

Specifications for
STRUCTURAL STEEL AND JOISTS

5A.01 GENERAL:

- a. Furnish all labor, materials and equipment necessary to completely install all structural steel and standard steel joists shown on the drawings or specified herein.
- b. Submit five (5) copies of shop drawings prior to fabrication of all structural steel and joists.
- c. Fabrication of all structural steel and joists shall be done by one qualified to fabricate the structural steel and joists in accordance with the drawings and specifications; minimum requirements for qualification shall be five years' experience with satisfactory completion of at least five generally similar projects.
- d. Erection of all structural steel and joists shall be done by one qualified to erect the structural steel and joists in accordance with the drawings and specifications. Minimum requirement for qualification shall be five years' experience with satisfactory completion of at least five generally similar projects.
- e. Welding of all structural steel in shop or field and all field welding of joists shall be done by one qualified to weld in accordance with the drawings and specifications. Minimum requirement for qualification shall be a current certificate as Certified Welder issued by the American Welding Society.
- f. The Contractor shall submit to the Architect, for each welder, a certificate, in triplicate, from the American Welding Society certifying that the welder has met the Society's qualification requirements. No welding shall be done until Architect has approved certificates. Only approved welders shall be used as called for above.
- g. All steel joists shall be manufactured by:
 - (1) A member manufacturer of the Steel Joist Institute, or
 - (2) A manufacturer who shall submit an affidavit that the materials, design and manufacture of the joists to be

provided will meet the requirements of the Steel Joist Institute Standard Specifications, 1965 Edition.

- h. The Owner reserves the right, at the discretion of the Architect, to have load tests made upon the structure by an Independent Testing Laboratory. The cost of the test will be borne by the Owner, unless the tests indicate that the strength of the structure is less than that called for by the Contract Documents. In such case, the cost of the testing and the removal of the defective part of the structure and its suitable replacement shall be borne by the Contractor.

5A.02 MATERIALS:

- a. Structural Steel shall be fabricated from ASTM A-36 Structural Steel. Chord sections of joists shall have a yield point of 50KSI; web sections shall have a yield point of 36KSI. Joists shall be standard H-Series as noted on the Drawings.
- b. High-strength bolts shall be ASTM A325-F, High Strength Steel Bolts for Structural Joints.
- c. Welding electrodes for manual shielded metal-arc welding shall be ASTM A233, Series E70.
- d. Bare electrodes and granular flux used in combination for submerged arc welding shall be Grade SAW-2.
- e. Shop and field paint for structural steel LA Joist shall be Tnemec 99 Red Metal Primer as manufactured by Tnemec Company, Rust-Oleum 769 Damp-Proof Red Primer as manufactured by Rust-Oleum Corporation, or Southern Coatings RIP 476 as manufactured by Southern Coatings and Chemical Company. Shop and field paint for J-Series Joist shall be of the type standard with the manufacturer, except asphaltic base paints will not be accepted.
- f. Furnish all accessories, lintels, anchor bolts, shims and shelf angles shown on the drawings or specified otherwise herein.

5A.03 FABRICATION:

- a. Fabrication of all structural steel and joists shall be in conformity with Part 5 of the Seventh Edition of the AISC Manual of Steel Construction entitled "Specifications and Codes" unless shown otherwise on the drawings or specified otherwise herein.

- b. Members shall be free from twists, kinks, buckles or open joints and shall be so made that, when assembled, the parts shall come together without shimming.
- c. Open holes shall be provided for bolted connections of work specified in other sections.
- d. No splice or other connection welded or otherwise in structural steel shall be made without having been detailed on shop drawings and approved by the Engineer.

5A.04 CONNECTIONS:

Bolted beam and girder connections shall be AISC Framed Beam Connections, Welded (Table III) for combination with Table I, connections utilizing High Strength Bolts for bearing type field connection. All connections of beams and girders shall be designed for the reaction shears only unless shown otherwise on the drawings.

5A.05 WELDING:

- a. Details of all joints (including butt joints, groove form, root face and root spacing) to be used shall comply with the requirements for joints which are accepted as prequalified under "Standard Code for Welding in Building Construction" of the American Welding Society. No joint form not included in the foregoing shall be employed until it shall have been qualified in accordance with the "Standard Qualification Procedure" of the American Welding Society.
- b. Minimum Fillet Weld permitted shall be 3/16 inch and the values allowed per linear inch of fillet weld shall be as follows:

3/16 inch - 1,500 lbs.
 1/4 inch - 2,000 lbs.
 5/16 inch - 2,500 lbs.
 3/8 inch - 3,000 lbs.

