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Free chromate Zn-Al flake coatings - Specification

无铬锌铝涂层 技术条件

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Free chromate Zn-Al flake coatings - Specification

1 Scope

This standard specifies the technical requirements and test methods for free chromate Zn-Al flake coatings (hereinafter referred to as coatings) on steel parts and components.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 1727 General preparation of paint film

GB/T 5270 Metallic coatings on metallic substrates - Electrodeposited and chemically deposited coatings - Revies of methods available for testing adhesion (GB/T 5270-2005, ISO 2819:1980, IDT)

GB/T 6462 Metallic and oxide coatings - Measurement of coating thickness - Microscopical method (GB/T 6462-2005, ISO 1463:2003, IDT)

GB/T 6739 Determination of film hardness by pencil test (GB/T 6739-1996, eqv JIS K5400:1990)

GB/T 10125 Corrosion tests in artificial atmospheres - Salt spray tests (GB/T 10125-1997, eqv ISO 9227:1990)

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1

Free chromate Zn-Al flake coatings

The anti-corrosion coating with scaly zinc as the main component, which is formed by dipping, brushing, spraying water-based free chromate Zn-Al paints on the surface of steel parts or components, through baking.

4 Information that the buyer shall provide to the supplier

a) The standard number.

b) The grade of coating required for the part to be coated.

c) The final heat treatment temperature of the workpiece to be coated. Since the coating is baked at a temperature of about 300 °C, the purchaser shall consider whether this temperature affects the mechanical properties of the coated workpiece.

d) Requirements for additional coatings, such as sealers, friction reducers, colours.

5 Markings

5.1 Overview

The coating is indicated by the element symbol "Zn" (zinc) plus the prefix 'fl' (flake) and the suffix "nc" (chromium-free). If it is required to indicate the technical requirements in a detailed manner, it shall indicate the coating thickness behind "fl Zn".

5.2 Examples

5.2.1 The coating, whose minimum salt spray test time is 480 h, is marked as flZn 480 nc.

5.2.2 The coating, whose minimum salt spray test time is 720h and the minimum thickness is 8 μm, is marked as flZn 720 8μm nc.

6 Technical requirements

6.1 Appearance

6.1.1 The basic color of the coating is silver-gray. Other colors and anti-friction properties of the coating can be obtained, by adding additional coatings or adding appropriate additives to the coating.

6.1.2 The coating shall be continuous, without defects such as holiday, blisters, peeling, cracks, pitting, inclusions. The coating shall be uniform, without obvious local over-thickness. Coatings allow slight color differences.

in 6.3.

6.6 Damp heat resistance

The coating shall be subjected to the damp heat resistance test, according to the method specified in 8.6; the red rust shall not appear within 360 hours.

6.7 Heat resistance

The heat resistance test of the coating is carried out, according to the method specified in 8.7. The coating is required to have no defects, such as discoloration, blisters, peeling, cracks. After the heat resistance test, the coating performance shall still meet the technical requirements specified in 6.3 and 6.4.

6.8 Hardness

The hardness test shall be carried out in accordance with the provisions of 8.8. The hardness of the coating shall not be lower than 7H.

7 Sampling

7.1 From the same batch of products, randomly take three specimens for each test. Carry out the test. If any one of the specimens is unqualified after the test, randomly take three more specimens for the same test. If one of them is unqualified, this batch of products is unqualified.

7.2 For assemblies or parts or components whose individual mass exceeds 150 g, cut a part of the workpiece as a specimen for testing. In order to prevent the exposed steel substrate, at the incision, from affecting the test results, it shall use paint, wax or adhesive tape to protect the incision. The same method can also be used to prepare specimens, for parts with complex shapes and difficult to calculate the surface area.

8 Test method

8.1 Appearance

Under natural scattered light, visually inspect the appearance of the coating with the naked eye or corrected vision.

8.2 Test of coating amount

8.2.1 Dissolution weighing method

For specimen which has a mass greater than 50 g, use a balance with an accuracy of 1 mg to obtain the original mass W_1 (unit in mg). Place the specimen in 20% NaOH aqueous solution at 70 °C ~ 80 °C; soak for 10 min to dissolve the free chromate zinc-flake coating. Take out the specimen. Use water to wash it thoroughly. Dry it immediately. Then weigh the mass W_2 (unit in mg) of the specimen after the coating is dissolved. Measure and calculate the surface area S of the workpiece (unit in dm^2). Calculate the amount of coating W_s (unit in mg/dm^2), according to the following formula:

$$W_s = \frac{W_1 - W_2}{S}$$

Refer to Appendix A, for the calculation method of coating surface area of commonly used parts.

Note 1: If the mass of the specimen is less than 50 g, several specimens shall be accumulated to reach a total mass of more than 50 g; then the coating amount test shall be carried out.

Note 2: After the free chromate Zn-Al flake coating is immersed in NaOH solution for 10 minutes, if the coating is not completely dissolved, the soaking time shall be extended, until the coating is completely dissolved.

8.2.2 Metallographic microscopy

According to the requirements of GB/T 6462, the thickness of the coating is detected by metallographic microscopy.

8.3 Adhesion strength test

The adhesive tape test method is used to detect the adhesion strength between the free chromate Zn-Al flake coating and the substrate. The adhesive tape test is carried out, in accordance with the requirements of GB/T 5270.

8.4 Salt spray test

The salt spray test is carried out, according to the neutral salt spray test requirements, which are specified in GB 10125.

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