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Replacing GB/T 2972-1991

Test method for uniformity of zinc coating on zinc-coated steel wire by the copper sulfate dip

(ISO 7989-2:2007 Steel wire and wire products –
Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc-alloy coating, NEQ)

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Foreword

This Standard is drafted as per provisions specified in GB/T 1.1-2009.

This Standard replaces GB/T 2972-1991 “Zinc-coated steel wire - Test method for uniformity of zinc coating on wire by the copper sulphate dip”. Compared with GB/T 2972-1991, this Standard makes significant changes in the respect of the following technical contents:

-- for application scope, add “Zn-Al alloy coated steel wire can refer to this Standard”;

-- add normative references;

-- modify the sample preparation requirements; sample length is modified to about-250mm;

-- modify reagent preparation requirements; modify crystal of copper sulphate to analytical pure; modify amount to 314g/L and temperature to 20°C ± 2°C; heating during dissolution is not allowed;

-- delete copper hydroxide and copper carbonate in the neutralization reagents;

-- delete specific gravity requirements of test solution;

-- add Annex A “Test method of zinc content in copper sulfate test solution”.

This Standard is drafted by adopting the re-drafting method and referencing to ISO 7989-2:2007 “Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc-alloy coating”. This Standard is not equivalent to ISO 7989-2:2007.

This Standard was proposed by China Iron and Steel Industry Association.

This Standard shall be under the jurisdiction of National Technical Committee for standardization of steel (SAC/TC 183).

Drafting organizations of this Standard: National Quality Supervision and Inspection Center for Wire Rope Products; China Metallurgical Information and Standardization Institute; Institute of Quality and Quantity Supervision Center of Yuhang District of Hangzhou.

The main drafters of this Standard Chen Jianhao, Yang Jinyan, Liu Aihua, Wang Lingjun, Ren Cuiying, Liang Pengshan.

Test method for uniformity of zinc coating on zinc-coated steel wire by the copper sulfate dip

1 Scope

This Standard specifies the testing principle, sample preparation, reagent preparation, testing procedure and judgment principle for test method for uniformity of zinc coating on zinc-coated steel wire by the copper sulfate dip.

This Standard is applicable to the uniformity test of zinc coating of hot-dip zinc-coated steel wire. For zinc-aluminum alloy coated steel wire and zinc-electroplated steel wire, it can also refer to this Standard.

2 Normative references

The provisions of the following documents, through reference of this document, constitute the provisions of this document. For dated documents, only the dated editions are applicable to this document. For undated documents, the latest editions (including all amendments) are applicable to this document.

GB/T 603 Chemical reagent - Preparations of reagent solutions for use in test methods

GB/T 665 Chemical reagent - Copper (II) sulfate pentahydrate

GB/T 674 Chemical reagent - Copper (II) oxide powder

3 Test Principle

During the pre-determined time, the zinc-coated steel wire sample is dipped into the copper sulphate solution once or several times, for carrying out the replacement reaction; the zinc coating is gradually dissolved. And finally, defects are revealed on the surface; judge the uniformity of the zinc coating.

Note: This test is to reflect that the coating thickness may exist non-uniformity, therefore, even if the coating on unit area complies with relevant requirements, defects on coating surface can also be revealed.

6 Test Procedure

6.1 The samples after cleaning shall be immersed vertically in the center of the stationary test solution; the test solution must not be stirred. The samples must not be in contact with each other and shall not be in contact with the vessel wall. After immersion as per the time specified in steel wire product standard (30s or 60s), take out the sample smoothly; wash it in water immediately; use absorbent cotton, cloth or brush to remove the copper and its compounds that are attached to, but not yet firmly adhered, the surface of the zinc coating. During the test, the temperature is maintained at 20°C ± 2°C; record the actual temperature.

6.2 Repeat the immersion test in accordance with the above procedure, until metal copper which are firmly adhered to the surface of the sample is first-time appeared, or until reaching the immersion times as specified in wire product standard. After the last immersion test, the sample shall be washed under running water; use absorbent cotton and clean-soft cloth to clean-dry.

6.3 After multiple tests, when concentration of the dissolved zinc in solution exceeds 5g/L, the solution shall be replaced. The zinc content in copper sulfate test solution can be determined by the method specified in Appendix A. In order to save time, under the premise of guaranteeing no mutual contact, maximum 6 samples can be tested at the same time.

6.4 Judgment of test end:

a) When bright and firmly adhered copper precipitated on the base steel of the sample, it is the test end.

b) The test end is not reached in following cases:

1) There is bright and firmly adhered copper precipitated, however, the area is less than 5mm^2;

2) The precipitated copper can be removed with a blunt device (such as a knife blade) and zinc coating is appeared under copper (In order to judge if there is zinc coating under copper, it may drop, at that position, a few drops of 5% dilute hydrochloric acid that contains 0.16% antimony trichloride. If there is zinc coating, lively hydrogen may be generated);

3) Copper is precipitated 25mm away from the end of sample.

7 Principle for accessing result

Carry out the operation of Chapter 6. The products are deemed as qualified if

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