5A.06 PAINTING FOR STRUCTURAL STEEL AND JOISTS:

- a. Surface Preparation - Structural Steel.
 - 1. Oil, grease or slats shall be removed by solvent cleaning as outlined in Steel Structures Painting Council Specification SSPC-SP 1-63.

2. Rust and loose mill scale shall be removed by hand tool cleaning in accordance with Steel Structures Painting Council Specification SSPC-SP 2-63 or by power tool cleaning in accordance with Steel Structures Painting Council Specification SSPC-SP 3-63.

b. Shop Painting - Structural Steel.

1. Prime coat of shop paint shall be applied immediately after cleaning and before further deterioration of the surface occurs. If the surface rusts or becomes dirty before painting, the surface shall again be cleaned as specified.
2. All surfaces shall receive one spray or brush coat of shop paint to a 2 mil dry film thickness.
3. Paint shall be used from the original container without dilution.

c. Field Painting - Structural Steel.

1. Before erection, all surfaces on which the shop coat of paint is damaged or destroyed or on which the metal is exposed by rust spots shall be cleaned as specified and painted one coat of field paint.
2. After erection, all bolt heads and abrasions shall be retouched with one coat of field paint.
3. Paint shall be used from the original container without dilution.

- d. J-Series joists and accessories shall receive one shop coat of paint. After erection of joist and bridging all abrasions shall be retouched with one coat of field paint.

5A.07 ERECTION:

- a. Erection of all structural steel and joists shall be in conformity with Part 5 of the Seventh Edition of the AISC Manual of Steel Construction entitled "Specifications and Codes."
- b. Field Connections shall be made with High Strength Bolts except where welded connections are shown on the drawings. Bolted connections shall be "bearing type" with bolts tightened to a bolt tension not less than the proof load. Tightening shall be done with

calibrated wrenches or by the turn-of-the nut method. No erection holes shall be burned or enlarged with a torch. Field welding to correct minor fabrication or erection errors in alignment or fit will be allowed only upon approval of the Engineer.

- c. Anchor bolts shall be located and built into the connecting work in advance.
- d. Temporary braces and stays shall be provided to hold all structural steel work in position until made permanently secure.

5A.08 INSPECTION OF WELDS:

- a. Full-penetration butt welds, both shop and field, shall be subject to 100 percent visual inspection during the process of welding by an independent testing laboratory selected by the Architect and paid by the Owner. The designated testing laboratory shall be a current member of the American Council of Independent Laboratories.
- b. Visual inspection shall consist of checking the "fit-up" of members prior to welding and observing the first and succeeding passes during the welding operation.
- c. Testing laboratory shall certify that all welds inspected were made in accordance with provisions of the AWS Building Construction Code.

Specifications for SHEET METAL WORK

PART 1: GENERAL

1.1 SCOPE:

Related Work Specified Elsewhere:

1. Through-Wall Flashing: Section 4C.
2. Built-Up Roofing: Section 7A.
3. Bituminous Membrane Flashing: Section 7A.

1.2 SUBMITTALS:

Shop Drawings.

Submit 4 copies of shop drawings of all sheetmetal work specified herein. Submit in accordance with Section 1C. Materials shall not be delivered to the site until after the approved shop drawings have been returned to the Contractor. Details and layouts shall show weights, gages, or thicknesses of sheet metal, jointing, expansion-joint spacing, and procedures to be followed during installation. The contractor shall be responsible for errors of detailing and fabrication and for the correct fitting of sheetmetal work shown on the shop drawings.

1.3 PRODUCT HANDLING:

Sheetmetal items shall be carefully handled to prevent damage to the surfaces, edges, and ends, and shall be stored at the site above the ground in a covered, dry location. Damaged items that cannot be restored to a like-new condition will be rejected and shall be replaced at no additional cost to the Owner.

PART 2: PRODUCTS

2.1 MATERIALS:

- a. **Materials** shall conform to respective specifications and other requirements specified below:
- b. **General:** The type and locations of the various kinds, gages, thickness and finish of sheet metal to be used are specified

hereinafter under the individual items; however, where sheetmetal is indicated on drawings and kind or type of metal is not definitely specified or noted, 16 ounce copper shall be provided.

- c. **Copper:** ASTM B 152-60; uncoated, light, cold-rolled.
- d. **Fastening materials** not specified for a particular sheet-metal application shall be of the type best suited for the intended purpose. Nails shall be barbed or screw type.
- e. **Plastic Cement Bituminous.** Federal Specification SS-C-152, Type II.

