

## SECTION 5

## SHEET METALWORK AND MISCELLANEOUS METAL

5-01 SCOPE: The work covered by this section of the specifications consist in furnishing all plant, labor, equipment, appliances, and materials not furnished by the Government, and performing all operations in connection with the installation of sheet metal and miscellaneous metal, complete, in strict accordance with this section of the specifications, and subject to the terms and conditions of the contract.

5-02 APPLICABLE SPECIFICATIONS: The following Federal Specifications, of the issues listed below but referred to thereafter by basic designation only, form a part of this specification:

O-F-506	Flux, Soldering; Paste
AA-L-486	Lockers; Clothes, Steel
FF-B-571a	Bolts; Nuts; Studs; and Tap Rivets and materials for same
FF-H-106a	Hardware; Builders' Locks and Lock Trim
FF-H-136	Hardware and Fittings; for Lavatory Partition and Inclosures
FF-N-101	Nails; Spikes; Staples and Tacks
FF-S-91	Screws, Machine; (Including Screws, Set)
FF-S-111a	Screws; Wood, Slotted-head
QQ-B-71a	Bars; Reinforcement for Concrete
QQ-B-611a	Brass, Commercial; Bars, Plates, Rods, Shapes, Sheets and Strips
QQ-B-691b	Bronze; Castings
QQ-B-721a	Bronze; Manganese; Bars, Forgings, Plates, Rods and Shapes
QQ-C-502	Copper Bars; Rods and Shapes
QQ-C-576	Copper Plates; Sawed Bars, Sheets and Strips
QQ-L-652	Iron, Gray; Casting
QQ-L-686a	Iron, Wrought (Refined); Bars
QQ-L-716	Iron and Steel; Sheet, Zinc-Coated (Galvanized)
QQ-L-201	Lead; Sheet
QQ-B-746a	Bronze, Phosphor, Bars, Plates, Rods, Shapes, Sheets and Strips
QQ-S-571b	Solder; Soft (Tin, Tin-lead and Silver)
QQ-S-741	Steel, Structural (Including Welding and Rivet) for Bridges and Buildings
QQ-S-766a	Steel, Corrosion-Resisting; Plates, Sheets, Strips and Structural Shapes
RR-S-141a	Screening, Wire; Insect
RR-F-191	Fencing; Chain-Link or Welded
RR-T-661	Threads Safety, Metallic
SS-C-466	Cloth, Yarn, Threaded, and Tape; Asbestos
TT-P-31b	Paint; Iron Oxide, Ready-Mixed Semi-paste
TT-P-636	Primer, Paint; Synthetic for Ferrous Metal and Wood Surfaces

WW-P-351	Pipe, Brass; Seamless, Iron-Pipe Size, Standard and Extra Strong
WW-P-404	Pipe; Steel and Ferrous Alloy for Bending, Flanging, etc., Iron Pipe Size
WW-P-541a	Plumbing Fixtures; for Land Use

5-03 GENERAL: Surfaces to which sheet metal is to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from all defects that might affect the application. All items of sheet and miscellaneous metal, which are to be built into the building, shall be furnished in time to the trades concerned to avoid delays to construction progress. All accessories or other items essential to complete sheet-metal and miscellaneous metal installation, though not specifically shown or specified, shall also be provided. Nails, screws, and bolts shall be of the types best suited for the intended purpose, and shall be of a composition that will not support galvanic action in the installation. Standard commercial products which meet the general requirements of the drawings and specifications will be acceptable if details of construction are approved by the Contracting Officer. Welding shall be continuous along entire line of contact except where tack welding is authorized by the Contracting Officer. Tack welding will not be permitted on exposed surfaces. Exposed welds shall be ground smooth. Exposed riveting shall be flushed unless otherwise specified or shown on the drawings. Bolting shall be done with proper size bolts. Nuts shall be drawn tight. Steel shall be clean and free from mill scale, flake rust or pittings. Nails, brads, slips, etc., for non-ferrous metal shall themselves be non-ferrous, and for ferrous metal they shall be galvanized iron or steel. Unless otherwise specified, gage of nonferrous sheet metal shall be Brown and Sharpe (B & S) and of ferrous sheet metal shall be Manufacturers' Standard Gage. All items shall be installed plumb, straight, square, level, at their proper elevation and location, and in proper alignment with adjacent work.

