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| Title      | External Diameter Zinc Coating of Ductile Iron Fittings for Water and Wastewater |
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**Product Profile (External Fitting Coating):** The fittings shall be coated with metallic zinc wire in accordance with ISO 8179-1 with a zinc content of at least 99.99% by mass with asphalt paint or synthetic resin topcoat compatible with zinc. The finished topcoat / product shall contain the following exterior labeling: (1) All applicable markings in accordance with AWWA C110 and AWWA C153. (2) The bells of the fittings are to be painted with a silver stripe around the circumference of the bell. (3) The words “Arc-ZINC©” shall be stenciled in one-inch letters on the fitting.

**(1) Zinc Coating Mass:** The mean mass of the metallic coating shall be a nominal 350 grams per square meter and a minimum of 300 grams per square meter using metallic zinc wire when measured in accordance with the section titled “Test Method for Determining Zinc Mass” of this specification. The mass of the zinc coating shall be verified at the beginning of each shift, at changes to application equipment settings, and at sufficiently frequent intervals to verify conformance to the mass requirements. Results shall be documented and kept on file for a period of one year.

**(2) Fitting Surface:** The fitting surface shall be dry and free from dirt, oil, grease, asphalt, loose rust, or any non-adhering particle or foreign material. The metallic zinc shall be applied to the as-cast annealed external fitting surface, or to a blast cleaned or wire brushed surface.

**(3) Fitting Coating Characteristics:** The zinc coating shall cover the outside exterior surface and shall be free from bare patches or areas with lack of adhesion which reveals bare iron surfaces. A spiraled appearance is permissible provided the zinc coating masses comply with the requirements described under the “Zinc Coating Mass” section of this article. Damaged area of the zinc coating caused by handling are acceptable, provided the area of damage is less than 5 square centimeters per square meter and the minor dimensions of the damaged area does not exceed 5 millimeters. Greater areas of damage shall be repaired in accordance with the materials and procedures specified in the “Repairs to the Zinc Coating” section and SIP Technical Advisory 2020-100.

**(4) Repairs to the Zinc Coating:** Any damaged areas on the fitting exceeding the criteria described under “Fitting Coating Characteristics” of this article and any areas left uncoated, e.g. under the test coupon, shall be repaired utilizing either: 1) metallic zinc spray complying with this section 2) application of a zinc-rich paint containing more than 88% zinc by mass in the dried film. The mean mass of the applied paint shall not be less than 20% above the nominal coating mass of the metallic zinc-based coating (as detailed in SIP Technical Advisory 2020-100).





**(5) Finish Layer (Topcoat):** After zinc coating has been applied, a finish layer of asphalt paint or synthetic resin topcoat compatible with zinc shall be applied with the requirements described under “Asphaltic Coating” section of this article. Topcoat shall be applied within 24 hours after zinc coating is applied. Application of the finishing layer may be done by spray, brush, or roller at the manufacturer’s discretion. It shall uniformly cover the zinc coating and be free from bare patches or lack of adhesion. Repairs to the finishing layer shall be in accordance with manufacturer’s recommendations. The mean dry film thickness (DFT) of the finishing layer shall not be less than 2 mils. The mean DFT shall not exceed 10 mils to avoid blistering and permit proper performance of the zinc coating. Provide a distinguishing feature on surface of fitting to signify that fitting is zinc coated in accordance with Section 8.

**(6) Test Method for Determining Zinc-Mass in Fitting:** A rectangular metallic test coupon approximately 3 cm by 40 cm is weighed to the nearest 0.01 grams. Immediately prior to application of the zinc, the test coupon is attached along the longitudinal axis of the fitting surface by applying adhesive tape (duct tape) to each end of the coupon in such a manner as to result in 100 square centimeters of exposed coupon surface. The fitting surface with the attached coupon shall be coated with the same equipment and application process as the entire fitting. The test coupon shall be a film of consistent thickness and density, stable at the temperature of the substrate during zinc-based application, for use as a surrogate surface for the measurement of coating thicknesses. After zinc coating, the tape is removed, and the coupon is again weighed to the nearest 0.01 gram after the coupon has been dried. The weight of the zinc on the test coupon is determined by subtracting the initial weight of the bare coupon from the coated weight of the coupon. The mass of the zinc in grams is then multiplied by 100 to give the mass of zinc in grams per square meter.

The uncoated area under the test coupon on the surface of the fitting shall then have to be coated as described in the “Repairs to Zinc Coating” section.

**(7) Asphaltic Coating:** After a fitting has been cement lined and zinc coated, the exterior surface of the fitting and interior surface of the bell shall be cleaned and then coated by lightly spraying or brushing with a minimum thickness of 2 mils DFT of an NSF-61 approved asphaltic coating, or other Engineer-approved coating. The coating shall be sufficiently thinned so it will dry without running.

**(8) Exterior Labeling/Markings:** The finished topcoat/product shall contain the following labels/markings: (1) All applicable labeling / markings in accordance with AWWA C110 and/or AWWA C153 standards. (2) The bells of the fittings are to be painted with a silver stripe around the entire circumference. (3) The words “Arc-ZINC©” shall be stenciled in one-inch letters on the fitting.