SPECIFICATION FOR ZINC PLATING

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SPECIFICATION FOR ZINC PLATING

1.0 PURPOSE

1.1 This specification describes the system for Zinc plated material from suppliers to ensure that received material is of required specifications.

1.2 This material specification is intended to aid the Quality control / production department in out sourcing and the vendor to comply the requirements of Zinc plating of a material which needs to meet its intended use, and the quality control department in the inspection and release of incoming material.

2.0 SCOPE

2.1 This specification covers requirements of Zinc plating to meet requirements of as specified in the ASTM B 633 or customer requirement.

2.2 All measurements shall compliance as specified in the ASTM B 633 specification.

3.0 CLASSIFICATION

3.1 Thickness: - The coating shall be provided in one of the four thickness classes defined in table 2.

3.2 Finish: - The coating shall have one of the finish type defined in table 2.

4.0 PREPARATION: -

4.1 The coating shall be non alloyed zinc produced by electro-deposition.

4.2 The base metal surface shall free of scratches, porosity, pits, inclusions, crack, roll marks, and die marks. The base metal shall be subjected to such polishing or buffing operations as are necessary to yield deposits with the desired final luster and appearance.

4.3 Proper preparatory procedure and through cleaning of the base metal are essential to ensure satisfactory adhesion and corrosion resistance performance of the coating.

4.4 All steel parts having an ultimate tensile strength greater than 1000 MPa (31 HRC) and that have been machined, ground, cold formed or cold straightened, shall be heat treated for stress relief to reduce the risk of Hydrogen Embrittlement in the part before clean and electroplate process.

4.5 All electroplated steel parts having an ultimate tensile strength greater than 1000 MPa (31 HRC) as well as surface hardened parts, shall be baked to reduce risk of Hydrogen Embrittlement.

4.6 Electroplated surfaces passivated as a result of the baking operation shall be reactivated before receiving a supplementary treatment.

4.6.1 Surfaces should be activated as soon as possible following baking and handled carefully to avoid contamination and maintain an active surface for post processing. Proprietary methods are available to prepare the surface or a 2% v/v sulfuric acid in de-ionized water can be used.

5.0 COATING REQUIREMENTS

5.1 Significant surfaces are areas where minimum thickness to be met shall be designated on the applicable drawing or by the provision of a suitably marked sample. Significant surfaces may be defined as those normally visible, directly or by reflection, which are essential to the appearance or serviceability of the article when assembled in normal position or which are the source of the corrosion products that deface visible surfaces on the assembled article.

5.2 Surface on which the specified thickness of deposit cannot readily be controlled, such as threads, holes deep recesses, bases of angles, and similar areas, are normally exempt from minimum thickness requirements, unless they are specially designated, and thus made subject to minimum thickness requirements.

5.3 The dimensional tolerance of the most threaded articles, such as nuts, bolts, screws and similar fasteners with complementary threads, normally does not permit the application of a coating thickness much greater than 8.0 µm. If heavier coatings are required, allowance for the deposit buildup must be made during the manufacture of the threaded articles.

5.4 The adhesion of the coating shall be such that when examined in accordance with practice B 571. The coating shall not show separation from the base metal at the interface.

5.5 Luster – Unless otherwise specified by the purchaser, a bright, semi-bright or dull finish shall be acceptable.

5.6 Zinc coating with Types II, III, V and VI treatments shall show neither corrosion products of zinc nor basis metal corrosion products at the end of the test period describe in Table 1 when tested by continuous exposure to salt spray in accordance with 4.2. The appearance of corrosion products when examined with 20/20 eyesight at normal reading distance shall be cause for rejection, except that white corrosion products 6 mm or less from the edges of the specimens shall not constitute failure. For corrosion requirement see table 1.

5.7 The surface of the electroplated article shall be uniform in appearance, free of visible coating defects, such as blisters, pits, roughness, nodules, burning, crakes or un-plated area and other defects that will affect the function of the coating.

6.0 INSPECTION

6.1 The purchaser and manufacturer are urged to employ statistical process control in the coating process. Properly performed, statistical process control will assure coated products of satisfactory quality and assure the amount of acceptance inspection. The sampling plan used for the inspection of the quality coated article shall be agreed upon between the purchaser & manufacturer.

