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

GB/T 8753.2-2005

**Anodizing of aluminium and aluminium alloys -- Assessment of
quality of sealed anodic oxide coatings -- Part 2: Phosphoric
acid/chromic acid test**

铝及铝合金阳极氧化 氧化膜封孔质量的评定方法 第2部分：-硝酸预浸的磷铬酸法
(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 2 of GB/T 8753.

This part is non-equivalent to EN 12373-7.1999 "Aluminum and aluminum alloys - Anodizing - Assessment of quality of sealed anodic oxidation coatings

by measurement of the loss of mass after immersion in phosphoric acid/chromic acid solution with prior acid treatment" (English version). Compared with EN 12373-7.1999, the main content changes are as follows.

- In Chapter 5, ADD that "For cold-sealed materials, they shall be placed for more than 24 hours before sampling."

From the date of implementation of this part, GB/T 14952.2-1994 "Anodizing of aluminum and its alloys - Assessment of sealing quality by measurement of the loss of mass after immersion in acid solution" shall be abolished at the same time.

Because the "acid dipping method" is not as correlated, to actual use, as the "phosphoric acid / chromic acid method with nitric acid predip", the "acid dipping method" is rarely used at home and abroad. European countries have also abolished their corresponding standards. Therefore, this part specifies the "phosphoric acid / chromic acid method with nitric acid predip"; meanwhile it abolishes the "acid dipping method".

The phosphoric acid / chromic acid test with nitric acid predip is a destructive test.

This part is especially applicable to the anodic oxidation coating of aluminum alloy for construction use.

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

This part shall be under the jurisdiction of the National Nonferrous Metals Standardization Technical Committee.

Responsible drafting organization of this part. Beijing General Research Institute of Nonferrous Metals.

Participated drafting organizations of this part. Shenzhen Huajiari Aluminum Co., Ltd., Guangdong Jianmei Aluminum Profile Factory Co., Ltd.

1 Scope

This part specifies the method for assessing the quality of sealed anodic oxidation coatings of aluminum and aluminum alloy, after nitric acid predip AND etching in phosphoric acid / chromic acid solution, through the loss of mass.

This part applies to both hot-sealed anodic oxidation coating and cold-sealed anodic oxidation coating.

This part does not apply to the anodic oxidation coating, which was treated by the following processes.

- a) Hard anodic oxidation coating that is usually not sealed;
- b) Anodic oxidation coating that has been sealed in a dichromate solution;
- c) Anodic oxidation coating produced in chromic acid solution;
- d) Anodic oxidation coating after hydrophobic treatment.

2 Principle of method

For the non-sealed anodic oxidation coating, after predip in nitric acid, it will quickly dissolve after soaking in the phosphoric acid / chromic acid solution, whilst the well-sealed oxidation coating will not be etched, even after long time soaking. For this method, according to this principle, the anodic oxidation coating is pre-dipped in nitric acid, then etched in a phosphoric acid / chromic acid solution; the sealing quality is evaluated according to the loss of mass.

3.1 Pre-dip solution. Pipette 650 mL of nitric acid ($\rho_{20} = 1.4 \text{ g/mL}$) into a 1000 mL volumetric flask. Use water to dilute it to the mark.

3.2 Phosphoric acid / chromic acid solution. Dissolve 20 g of chromium trioxide (CrO_3) and 35 mL of phosphoric acid ($\rho_{20} = 1.7 \text{ g/mL}$), in 500 mL of water.

4 Instruments

Analytical balance, which has a sensitivity of 0.1 mg.

5.1 For hot-sealed materials, it may take specimen at any time after sealing.

For cold-sealed materials, it can take specimen after standing for more than 24 hours.

5.2 From the material to be tested, cut a specimen, which has an effective

surface area of about 10000 mm² (minimum 5000 mm²). Usually, its mass does not exceed 200 g.

5.3 For hollow extrusions, it shall take specimen from the end of the profile,

which is covered with anodic oxidation coating on both the inner and outer surface of the test piece.

6.1 Measure the effective surface area of the specimen. Use a dry cloth, to wipe off the frost spots on the surface of the specimen.

6.2 At room temperature, stir the specimen in a suitable organic solvent for 30

seconds OR wipe off the grease. When using a chlorinating agent, such as perchloroethylene, for degreasing, the pre-drying shall be carried out in a well-ventilated fume hood, to prevent inhalation of solvent vapor.

6.5 Fully immerse the specimen upright in the predip solution (3.1), which has a temperature of 19 °C ± 1 °C. Keep it for 10 minutes.

6.6 Take the specimen out of the predip solution. First use tap water, then distilled water, to wash it thoroughly clean.

6.7 Put the specimen upright; completely immerse it into the phosphoric acid / chromic acid solution (3.2), which was preheated to 38 °C ± 1 °C, to soak it for

15 minutes. The solution can be reused; however, each liter of solution, after

processing 1 x 10⁵ mm² of oxidation coating, shall be discarded. Do not use solutions, that have been in contact with materials other than the anodic