



Standard Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners¹

This standard is issued under the fixed designation F 1136; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—Section 2 was editorially updated in October 1998.

1. Scope

1.1 This specification covers the basic requirements for three grades of chromium/zinc inorganic coatings for threaded fasteners.

1.2 These coatings are applied by conventional dip-spin or dip-drain methods.

1.3 The coating process does not induce hydrogen embrittlement providing that the fasteners have not been pre-treated with an acid.

2. Referenced Documents

2.1 ASTM Standards:

B 117 Test Method of Salt Spray (Fog) Testing²

D 1000 Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications³

D 2247 Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity⁴

F 1470 Guide for Fastener Sampling for Specified Mechanical Properties and Performance Inspection⁵

3. Classification

3.1 These coatings are classified into three grades according to the requirements in Table 1.

4. Ordering Information

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

4.1.1 Quantity of parts.

4.1.2 Grade of coating.

4.1.3 Any additions to the specification as agreed upon by the purchaser and the supplier.

TABLE 1 Classification of Coatings

Grade No.	Chromium/Zinc Coating Weight, g/m ²	Supplemental Coating	Thickness, μm Average	Salt Spray, h
1	14.0–17.2	No	5.0–6.0	144
2	20.4–23.6	No	6.0–13.0	240
3	20.4–27.0	clear sealer	7.0–13.0	400

5. Requirements

5.1 *Appearance*—The coating shall have a uniform appearance free from tears and other discontinuities which may affect the appearance or performance, or both, of the coating.

5.2 *Adhesion*—The coating shall show no evidence of blistering or other changes in appearance after exposure to humidity testing for a minimum of 96 h. In addition there shall be no more than 3.0 mm peel-back from the intersection of scribed lines that are taped tested immediately following a 10 min recovery period from the humidity test and there shall be no other peeling under tape (see 6.3 and 6.4).

5.3 *Corrosion*—These coatings shall be capable of withstanding neutral salt spray testing for the minimum h specified in Table 1. Unless otherwise defined, acceptable corrosion resistance shall be where there is no base metal corrosion on significant surfaces.

5.3.1 Significant surfaces are defined as the exposed surfaces of the fastener when it is installed in a normal manner. Surfaces on which a controlled deposit ordinarily cannot be obtained, such as holes, recesses, bases of angles, and similar areas are normally exempt from the requirements of significant surfaces.

5.4 *Blisters*—There shall be no signs of blisters after testing in accordance with 6.1 and 6.3.

5.5 *Thread Fit*—The coating shall not have an adverse affect on normal installation and removal practices as determined by the proper GO thread gauge. Excessive coating on the threaded surface may be acceptable only when the fastener passes the torque test outlined in 7.2.3.

5.5.1 The thickness of the coating is limited by the basic thread size. Where greater thickness is necessary the internal threads may be produced oversized (before coating) providing the finished product (after coating) meets all the specified mechanical properties. Where mechanical properties are not

¹ This specification is under the jurisdiction of ASTM Committee F-16 on Fasteners and is the direct responsibility of Subcommittee F16.03 on Metal Coatings on Threaded Fasteners.

Current edition approved Feb. 26, 1988. Published April 1988.

² Annual Book of ASTM Standards, Vol 03.02.

³ Annual Book of ASTM Standards, Vol 10.01.

⁴ Annual Book of ASTM Standards, Vol 06.01.

⁵ Annual Book of ASTM Standards, Vol 14.02.

specified, oversizing is subject to the approval of the purchaser.

6. Test Methods

6.1 *Corrosion*—Corrosion resistance shall be tested in accordance with Test Method B 117.

6.2 *Coating Thickness*—The coating thickness may be determined by the microscopic examination of a cross section taken perpendicular to the significant surface or by the weigh-strip-weigh method.

NOTE 1—The weigh-strip-weigh method involves weighing the test specimen before and after the coating is stripped. The method requires a reagent that does not attack the base metal. Coating weight must be within the ranges given in Table 1.

6.3 *Humidity Test*—The humidity test shall be conducted in accordance with Practice D 2247 (100 % relative humidity at 100°F (38°C)).

6.4 *Adhesion*—Semi-transparent pressure sensitive tape with an adhesive strength of $400 \pm \text{N/m}$ as tested in accordance with Test Methods D 1000 shall be used to test the adhesion of the coating. The adhesive characteristic of the tape shall not change by more than 5 % of its mean value within 12 months. The backing of the tape may consist of fiber-reinforced cellulose acetate, unplasticized poly vinyl chloride, or poly-

ter film. When performing the adhesion test the tape shall be removed from the surface of the coated specimen with a sharp jerk.

7. Inspection

7.1 The purchaser may request samples in accordance with Guide F 1470.

7.2 *Referee Inspection*—The following referee thread inspection may be utilized if the specified go-gauge binds on the bolt, nut, or screw.

7.2.1 *Bolt or Screws*—Assemble a phosphate test nut with a 2B or 6H class thread down the full length of the thread.

7.2.2 *Nut*—Assemble a phosphate bolt or screw with a 2A or 6g class thread for a minimum of one diameter through the nut.

7.2.3 The test nut, screw, or bolt must run freely for the total length without binding. If nonuniformity of the coating causes difficulty in assembling the part, the coating may be found acceptable if it requires no more than a torque equivalent to 0.06D N·m to assemble the part.

8. Rejection

8.1 Materials that fail to conform to the requirements of this specification may be rejected.

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