

**SECTION 05 50 00
METAL FABRICATIONS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Shop fabricated, prime painted and galvanized ferrous metal.
2. Shop fabricated, cast aluminum nosings.
3. Shop fabricated, stainless steel corner guards.

B. Products Furnished But Not Installed Under This Section:

1. Furnish items cast in concrete to Section 03 30 00 - Cast-In-Place Concrete.
2. Furnish items placed in masonry to Division 4 - Masonry.

1.2 SUBMITTALS

A. Product Data: Submit for manufactured components indicating type, finish, size, accessories, and anchorage details.

B. Shop Drawings: Indicate profiles, dimensions, fabrication and installation details, size and type of fasteners, welds, accessory items, shop finish and method of anchorage.

1. Stamp with seal and signature of professional engineer responsible for design.

C. Informational Submittals: Submit following packaged separately from other submittals:

1. Certifications specified in Quality Assurance article.

1.3 QUALITY ASSURANCE

A. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering in jurisdiction where Project is located, with minimum of five years documented experience in design of metal fabrications.

B. Welder Qualifications: AWS certified within past 12 months for each type of weld required. Maintain current certification for duration of Project.

C. Certifications:

1. Certificates verifying AWS qualifications for each welder employed on Project.

PART 2 - PRODUCTS

2.1 FERROUS METALS, GENERAL

- A. Structural Steel: ASTM A36/A36M.
- B. Rolled Steel Bars, Plates, and Shapes: ASTM A6/A6M
- C. Steel Bar Grating: ASTM A569/A569M.
- D. Steel Tubing: Cold-formed, ASTM A500.
- E. Structural Steel Sheet: Hot-rolled, ASTM A570/A570M, Class 1; of grade required for design loading.
- F. Galvanized Structural Steel Sheet: ASTM A653/A653M, Quality SQ, of Grade required for design loading. Coating designation; G90.
- G. Cold-Rolled Steel Sheet, Commercial Quality: ASTM A366/A366M.
- H. Steel Pipe: ASTM A53; type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless otherwise indicated.
- I. Gray Iron Castings: ASTM A48, Class 30.
- J. Malleable Iron Castings: ASTM A47, grade as selected by fabricator.
- K. Brackets, Flanges and Anchors: Cast or formed metal of same type material and finish as supported rails, unless otherwise indicated.
- L. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27/A27M. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

2.2 GROUT

- A. Non-Shrink Grout: Premixed, factory packaged, non-ferrous aggregate, non-staining, shrinkage-resistant, non-corrosive, non-gaseous, ASTM C1107.
 - 1. Minimum Strength at 28 Days: 5000 PSI.
 - 2. Acceptable Products:
 - a. Masterflow 713, Master Builders, Cleveland, OH.
 - b. Euco N.S., Euclid Chemical Co., Cleveland, OH.
 - c. Crystex, L&M Construction Chemicals, Omaha, NE.
 - d. SikaGrout 212, Sika Corporation, Lyndhurst, NJ.
 - e. SonogROUT 10K, Sonneborn Building Products, Minneapolis, MN.
 - f. Five Star Grout by US Grout Corp, Fairfield, CT.

2.3 ANCHORS

- A. Flush or Shield Type Expansion Anchor Sleeve:
 - 1. Size: As indicated on Drawings.
 - 2. Finish: Zinc plated.
 - 3. Acceptable Products:

- a. HDI-Drop In Anchor, Hilti Fastening Systems, Inc., Tulsa, OK.
- b. Red Head Multi-Set II, ITW Ramset/Red Head, Michigan City, IN.
- c. Steel Drop-in, Powers (Rawl) Fastenings Inc., New Rochelle, NY.

2.4 FASTENERS

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for type, grade and class required.
 1. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.
 2. Lag Bolts: Square head type, FS FF-B-561.
 3. Machine Screws: Cadmium plated steel, FS FF-S-92.
 4. Wood Screw: Flat head carbon steel, FS FF-S-111.
 5. Plain Washers: Round, carbon steel, FS FF-W-92.
 6. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
 7. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
 8. Lock Washers: Helical spring type carbon steel, FS FF-W-84.
- B. Truss Connectors and Accessories: Provide elements of the trusses and connectors as indicated on the Drawings and as follows:
 1. Bent eyelets.
 2. Thru-bolted eyelet connectors.
 3. Steel rods, threaded.
 4. Turnbuckles.
 5. Clevice with 5" grip.
 6. Fabricated metal beam wrap.

2.5 SURFACE PREPARATION AND APPLICATION

- A. Steel surfaces to be primed must be dry and free of dirt, oils, rust, salt and other contaminants.
 1. Blast-clean steel to SSPC SP-6 Commercial Grade for general use.
 2. Apply primers in accordance with manufacturer's instructions.

2.6 UNIVERSAL PRIMER

- A. Manufacturer's standard, lead free primer, capable of providing sound foundation for field applied top coats despite prolonged exposure.
 1. Rust inhibitive/corrosion-resistant.
 2. Solids: Nominal 60 percent.
 3. DFT: 2 to 3 mils.
 4. Maximum Allowable Dry Time: One hour to touch; 12 hour dry to recoat at 75°F.
 5. Compatible with finish paint system specified in 09910.

B. Acceptable Products:

1. Themec, Chem Prime 37H-77, Themec, Kansas City, MO.
2. Carboline Multi-Bond 150, Carboline Company, St. Louis, MO.

2.7 ZINC-RICH PRIMER

A. Inorganic, zinc-rich, capable of providing sound foundation for field applied top coats despite prolonged exposure, cathodic protection and corrosion resistance. Similar to galvanizing.

1. Pigment Content: Minimum 80 percent zinc in dry film by weight.
2. Maximum Allowable Dry Time: One hour to touch; 12 hours to top coat.
3. Compatible with finish paint system specified in 09960.

B. Acceptable Products:

1. Themec N90-E92 Theme-Zinc, Themec Co., Kansas City, MO.
2. Carbo-Zinc 11 VOC, Carboline Company, St. Louis, MO.

2.8 GALVANIZING

A. Galvanized Finish: Hot-dipped galvanized.

1. Iron and Steel Hardware: ASTM A153/A153M.
2. Iron and Steel Products: ASTM A123; Coating Grade 85.

B. Galvanizing Repair Paint: MIL-P-21035 or SSPC-Paint-20.

1. Acceptable Products:

- a. Valspar M-2-2 (13-F-2), Valspar, Baltimore, MD.
- b. Themec 90-93, Themec Co., Kansas, MO.
- c. Carboline Galvanox, Carboline Company, St. Louis, MO.

2.9 METAL FABRICATIONS

A. Field verify dimensions prior to shop fabrication.

B. Minimize joints and seams by using largest stock sizes practical.

1. Locate multiple joints at regular intervals and at least conspicuous locations.
2. Form flush, tight, hairline joints and seams. Continuously weld joints and seams to develop full strength of jointed members.
3. Miter exposed joints. Grind exposed welds, seams and joints to form smooth, uniform surface.

C. Welding: Weld in accordance with AWS D1.1 for materials being welded.

D. General: Ease exposed edges to minimum, uniform radius of 1/32 inch.

1. Fit and shop assemble sections in largest sizes practical for site delivery.
2. Fabricate work to exclude rain and condensate or provide weep holes to divert water to exterior.

3. Form break metal corners to smallest radius possible without distressing finish surface.
- E. Fasteners: Cut, drill, punch, tap, reinforce and provide anchors to accommodate adjoining work and hardware.
 1. Provide anchors, bolts, rough hardware, fasteners and accessories required to incorporate and secure fabrications and to make units functionally operational.
 2. Use countersunk, flat head screws and bolts at exposed joints requiring mechanical fasteners.
- F. At exposed work, use materials which are smooth, free of surface blemishes, pitting, seam marks, roller marks, trade names and roughness.
- G. Blocking: Metal grounds, corner beads, casing beads, hat channels, or wood blocking specified in Section 06 10 00. For supported items requiring blocking, comply with manufacturer's requirements for type of blocking provided.

2.10 ROUGH HARDWARE

- A. Furnish bent or custom fabricated bolts, plates, anchors, hangers, dowels and miscellaneous steel and iron shapes required for framing, supporting, anchoring or securing fixtures, accessories, and furnishings.
 1. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
 2. Fabricate items to sizes, shapes and dimensions required.
 3. Furnish steel washers, except use malleable-iron washers for heads and nuts which bear on wood structural connections.
- B. Finish: Same as item being supported or anchored.

2.11 SHELF ANGLES

- A. Provide steel shelf angles of sizes indicated for attachment to building framing.
- B. Miter outside and inside corners. Do not weld joints.
- C. Finish: Galvanized.

2.12 STEEL LINTELS

- A. Steel Lintels: Provide at wall opening and recesses.
 1. Weld multiple loose lintels to form single unit.
 2. Provide minimum of 8 inches of bearing at ends unless noted otherwise.

- B. Support Reactions Design Data: Obtain this design data and other performance requirements from manufacturer and installer of items supported by steel lintels.
- C. Finish: Galvanized.

2.13 ANGLE FRAMES AND EDGE ANGLES

- A. Description: Steel angles complete with anchors and bolts.
 - 1. Anchors: Within 6 inches of ends and corners and spaced maximum 24 inches OC elsewhere, welded to steel angles.
 - 2. Casting in Concrete: 1/2 by 6 inch stud or 1 inch by 1/4 inch by 6 inches steel strap anchors.
 - 3. Casting in Masonry: 1-1/4 inches by 1/4 inch by 8 inches steel straps.
- B. Finish: Universal primer.

2.14 ANGLE CORNER GUARDS

- A. Type: ASTM A240, UNS Number S30400, Stainless Steel.
 - 1. Thickness: 0.125 inch.
 - 2. Height: 4 feet.
 - 3. Finish: No. 4 satin.
- B. Attachment: Through drywall to metal studs with flat head countersunk, self-tapping stainless steel screws 16 inches OC.

2.15 FRAMING AND SUPPORTS

- A. Provide steel framing to support ceiling hung toilet partitions, countertops, vanity.
- B. Provide fasteners and accessories for rafter ties and connectors.
- C. Support Reactions Design Data: Obtain this design data and other performance requirements from manufacturer and installer of items supported by metal fabrication framing.
- D. Finish: Universal primer.

2.16 PIPE BOLLARDS

- A. Fixed Pipe Bollard: Standard weight Schedule 40 steel pipe, ASTM A53.
 - 1. Concrete Fill: 3000 PSI, air-entrained concrete.
 - 2. Concrete Foundation: 3000 PSI, air-entrained concrete.
 - a. Anchor Tabs: Four - 4 inch by 3 inch bent No. 4 reinforcing bars welded to bollard to anchor bollard in concrete foundation.
- B. Finish: Universal primer.

2.17 FINISH

- A. Field finish as specified in Section 09 91 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions and proceed with Work.
 - 1. Coordinate and furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors which are embedded in concrete or masonry construction.

3.2 METAL FABRICATIONS INSTALLATION

- A. General: Perform cutting, drilling and fitting required for installation of fabrications.
 - 1. Set work accurately to established lines and levels.
 - 2. Provide temporary bracing and anchors for items which are to be built into concrete, masonry or similar construction.
 - 3. Fit exposed connections together to form tight hairline joints. Weld connections which are left as exposed joints.
 - 4. Grind exposed joints smooth and touch-up shop paint.
 - 5. Do not weld, cut or abrade galvanized surfaces of bolted or screwed connections.
- B. Field Welding: AWS Code D1.1.
- C. Bearing: Clean concrete and masonry bearing surfaces of any bond-reducing materials; roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
 - 1. Set loose leveling and bearing plates on wedges, or adjustable devices. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims, but if protruding, cut flush with edge of bearing plate before packing with grout.
 - 2. Non-Shrink Grout: Pack grout between bearing surfaces and plates; ensure no voids remain.
- D. Edge Angles: Cast integral and flush with cast-in-place concrete using Anchors.

3.3 PIPE BOLLARDS

- A. Set plumb and rigid.

1. Concrete Foundation: Provide rubble or gravel base bearing on undisturbed soil or compacted fill. Install bollard in place in concrete foundation. Maintain in plumb centered position until concrete set.
2. Concrete Fill: Fill bollard core solid. Provide cap wash at top of pipe with smooth finish in mounded shape.

3.4 ADJUSTING AND CLEANING

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas and paint with same material used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Cleaning Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply ASTM A780 galvanizing repair paint.

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