

SECTION 16445

GALVANIZING

PART 1 DESCRIPTION

- A. Galvanize or repair galvanizing on metal items.

PART 2 MATERIALS

- A. Provide galvanized metal items that meet the standards in Table 1.

**Table 1
Galvanizing Standards**

Item	Standard
Fabricated items, rolled, pressed or forged steel shapes, plates, pipes, tubular items, and bars	ASTM A 123
Steel or iron castings	ASTM A 153, Class A
Bolts, nuts, screws, washers, and other miscellaneous hardware	ASTM A 153, Class C or D or ASTM B 695, Class 50
Miscellaneous fasteners	ASTM B 633, Class Fe/Zn 8
Rail elements for metal beam guard fence or bridge railing	AASHTO M 180
Permanent metal deck forms, supporting angles and incidental items	ASTM A 653, Coating Designation G165

PART 3 CONSTRUCTION

3.01 GENERAL

- A. If fabricated members or assemblies are required to be hot-dip galvanized, provide for proper filling, venting, and draining during cleaning and galvanizing. Provide drain holes or slots as required, except where prohibited by the plans. If assembling tapered members using slip-joint splices, drain to the small end of the section. Ensure that cleaning and galvanizing do not produce hydrogen embrittlement.
- B. Before galvanizing material 1/4 in. or greater in thickness:
 - 1. remove all sharp burrs and
 - 2. chamfer to approximately 1/16 in. all edges exposed to electrical conductors or to human activity.
- C. If painting is specified on galvanized materials, paint in accordance with Item 16446, "Cleaning and Painting Steel." Do not water-quench or chromate-quench galvanized surfaces to be painted.

3.02 GALVANIZING WELDMENTS

- A. If problems develop during galvanizing of welded material, the Owner's Representative may require a test of the compatibility of the combined galvanizing and welding procedures in accordance with Section 16441, Part 3, 3.02 F. "Testing of Galvanized Weldments," and may require modification of one or both of the galvanizing and welding procedures.

3.03 WORKMANSHIP

- A. Coverage

- 1. Bare spots at most 1/8 in. across are acceptable unless numerous. Repair larger bare spots in accordance with Section 16445, Part 3, 3.04 "Repairs." Runs or drips of zinc coating are acceptable unless they interfere with the intended use of the product. Carefully hand-file excessive zinc accumulations.

- B. Adhesion

- 1. To test coating adhesion, tap the coated area with a small hammer. The coating is acceptable if it is not brittle and does not scale or flake.

- C. Appearance.

- 1. White Rust

- a. A white powdery residue indicates moisture. Remove heavy layers of white rust that have caused the coating to pit. Light coatings may remain unless the Owner's Representative requires chemical removal. Remove white rust from articles that will be in direct contact with soil.

- 2. Red Rust

- a. Red rust on galvanized items indicates uncoated areas. See Section 16445, Part 3, 3.03 A. "Coverage," for acceptance criteria.

- 3. Alligator Cracking or Spider Webbing

- a. The composition of the base metal may cause dark lines resembling alligator skin. See Section 16445, Part 3, 3.03 B. "Adhesion," to determine whether the coating is acceptable.

- 4. Dull Gray Coating

- a. The composition of the base metal can cause a dull gray color. See Section 16445, Part 3, 3.03 B. "Adhesion," to determine whether the coating is acceptable.

- D. Coating Thickness

1. Galvanize to the thickness specified.

3.04 REPAIRS

- A. Use zinc-based solders, sprayed zinc, or zinc-rich paints for repairs, in accordance with this Section.

1. Materials

- a. Zinc-Based Solders

- (1). Solders used in rod form or as powders:

- (a). zinc–tin–lead alloys with liquidus temperatures in the range of 446°F to 500°F or
- (b). zinc–cadmium alloys with liquidus temperatures in the range of 518°F to 527°F.

- b. Sprayed Zinc (Metallizing)

- (1). Zinc coating applied by spraying with droplets of molten metal using wire, ribbon, or powder processes.

- c. Organic Zinc-Rich Paints

- (1). Zinc-rich paints based on organic binders that:

- (a). are premixed and formulated specifically for use on steel surfaces and
- (b). will provide a dried film containing a minimum of 94% zinc dust, by weight.

2. Repair Processes.

- a. Zinc-Based Solders

- (1). Remove moisture, oil, grease, dirt, corrosion products, and welding slag or flux from surfaces to be repaired. Clean surface to white metal by wire brushing, light grinding, or mild blasting extending into the surrounding undamaged galvanized coating. Preheat cleaned areas to at least 600°F but not more than 750°F. Wire-brush while heating and evenly distribute a layer of zinc solder. When repair is completed, flush the repaired area with water or wipe with a damp cloth to remove flux residue.

- b. Sprayed Zinc (Metallizing)
 - (1). Remove oil, grease, corrosion products, and any welding slag or flux from surfaces to be repaired, and ensure that the surfaces are dry. Clean surface to white metal by wire brushing, light grinding, or mild blasting extending into the surrounding undamaged galvanized coating. Apply coating by metal-spraying pistols fed with either zinc wire or zinc powder. Provide a coating that is uniform and free of lumps, coarse areas, or loose particles.
 - c. Organic Zinc-Rich Paints
 - (1). Do not use paint to repair galvanizing damage caused by welding. Remove oil, grease, corrosion products, and welding slag or flux from surfaces to be repaired, and ensure that the surfaces are clean and dry. Clean surface to near-white metal by wire brushing, light grinding, or mild blasting extending into the surrounding undamaged coating to provide a smooth repair. Spray or brush-apply the paint to the prepared area in accordance with the paint manufacturer's instructions to attain the required dry-film thickness. Provide multiple passes when using spray application.
3. Repair Coating Thickness
- a. After completing repair and cooling or curing, measure thickness in the repaired area. The minimum thickness required is the same as that required for the specified galvanizing. However, if the repair uses zinc-rich paints, the minimum coating thickness is 50% higher than the specified galvanizing thickness, but not greater than 4.0 mils.

PART 4 MEASUREMENT AND PAYMENT

- A. The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be considered subsidiary to pertinent Items.

END OF SECTION