PART 3: EXECUTION

3.1 GENERAL:

Surfaces that are to receive sheet metal shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect the application. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades shall be performed. Accessories and other items essential to complete the sheet metal installation, though not specifically indicated or specified, shall be provided. Where sheet metal abuts or members into adjacent materials, the juncture shall be executed in a manner to assure waterproof construction. Sheet metal items shall be fabricated and installed in accordance with the details indicated and as specified.

3.2 FASTENING:

- a. Nailing of sheet metal shall be confined generally to sheet metal having a width of less than 12 inches and shall be confined to one edge only. Nails shall be evenly spaced not over 4 inches on centers unless otherwise specified or indicated.
- b. Cleats shall be provided where specified or required and shall be evenly spaced not over 12 inches on centers unless otherwise specified or indicated. Cleats shall be not less than 2 inches wide by 3 inches long and shall be of the same material and weight as the sheet metal being installed. One end of the cleat shall be secured with two nails and the cleat folded back over the nail heads. The other end shall be locked into the seam. Cleats for soldered seams shall be pretinned.
- c. Bolts, Rivets and Screws shall be installed where indicated or required in accordance with approved commercial practice.

3.3 SOLDERING AND SEAMING:

- a. **Soldering:** Edges of sheet metal shall be cleaned with steel wool and pretinned before soldering. Soldering shall be done slowly with well heated coppers. Upon completion of soldering, neutralize the air and clean.
- b. **Seams shall conform to the following requirements:**
 - 1. Flat-lock seams shall finish not less than 3/4 inch wide.
 - 2. Soldered-lap seams shall finish not less than 1/2-inch wide.
 - 3. Unsoldered plain-lap seams shall lap not less than 4 inches unless otherwise specified.
 - 4. Flat seams shall be made in the direction of the flow.

3.4 EXPANSION AND CONTRACTION JOINTS FOR SHEET METAL:

Expansion and contraction joints for sheet metal shall be provided at 40 foot intervals except that an expansion joint shall be provided within 20 feet of the end of a continuous run. Joints shall be evenly spaced.

3.5 FLASHINGS:

- a. Flashing shall be installed at intersections of roofs with vertical surfaces, at projections through roofs other than plumbing pipe vents and roof drains (which are flashed under section PLUMBING and elsewhere as shown or specified) and as required to provide watertight protection. Exposed edges of flashings shall be folded back 3/4-inch. Except as otherwise specified or indicated, cap flashings shall be provided over base flashings.
- b. Cap Flashing shall be made of 16-ounce copper and shall extend up the vertical surface not less than 2 inches above the top of the base flashing and shall lap over base flashing. The cap flashing shall be extended down close to the top of the cant strip to protect the base flashing. The upper edge of cap flashing in masonry shall extend into the masonry not less than 3-1/2 inches. Cap flashing at fascia shall be made of 16-ounce copper and shall be installed into reglet in precast fascia. Cap flashing shall be pre-formed and shall be by same manufacturer as reglet.

- c. Gravel stop shall be formed of 16 ounce copper, in shapes indicated of standard stock lengths not less than 8 feet long. The gravel stops shall be shop fabricated of one-piece material of the indicated width. Gravel stops shall be provided with concealed splice plate or other suitable slip joining member designated to allow for expansion at intervals specified and shall be one-piece assemblies around internal and external corners. Allowance for expansion shall be not less than 1/4 inch at each joint. Splice plates or other concealed items for securing the joints shall lap the gravel stops not less than 4 inches. The inner flange of the gravel stops shall extend not less than 4 inches onto the roof over the felt roofing plies and shall be fastened to the edge nailing strips with nails spaced not over 3 inches on centers. The flange shall be covered with strips of roofing felt as specified in Section 7A. The lower edge shall be hooked at least 3/4 inch over continuous edge drip strips and bent outward at an angle of 45 degrees to form a drip.

3.6 PROJECTIONS:

- a. Flash all openings and projections through roof, not elsewhere specified, in accordance with the specifications and recommendations of the roofing manufacturer and the bonding company. NOTE: Flashings for plumbing pipe and roof drains are specified in Section 15.
- b. All roof fans, ventilators, and similar items shall be installed on wood curbs. Do not flash any curbs that do not meet the requirements of the roofing supplier and the bonding company. Any discrepancies shall be reported to the Architect.