringers: Rolled steel channels.
          1. Stringer Depth: 1O inches (250 mm).
          2. End Closure: Sheet steel of same thickness as risers welded across ends.
       5. Railings: Galvanized steel pipe and tube railings.
    3. Prefabricated Egress Stairs: Welded steel unit, factory fabricated to greatest degree practical and in the largest components possible.
  1. HANDRAILS AND RAIL GUARDS
     1. Railing Materials:
        1. Tubing: [ASTM A500/A500M (cold formed)] [or] [ASTM A513/A513M, Type 5].
        2. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

\*\* NOTE TO SPECIFIER \*\* Delete if not required. Or delete Metal options not required.

* + 1. Infill Guard Panels:
       1. Expanded Metal: ASTM F1267

\*\* NOTE TO SPECIFIER \*\* Delete type and style designations options not required.

* + - * 1. Type I expanded. Class 1 uncoated.
        2. Type II expanded and flattened. Class 1 uncoated.
        3. Style Designation: 3/4 number 13
        4. Style Designation: 1-1/2 number 10
        5. Style Designation: \_\_\_\_\_\_\_\_.
      1. Perforated-Metal:
         1. Cold-Rolled Steel Sheet: ASTM A1008/A1008M commercial steel, Type B.

\*\* NOTE TO SPECIFIER \*\* Delete thickness and perforations options not required.

Thickness: 0.060 inch (1.52 mm)

Thickness: \_\_\_ inch( \_\_\_ mm)

Perforations: 1/4 inch (6.4 mm) holes 3/8 inch (9.5 mm) on center in staggered rows.

Perforations: \_\_\_\_\_\_\_\_.

* + - * 1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M commercial steel, Type B.

\*\* NOTE TO SPECIFIER \*\* Delete thickness and perforations options not required.

Thickness: 0.060 inch (1.52 mm)

Thickness: \_\_\_ inch( \_\_\_ mm)

Perforations: 1/4 inch (6.4 mm) holes 3/8 inch (9.5 mm) on center in staggered rows.

Perforations: \_\_\_\_\_\_\_\_.

* + - * 1. Galvanized-Steel Sheet: ASTM A653/A653M, G90 (Z275) coating, commercial steel Type B,

\*\* NOTE TO SPECIFIER \*\* Delete thickness and perforations options not required.

Thickness: 0.064 inch (1.63 mm)

Thickness: \_\_\_ inch( \_\_\_ mm)

Perforations: 1/4 inch (6.4 mm) holes 3/8 inch (9.5 mm) on center in staggered rows.

Perforations: 1/8 x 1 inch (3.2 x 25.4 mm) round end slotted holes in staggered rows.

Perforations: \_\_\_\_\_\_\_\_.

* + - 1. Woven-Wire Mesh Infill Panels: Intermediate-crimp. 0.134 inch (3.42 mm) diameter steel wire complying with ASTM A510.

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

* + - * 1. Pattern: Diamond 2 inch (50 mm) woven-wire mesh.
        2. Pattern: Square 2 inch (50 mm) woven-wire mesh.
    1. Fasteners:
       1. Anchor Railings to Other Construction: Fasteners types, grades, and classes needed to produce connections and withstand design loads.
       2. Interconnecting Railings:

\*\* NOTE TO SPECIFIER \*\* Delete one of the two options below.

* + - * 1. Concealed fasteners unless otherwise indicated.
        2. Concealed fasteners unless exposed fasteners are unavoidable.
    1. Post-Installed Anchors: Working capacity greater than or equal to design load, according to evaluation report acceptable to authorities having jurisdiction, based on:
       1. ICC-ES AC193: Mechanical anchors.
       2. ICC-ES AC308: Adhesive anchors.
       3. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  1. METAL LADDERS

\*\* NOTE TO SPECIFIER \*\* ANSI A14.3 specifies minimum design requirements for ladders.

* + 1. Comply with ANSI A14.3.

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

* + - 1. For Elevator Pit Ladders: ASME A17.1
    1. Steel Ladders:

\*\* NOTE TO SPECIFIER \*\* Delete siderail spacing option not required.

* + - 1. Siderail Spacing: \_\_\_inches (\_\_\_ mm)
      2. Siderail Spacing: As indicated on Drawings.
      3. Siderail Spacing: To be determined by the Architect.

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

* + - 1. Continuous Siderails: \_\_\_ x \_\_\_ inch (\_\_\_ x \_\_\_ mm).
         1. Steel flat bars, with eased edges.
      2. Rungs: Fit in centerline of siderails, Plug-weld and grind smooth on outer rail faces.
      3. Rung Size: \_\_\_ inch (\_\_\_ mm).

\*\* NOTE TO SPECIFIER \*\* Delete rung shape option not required.

* + - 1. Rung Shape: Round steel bars.
      2. Rung Shape: Square steel bars.
      3. Nonslip Surfaces: On top of each rung from single manufacturer.
         1. Aluminum-oxide granules in epoxy-resin adhesive.
         2. Manufactured rung filled with aluminum-oxide grout.
      4. Coating with abrasive material metallically bonded to rung.
      5. Platforms: Fabricate from welded or pressure-locked steel bar grating, supported by steel angles.

\*\* NOTE TO SPECIFIER \*\* Delete grate openings option not required.

* + - * 1. Grate Openings: 1/2 inch (12 mm) in least dimension.
        2. Grate Openings: 3/4 inch (19 mm) in least dimension.
      1. Ladder Support: At top and bottom and not more than 60 inches (1500 mm) on center with bolted steel brackets.
      2. Ladder Finish: Galvanize and prime ladders, including brackets.
         1. Prime Ladders: Brackets and fasteners, with zinc-rich primer.
  1. MATERIALS
     1. Metal Surfaces: Smooth and flat unless otherwise specified.
        1. Fabrications Exposed to View: Materials without seam marks, roller marks, rolled trade names, or blemishes.
     2. Steel Sections: ASTM A 36/A 36M.
     3. Checkered Plate: ASTM A786/A786M, rolled steel floor plate; pattern no. 2.
     4. Gratings: Bar gratings complying with NAAMM MBG 531 or NAAMM MBG 532, whichever applies based on bar sizes.
     5. Steel Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
     6. Welding Materials: AWS D1.1; type required for materials being welded.
     7. Stairs - Interior and exterior to be galvanized.
  2. SHOP FINISHING
     1. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
     2. Do not prime surfaces in direct contact with concrete or where field welding is required.
     3. High-Performance Coating: Apply epoxy topcoats to prime-coated surfaces per manufacturer's written instructions and with requirements in SSPC-PA 1 for shop painting.
        1. Apply at spreading rates recommended by coating manufacturer.
           1. Colors: \_\_\_\_\_\_\_\_
           2. Colors: As selected by Architect from manufacturer's full range.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly constructed and prepared.
      2. 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.
         1. When field welding is required, clean and strip primed steel items to bare metal.
      3. Supply items required to be cast into concrete and embedded in masonry with setting templates.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
         1. Install components plumb and level, accurately fitted, free from distortion or defects.
         2. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
         3. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1.
         4. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
         5. Obtain approval prior to site cutting or creating adjustments not scheduled.
         6. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.
      2. Tolerances:
         1. Maximum Variation from Plumb: 1/4 inch (6 mm) per story, non-cumulative.
         2. Maximum Offset from True Alignment: 1/4 inch (6 mm).
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION