



Standard Specification for Cast and Wrought Galvanic Zinc Anodes¹

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This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This specification covers cast and wrought galvanic zinc anodes for the cathodic protection of more noble metals and alloys in sea water, brackish water, or other saline electrolytes. Type I anodes are most commonly used for such applications. The Type I anode composition in this specification meets the chemical composition requirements of MIL-A-18001J.

1.2 Zinc anodes conforming to this specification may be used in other waters, electrolytes, backfills, and soils where experience has shown that the specified composition is efficient and reliable. Type II anodes are most commonly used for such applications.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

B 6 Specification for Zinc²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance With Specifications³

E 527 Practice for Numbering Metals and Alloys (UNS)²

E 536 Test Method for Chemical Analysis of Zinc and Zinc Alloys⁴

2.2 Military Standard:

MIL-A-18001J Military Specification Anodes, Corrosion Preventative, Zinc, Slab Disc, and Rod Shaped⁵

3. Terminology

3.1 Definitions:

3.1.1 *cathodic protection*—reduction of corrosion by making the protected metal the cathode in a conducting medium by applying direct current.

3.1.2 *galvanic anode*—a metal electrode that sacrificially corrodes when coupled to a more noble metal in a conducting medium, and thereby supplies a protective electric current to the noble electrode.

3.1.3 *saline electrolyte*—a solution consisting of mainly

the chlorides of the alkali metals.

4. Ordering Information

4.1 Orders for anodes under this specification shall include the following information:

4.1.1 ASTM designation and year of issue,

4.1.2 Type of anode material (see Table 1),

4.1.3 Quantity in pounds,

4.1.4 Number of anodes,

4.1.5 Size of anode and whether contains rod insert and if so, type of insert and whether contains bolt hole and if so, whether threaded.

4.1.6 Whether marking for identification is required including the marking patterns, if required, and

4.1.7 Whether certification is required.

5. Chemical Composition

5.1 The anode shall be made from Special High Grade zinc conforming to Specification B 6, with suitable alloying additions for Type I anodes. Composition of the anode alloy content shall conform to the limits prescribed in Table 1.

5.2 Evidence from laboratory tests shows that Type I composition may suffer intergranular corrosion. Susceptibility to intergranular corrosion increases with increasing temperature and is particularly severe above approximately 120°F (50°C). Intergranular corrosion can be avoided (at temperatures above about 120°F) with Type II composition, which must be made from special high-grade zinc with an iron content well below the 0.003 % maximum given in Specification B 6.

6. Methods of Chemical Analysis

6.1 The chemical compositions enumerated in this specification shall, in case of disagreement, be determined by methods mutually agreed upon or the methods listed in Table 3 approved for referee purposes by ASTM. Test Method E 536 shall be used, except for Type II.

7. Bolt Holes and Threads

7.1 For anodes with integral inserts intended for attachment by bolting, it is recommended that a bolt-hole spacing of 6 in. (152 mm) or even multiples thereof be used.

7.2 Anodes with projecting rod inserts threaded for attachment by means of a bolted connection shall have Unified National Coarse threads.

8. Workmanship, Finish, and Appearance

8.1 The zinc anodes shall be free of flash, burrs, cracks, blow holes, and surface slag, consistent with good commercial practice. Cast anodes shall not have shrinkage cavities exceeding ¼ the depth of the anode or 1 in. (25.4 mm),

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² Annual Book of ASTM Standards, Vol 01.01.

³ Annual Book of ASTM Standards, Vol 02.04.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Annual Book of ASTM Standards, Vol 03.06.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.