5-04 SHOP DRAWINGS: Prior to the initiation of any work, shop drawings as otherwise required, shall be submitted to the Contracting Officer for approval.

5-05 MATERIALS:

a. Copper shall conform to Federal Specification QQ-C-576. Except as otherwise specified or indicated on the drawings, sheet copper shall be light-cold-rolled temper and shall weigh not less than 16 ounces per square foot.

b. Galvanized Iron and Steel shall be copper-bearing, conforming to Federal Specification QQ-I-716, Class D1. Except as otherwise specified or indicated on the drawings, sheets shall be not lighter than 26 gage.

c. Pipes for rails shall conform to Federal Specification WW-P-404, Type I, Class A, unless otherwise specified.

d. Insect screen cloth shall conform to the requirements of Federal Specification RR-S-141, 18 x 14 mesh, 0.015-inch diameter brass or bronze wire.

e. Solder not otherwise specified shall conform to Federal Specification QQ-S-571b, composition Sn50.

f. Soldering Flux not otherwise specified shall be rosin, except that for nickel-copper alloy, and where conditions of application prohibit use of rosin, flux conforming to Federal Specification Q-F-506 shall be used.

g. Steel Shapes: Items involving steel plate or shapes shall be of steel conforming to the requirements of Federal Specification QQ-S-741, type II, grade B, class 1. All necessary holes and sinkages shall be provided for attaching hardware or other items. Anchorage for attachment to adjoining construction shall be provided.

h. Steel Bars shall conform to Federal Specification QQ-B-71.

i. Brass shall conform to Federal Specification QQ-B-611a.

j. Bronze shall conform to Federal Specification QQ-B-721a.

k. Wrought Iron Bars Federal Specification QQ-I-686a.

l. Fastenings:

(1) General: Bolts, nuts, screws, washers, and other various fastenings shall be furnished as necessary for the proper erection of the various items of work specified herein. The types and materials of the fastenings shall be suitable for use with the materials which are to be fastened or joined. Fastenings on exterior iron or steel work shall be brass, galvanized steel or other non-rusting types.

(2) Steel Bolts and Nuts shall conform to Federal Specification FF-B-571a; types and sizes as required.

(3) Machine Screws shall conform to Federal Specification FF-S-91, types I or II, and of required sizes. Aluminum machine screw products shall be alloy 24S-Tg, (ALCOA), or approved equal.

(4) Wood Screws shall conform to Federal Specification FF-S-1111a, flat or round headed of sizes as required.

(5) Lead Expansion Sleeves shall conform to Federal Specification FF-H-136, type 4424, of required sizes.

(6) Lead Anchors shall conform to Federal Specification FF-H-136, type 4426, of required sizes.

(7) Flat Washers shall conform to Federal Specification FF-H-136, type 4430, of required sizes.

(8) Toggle Bolts shall conform to Federal Specification FF-H-136, type 4420A, galvanized steel of required sizes.

m. Brass pipe shall conform to Federal Specification WW-P-351.

n. Stainless Steel shall be type No. 18-8 containing not less than 18% chromium; not less than 8% nickel; and not more than 0.12% carbon. It shall be "Allegheny Metal" as manufactured by Allegheny Steel Company; "Endure Ka2" as manufactured by Republic Steel Company, or "Resistal" as manufactured by Crucible Steel Company, or approved equal. All stainless steel shall be non-magnetic. No straight chrome irons shall be used. All sheets shall be patent leveled, free from waves, dents or other imperfections. All tubing and structural shapes shall be standard sizes.

o. Miscellaneous: Materials not specified above shall be as shown on the drawings or as hereinafter specified under the various items.

5-06 SAMPLES of all Contractor-furnished material shall be submitted for approval.

5-07 NAILING: Except as otherwise specified or indicated on the drawings, nailing in general shall be confined to sheet metal having a width of less than 12 inches. Nailing of flashings shall be confined to one edge only. Nails shall be spaced evenly and approximately 8 inches apart, except as shown. Where sheet metal is applied to surfaces other than wood, detailed shop drawings shall be provided to establish locations for sleepers and nailing strips required to properly secure the work.

