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Metallic coatings — Electroplated coatings of zinc on iron or steel

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Descriptors : metal coatings, electrodeposited coatings, zinc coatings, characteristics, classifying, quality control.

Metallic coatings — Electroplated coatings of zinc on iron or steel

0 INTRODUCTION

This International Standard covers a range of coatings of zinc for the protection of iron and steel against corrosion under various service conditions.

The minimum thickness requirements apply only to those portions of the significant surface that can be touched by a ball 20 mm in diameter.

Passivation by chromate conversion coatings gives additional protection against corrosion and shall be applied unless there is reason to the contrary.

Articles to be painted may require alternative treatment such as phosphating to provide good adhesion.

It is essential that the purchaser state the service condition number or the classification number: merely to ask for plating to be carried out in accordance with ISO 2081 without this information is insufficient.

1 SCOPE AND FIELD OF APPLICATION

This International Standard applies to electroplated coatings of zinc on iron or steel for protection against corrosion, except for the following:

- coatings applied to machine screw threads (with tolerance);
- coatings applied to sheet, strip or wire in the unfabricated form, or to coil springs.

This International Standard does not specify the surface condition of the basis metal prior to plating; agreement on the degree of roughness which is acceptable shall be reached between the interested parties.

2 REFERENCE

ISO 1463, *Metal and oxide coatings — Measurement of thickness by microscopical examination of cross-sections.*

3 DEFINITION

For the purposes of this International Standard the following definition applies:

significant surface: The part of the surface which is essential to the appearance or serviceability of the article and which is to be covered or is covered by the coating.

When necessary the significant surface shall be the subject of agreement, and shall be indicated on drawings or by the provision of suitably marked samples.

4 CLASSIFICATION

4.1 Grading of service conditions

The service condition number indicates the severity of the service conditions in accordance with the following scale:

- 4 — exceptionally severe
- 3 — severe
- 2 — moderate
- 1 — mild

These designations are conventional and it is recommended that the choice of the service condition number corresponding to the use of the part to be plated should be the subject of agreement between the interested parties.

4.2 Classification of coatings

The classification number comprises:

- the chemical symbol, Fe, for the basis metal (iron or steel);
- the chemical symbol for zinc, Zn;
- a number indicating the minimum thickness (in micrometres) of the zinc coatings;
- the letter "c" indicating that passivation has been applied (to be omitted if agreed to the contrary — see section 6).

In the case of articles having a significant surface area less than 100 mm² this minimum thickness shall be regarded as the minimum value of average thickness measured by the method given in Annex B.

7.3 Adhesion

The coating shall continue to adhere to the basis metal when subjected to the test given in Annex C.

7.4 Continuity of passivation film

The passivation film shall be continuous over the zinc surface. The presence of a colourless film shall be verified by the test method given in Annex D.

7.5 Adhesion of passivation film

The passivation film shall be adherent and coloured films shall be tested by one of the methods given in Annexes E and F.

7.6 Corrosion resistance of colourless passivation films

Colourless passivation films shall be tested in accordance with the method given in Annex G. After the passivated article has been subjected to two cycles of the humidity

test, there shall be no breakdown of the film, or any appearance of white corrosion products. Slight staining may be ignored.

NOTE – When heat treatment is required after plating it is usual to passivate after the heat treatment process. This is because many passivation films are affected by heat. In any event, tests on passivation films shall be made after heat treatment.

7.7 Manner of specifying requirements

When ordering articles to be plated in accordance with this International Standard, the purchaser shall state, in addition to the number of the International Standard, either the service condition number denoting the severity of the condition the coating is required to withstand (see 4.1) or the classification number of the particular coating required (see 4.2). The purchaser shall also indicate any heat treatment required before and after plating.

8 SAMPLING

The method of sampling shall be agreed between the interested parties.

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ANNEX C**BURNISHING TEST FOR ADHESION¹⁾**

Rub an area of not more than 650 mm² of the plated surface rapidly and firmly with a smooth metal implement for 15 s.

The pressure shall be sufficient to burnish the coating at every stroke, but not so great as to cut the deposit. Poor adhesion will be shown by the appearance of a loose blister which grows as rubbing is continued. If the quality of the deposit is also poor, the blister may crack and the plating will peel away from the basis metal.

More than one area may be tested if desired.

ANNEX D²⁾**TEST FOR PRESENCE OF PASSIVATION FILM**

Prepare a test solution consisting of 50 g of lead acetate (hydrated) in 1 l of distilled or de-ionized water.

Place 1 drop of this test solution on the surface and allow it to remain there for 5 s. After this period, remove the drop by blotting gently, taking care not to disturb any deposit that may have formed.

A dark deposit or black stain is indicative of the absence of a passivation film.

For comparative purposes, a surface that is known not to have been passivated may be similarly treated.

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ANNEX E²⁾

ISO 2081-1973
PAPER TEST FOR ADHESION OF COLOURED PASSIVATION FILMS

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The adhesion of a coloured passivation film is tested by rubbing the surface with soft white tissue paper. Failure is indicated by the appearance of anything more than a faint stain on the paper.

ANNEX F²⁾**ERASER TEST FOR ADHESION OF COLOURED PASSIVATION FILMS**

Rub the chromated surface with a gritless gum eraser (art-gum) for 2 or 3 s (about 10 strokes) using normal hand pressure and a stroke approximately 50 mm long. The passivation film shall not be removed or worn through to the underlying metal as a result of this treatment.

1) This method should be regarded as tentative until adhesion testing has been studied by Technical Committee ISO/TC 107.

2) a) These methods are valid until the adoption of an International Standard relating to passivation.

b) Before subjecting a chromate conversion coating to any test, it shall be aged at room temperature in a clean environment for at least 24 h after the passivation treatment.