BRITISH STANDARD

BS EN
10244-4:2001

Steel wire and wire products — Non-ferrous metallic coatings on steel wire —

Part 4: Tin coatings

The European Standard EN 10244-4:2001 has the status of a British Standard

ICS 25.220.40; 77.140.65

National foreword

This British Standard is the official English language version of EN 10244-4:2001.

The UK participation in its preparation was entrusted to Technical Committee ISE/26, Steel wire, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 May 2001

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 7 and a back cover.

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English version

Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 4: Tin coatings

Fils et produits tréfilés en acier - Revêtements métalliques non ferreux sur fils d'acier - Partie 4: Revêtements d'étain

Stahldraht und Drahterzeugnisse - Überzüge aus Nichteisenmetall auf Stahldraht - Teil 4: Überzüge aus Zinn

This European Standard was approved by CEN on 21 January 2001.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by Technical Committee ECISS/TC 30 "Steel wires", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2001, and conflicting national standards shall be withdrawn at the latest by September 2001.

This European Standard for non-ferrous metallic coating on steel wire is made up of the following parts:

Part 1 : General principles

Part 2 : Zinc and zinc alloy coatings

Part 3 : Aluminium coatings

Part 4 : Tin coatings

Part 5 : Nickel coatings

Part 6 : Copper, bronze and brass coatings

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This part of this European Standard specifies the requirements for the mass, other properties and testing of tin coatings on steel wire and steel wire products of round or other cross section.

2 Normative reference

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 10244-1*, Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 1: General principles*

3 Term and definition

For the purposes of this European standard the following term and definition apply.

3.1
wire with tin coating
wire to which a tin coating has been applied by hot dipping or by an electrolytic procedure It does not apply to the coating procedure by ion exchange, which only produces a very fine porous coating with an irregular degree of purity

4 Requirements relating to coating

4.1 Material

For hot dip tinning, the ingot material used shall be pure tin .

The permissible impurity level shall be less than 0,5 %.

Coating applied by an electrolytic procedure shall contain minimum 99 % of tin.

4.2 Mass of coating

The coating mass, when required, shall be agreed at the time of enquiry and order or according to the product standard.

4.3 General requirements

See requirements in EN 10244-1.

4.4 Porosity

If the order specifications require it, a test may be carried out to establish the presence of small areas of porosity in the coating. In this case porosity does not mean a degree of surface roughness but extremely fine discontinuites in the coating giving direct access to the base metal.

The test conditions and acceptance criteria shall be defined at the time of the invitation to tender or the order.

5 Test conditions

5.1 Samples

5.1.1 General

See the general requirements in EN 10244-1.

5.1.2 Length of samples

The length of the samples shall be sufficient to allow the various tests to be carried out.

5.2 Determination of mass of coating

5.2.1 General

The mass of the coating shall be determined using the gravimetric method. The sample length necessary to determine the mass of coating shall be in accordance with Table 1.

Table 1 — Length of samples

diameter of wire *d* (mm)	length (mm)
0,08 ≤ *d* ≤ 0,15	3000
0,15 < *d* ≤ 0,30	2000
0,30 < *d* ≤ 0,60	1000
0,60 < *d* ≤ 1,00	500
1,00 < *d* ≤ 2,50	200
2,50 ≤ *d*	100

5.2.2 Procedure

If necessary, degrease the sample with a suitable solvent. Weigh the sample to an accuracy of 0,1 mg.

Strip the tin of the samples by dipping in the stripping solution.

The stripping solution is obtained by adding 12,5 g $SbCl_3$ to 250 ml HCl (18° Be') and 250 ml demineralized water.

When the gas evolution is ceased, remove the samples from the stripping solution, rinse under running water, dry and weigh once again to an accuracy of 0,1 mg. If the mass difference is less than 10 mg, repeat the test with a sample of double the length.

Determine the dimension of the wire.

5.2.3 Calculation of mass of coating

The mass shall be calculated in accordance with EN 10244-1.

5.3 Porosity

The acceptable porosity shall be agreed at the time of enquiry and order. The porosity of the tin coating layer shall be evaluated qualitively by one of the following methods:

METHOD 1

Bend samples of wire at least 30 cm long into a U shape, thoroughly degrease and dry and then immerse to at least 10 cm in the following solution.

100 ml 5,0 % NH_4SCN analytical purity

100 ml 2,5 % CH_3COOh analytical purity

50 ml 0,3 % H_2O_2

Remove the samples from the solution after 1 minute. Areas of porosity are shown by the appearance of a red colour.

METHOD 2

An alternative method consists of immersing the same wire samples in the following solution.

Hydrogen peroxide H_2O_2 20 ml

Sodium chloride NaCl 30 g

Potassium ferricyanide $K_4[Fe(CN)_6].3H_2O$ 10g

Make up to 1 litre with demineralized water.

Rinse under cold water and wipe dry. Immerse the sample again in the test solution and repeat the operation.

Examine the sample to establish the presence of blue coloured areas on the surface (examination with naked eye shall generally be sufficient).

The blue coloured areas indicate porosity in the tin coating.

5.4 Adherence test

With regard to adherence, the wrapping test shall be carried out around the actual diameter of the wire in so far as the ductility of the base material permits this. If it is not the case, the conditions of the wrapping test shall be agreed between the parties.

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