6.2 An inspection lot shall be defined as a collection of coated articles that are the same kind, that have been coated by a single supplier at one time or approximately the same time, under essentially identical conditions, and that are submitted for acceptance or rejection as a group.

7.0 SPECIMEN PREPARATION

7.1 When the electroplated parts are of such from shape, size and value as to prohibit use thereof, or are not readily adaptable to a test specified herein, or when destructive tests of small lot sizes are required, the test shall be made by the use of separate specimens plated concurrently with the articles represented. The separate specimens shall be of a basis metal equivalent to the articles represented. "Equivalent" basis metal includes chemical

composition, grade, condition and finish of surface before electroplating. For example, a cold-rolled steel surface shall not be used to represent a hot-rolled steel surface. Due to the impractically of forging or casting separate test specimens, hot-rolled steel specimens may be used to represent forged and cast steel articles. The separate specimens may also be cut from scrap castings when ferrous alloy castings are being electroplated. These separate specimens shall be introduced into a lot at regular intervals before the cleaning operations, preliminary to electroplating and shall not be separated therefore until after completion of electroplating.

7.2 Conditions affecting the electroplating of specimens, including the spacing, plating media, bath agitation, temperature etc. in respect to other objects being electroplated, shall correspond as nearly as possible to those affecting the significant surfaces of the articles represented. Unless a need can be demonstrated, separately prepared specimens shall not be used in place of production terms for nondestructive and visual examinations.

7.3 If separate specimens for corrosion resistance tests are required, they shall be panels not less than 150 mm long, 100 mm wide, and approximately 1 mm thick.

8.0 CORROSION RESISTANCE

8.1 Zinc coating with Types II, III, V and VI treatments shall show neither corrosion products of zinc nor basis metal corrosion products at the end of the test period describe in Table 1 when tested by continuous exposure to salt spray in accordance with 7.2. The appearance of corrosion products when examined with 20/20 eyesight at normal reading distance shall be cause for rejection, except that white corrosion products 6 mm or less from the edges of the specimens shall not constitute failure. For corrosion requirement see table 1.

8.2 The selected samples to the salt spray test; the length of time to be applicable for the type of supplementary coating shall be in accordance with the requirement of 4.1. To secure uniformity of results, age types II, III, V and VI supplementary coatings at room temperature for 24 h before subjection to the salt spray. The salt spray test shall commence within 72 h of the completion of the aging period.

8.3 Coating not conforming to this specification or to authorized modification shall be rejected. They may be reconsidered for inspection in accordance with test method B 602.

Table 1

Type	Description	Minimum Salt Spray Hrs.
I	As-plated without supplementary treatments	
II	With colored chromate coatings	96
III	With colorless chromate conversion coatings	12
IV	With phosphate conversion coatings	
V	With colorless passivate	72
VI	With colorless passivate	120

Table 2

Classification No. & Conversion Coating Suffix	Service Condition	Thickness, min µm
Fe/Zn 25	SC 4 (very severe)	25
Fe/Zn 25	SC 3 (severe)	12
Fe/Zn 25	SC 2 (moderate)	8
Fe/Zn 25	SC 1 (mild)	5

9.0 SERVICE CONDITIONS

9.1 SC 4: Very Severe: - Exposure to harsh conditions, or subject to frequent exposure to moisture, cleaners, and saline solutions, plus likely damage by denting, scratching, or abrasive wear. Examples are: plumbing fixtures, pole line hardware.

9.2 SC 3: Severe: - Exposure to condensation, perspiration, infrequent wetting by rain, and cleaners. Examples are: tubular furniture, insect screens, window fittings, builder's hardware, military hardware, washing machine parts, and bicycle parts.

9.3 SC 2: Moderate: - Exposure mostly to dry indoor atmosphere but subjected to occasional condensation, wear or abrasion. Examples are: tools, zippers, pull shelves, machine parts.

9.4 SC 1: Mild: - Exposure to indoor atmosphere with rare condensation and subject to minimum wear or abrasion. Examples are: buttons, wire goods, fasteners.