#### 5-08 SOLDERING AND SEAMING:

a. Soldering: All edges of uncoated sheet metal to be soldered shall be pretinned before soldering is begun. Soldering shall be done slowly with well-heated coppers so as to thoroughly heat the seam and completely sweat the solder through the full width of the seam. Ample solder shall be used and the seam shall show not less than one full inch of evenly flowed solder. Soldering shall follow immediately after application of flux. Upon completion of soldering, acid shall be neutralized and surfaces shall be thoroughly cleaned.

b. Seams shall conform to the following requirements:

(1) Flat Lock Seams: Finish not less than 3/4" wide.

(2) Soldered Lap Seams: Finish not less than 1" wide.

(3) Unsoldered Plain Seams: Lap not less than 3".

5-09 FLASHING shall be installed at all roof eaves and projections through roofs and elsewhere as shown on the drawings to provide watertight protection. Eave flashings and water stops over doors shall be constructed of metal plates and angles bolted over roofing as detailed. Water stops over doors shall be galvanized.

5-10 REGLETS for flashing to concrete shall be provided and shall be set in the forms where and as shown on the drawings, or required to provide watertight connections. Reglets shall be manufactured products constructed of sheet copper of approved design and shall be complete with all fittings and special shapes as may be required so as to be weathertight. Reglets of all types shall have edges bent to an angle of at least 45°, of sufficient width to provide firm and secure anchorage into the wall construction. Open-type reglets shall be fitted with fiberboard or other suitable separators to prevent crushing or filling of the slot during placing of concrete. Reglets shall be secured in the concrete forms with double-head copper nails spaced not over 12 inches on centers and/or with metal strap brackets spaced not more than 2 feet apart nailed to forms with 1-inch smooth wire nails. Base flashing and roofing sheets shall be carried into the reglets. Cap flashing shall be secured in reglets with copper or lead plugs spaced not over 12 inches on centers, with the groove filled with calking compound and calked smooth after application.

5-11 LOUVERS shall be fabricated to the details shown on the drawings of galvanized steel angle subframes and galvanized steel frames, blades and mullions. Blades shall be accurately fitted and firmly secured to the galvanized steel frame. Frames and blades shall be made of 16-gage sheet. If assemblies are of welded construction they shall be galvanized after fabrication. Insect screens shall be bronze wire in pressed galvanized steel frames. This work includes all steel angles and accessories as shown on the drawings or required for support and installation of the louvers.

5-12 SMOKE PIPE AND CAP: The smoke pipe shall be made of 10-gage black iron or steel sheet. Seams shall be lapped and welded. Joints shall be made flush with collars welded to pipe sections or slip type, welded after erection. The smoke pipe cap and its supports shall be made of 1/4 inch black iron or steel plate to details shown on the drawings.

5-13 METAL THRESHOLDS shall be in single lengths for each opening up to 6 feet wide, shall be of the design shown and shall be of extruded brass or bronze. Thresholds shall be set in beds of grout and secured to floors with expansion anchors and flat-head countersunk machine screws, finished to match the thresholds and spaced not more than 12 inches apart. Angle thresholds shall be galvanized and set in the concrete with strap anchors as indicated on the drawings.

5-14 FLOOR DIVIDER STRIPS for terminating or dividing floor finishes shall be standard terrazzo dividers of brass, bronze or aluminum. They shall be supported by suitable spring-clip metal chairs.

5-15 EXPANSION JOINTS: Expansion joints shall be provided as shown on the drawings. Flexible strips of soft copper shall be used for built-in expansion joints in concrete or masonry walls, floors and roofs of buildings, where noted on the drawings.

5-16 FIXTURES AND ACCESSORY ITEMS: All miscellaneous metal items necessary for the proper installation of fixtures and equipment such as water stops over doors, shelf hanger rods and shelf supports not otherwise specified in other sections of these specifications shall be provided, installed and anchored in strict accordance with the general drawings, details and shop drawings. Insofar as possible, work shall be fitted and shop assembled ready for erection. Work shall be bolted or welded as indicated or directed by the Contracting Officer. Welded work shall conform to the best modern practice with base metals clean and smooth. Jointings and intersections shall be accurately made, tightly fitted and in true planes. Installation shall be true and plumb.

5-17 PAINTING: All miscellaneous uncoated metal items shall be given protective paint in accordance with the provisions of the section on PAINTING; PROTECTIVE, ON METAL. Finish painting shall be as specified in the section PAINTING; GENERAL.