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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 8753.4-2005

**Anodizing of aluminium and aluminium alloys -- Assessment of
quality of sealed anodic oxide coatings -- Part 4: Dye spot test
with prior acid treatment**

铝及铝合金阳极氧化 氧化膜封孔质量的评定方法 第4部分：酸处理后的染色斑点
法

(English Translation)

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Foreword

GB/T 8753 "Anodizing of aluminum and its alloys - Assessment of quality of sealed anodic oxidation coatings" is divided into 4 parts:

- GB/T 8753.1-2005 Anodizing of aluminum and its alloys - Assessment of quality of sealed anodic oxidation coatings - Part 1: Measurement of the loss of mass after immersion in acid solution(s);
- GB/T 8753.2-2005 Anodizing of aluminum and its alloys - Assessment of quality of sealed anodic oxidation coatings - Part 2: Phosphoric acid/chromic acid test with nitric acid predip;
- GB/T 8753.3-2005 Anodizing of aluminum and its alloys - Assessment of quality of sealed anodic oxidation coatings - Part 3: Admittance method;
- GB/T 8753.4-2005 Anodizing of aluminum and its alloys - Assessment of quality of sealed anodic oxidation coatings - Part 4: Dye spot test with prior acid treatment.

This part is Part 4 of GB/T 8753.

This part modifies and adopts ISO 2143:1981 "Anodizing of aluminum and its alloys - Estimation of loss of absorptive power of anodic oxide coatings after sealing - Dye spot test with prior acid treatment" (English version). It is re-

drafted according to ISO 2143:1981. The difference between this part and ISO 2143:1981 is reflected in the compilation format. For the convenience of comparison, a comparison of clause numbers BETWEEN this part AND the corresponding international standard, is listed in the informative Appendix A. This part replaces GB/T 8753-1988 "Anodizing of aluminum and aluminum alloys - Estimation of loss of absorptive power of anodic oxide coatings after sealing - Dye spot test with prior acid treatment". The difference between this part and GB/T 8753-1988 is mainly reflected in the compilation format.

This part is suitable for the production control inspection of anodic oxidation, which is a non-destructive testing method.

For the the methods specified in this part, although they can be graded based on dye spots, the quantitative data is not accurate. It is not suitable to be an arbitration test.

Appendix A of this part is an informative Appendix.

This part was proposed by the China Nonferrous Metals Industry Association.

Anodizing of aluminum and its alloys - Assessment of
quality of sealed anodic oxidation coatings - Part 4:

Dye spot test with prior acid treatment

1 Scope

This part specifies the method for assessing the quality of sealed anodic oxidation coatings, by the anti-dyeing adsorption ability, after acid treatment.

This part is applicable to the production control inspection of anodic oxidation coating, with anti-pollution ability, which is subject to atmospheric sun-exposure or corrosive environment.

This part does not apply to the anodic oxidation coating, which is produced by the following aluminum alloys:

a) Anodic oxidation coating, which has a copper content > 2% AND silicon content > 4%;

- b) Oxidation coating which is sealed by potassium dichromate;
- c) Oxidation coating which is treated by oiling, waxing, painting;
- d) Dark oxidation coating;
- e) Oxidation coating, which has a thickness of less than 3 μm .

When the sealing solution contains nickel, cobalt or other organic additives, this method is not effective enough.

2 Principle of method

In this method, the degreased surface of the specimen is first subject to acid treatment; then it is colored by a dye, to observe the dyeing condition. According to the loss of the dyeing adsorption capacity of the oxidation coating, assess the anti-dyeing absorption capacity of the anodic oxidation coating.

The anti-dyeing adsorption capacity of the anodic oxidation coating is one of the methods to assess the sealing quality. Under normal circumstances, the strong anti-dyeing adsorption capacity indicates good sealing quality. However, a slight decrease in the anti-dyeing adsorption capacity, does not mean that the sealing quality of the oxidation coating is deteriorated, because the anti-dyeing adsorption capacity is sometimes related to other factors.

3 Solution

The test solution shall be prepared by analytical reagents and distilled water (or deionized water). The acid solutions, which are listed in 3.1 and 3.2, can be equivalently applied to any kind of dye spot test. However, the solution which is specified in 3.4 is safer. When using the container, which is made of anti-fluoric acid material, to store the acid solution, it must be careful during operation.

3.1 Acid solution A: Pipette 25 mL of sulfuric acid (rho20 1.84 g/mL). Weigh 10 g of potassium fluoride into a 1000 mL volumetric flask. Slowly add water to dilute it to the mark.

3.2 Acid solution B: Pipette 25 mL of fluorosilicic acid (H₂SiF₆) (rho20 1.29 g/mL)

into a 1000 mL volumetric flask. Slowly add water, to dilute it to the mark.

3.3 Dyeing solution A: Pipette 5 g of Aluminum Blue 2LW solution (blue dye

which has an international color number 69), into a 1000 mL volumetric flask.

Use diluted sulfuric acid or diluted sodium hydroxide solution to adjust the pH of the solution to 5.0 ± 0.5 (the temperature is about 23 °C).

3.4 Dyeing solution B: Pipette 10 g of Sanodal Red B3LW solution (acid red

which has an international color number 331), OR aluminum red GLW solution, into a 1000 mL volumetric flask. Use diluted sulfuric acid or diluted sodium hydroxide solution to adjust the pH of the solution to 5.0 ± 0.5 (the temperature is about 23 °C).

4 Specimen

The specimen is generally cut directly from the product. If a specially prepared specimen is used, even if its production process is the same as the product, it will produce some erroneous results.

5.1 Use a cotton ball, which is dipped in acetone or ethanol, to wipe the surface place it levelly.

5.2 Apply a drop of acid solution A or acid solution B (3.1 or 3.2), on the surface of the specimen; keep it for exactly 1 minute (the temperature of the test solution is about 23 °C).

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