

# Steel wire and wire products — Organic coatings on steel wire —

## Part 2: PVC finished wire

The European Standard EN 10245-2:2001 has the status of a British Standard

ICS 25.220.60; 77.140.65

## National foreword

This British Standard is the official English language version of EN 10245-2:2001.

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.

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### Summary of pages

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## Steel wire and wire products - Organic coatings on steel wire - Part 2: PVC finished wire

Fils et produits tréfilés en acier - Revêtements organiques  
sur fils d'acier - Partie 2: Fils à revêtement de PVC

Stahldraht und Drahterzeugnisse - Organische  
Beschichtungen auf Draht - Teil 2: PVC-beschichteter  
Draht

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

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## Contents

	Page
Foreword .....	3
Introduction .....	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions .....	5
4 Methods of application and classes of PVC coatings.....	6
5 Requirements and testing methods for the PVC coating material .....	6
5.1 Requirements .....	6
5.1.1 The PVC organic coating composition .....	6
5.1.2 PVC organic coating material consistency .....	6
5.2 Test methods .....	7
6 Requirement and test on the PVC coating on wire.....	7
6.1 Requirements .....	7
6.2 Test methods .....	7
7 Performance requirements and testing methods for PVC coatings on wire .....	8
7.1 Performance requirements .....	8
7.2 Test methods for performance appraisal .....	8
8 Retests .....	8
9 Inspection and quality assurance .....	9

## 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of an identical text or by endorsement, at the latest by September 2001, and conflicting national standards shall be withdrawn at the latest by September 2001.

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.

## Introduction

This European Standard for organic coatings for steel wire is a number of parts; Part 1 covering the requirements of a general nature and applying also to coatings for which no specific requirements have been established in the subsequent parts of this standard.

The subsequent parts of this standard deal more specifically with clearly defined coatings or groups of coatings. These coatings may have their own particular methods of application and their individual requirements which are specified in these parts of this standard, in other standards or in manufacturers data sheets.

Because the standard specifies requirements and tests not only for the coating but also for the coating material, it has proved not practical to put all the requirements in one clause and all the tests in another one. Following structure has been chosen in order to limit complexity and to facilitate the use.

This standard is made up of the following parts :

Part 1 : General Rules

Part 2 : PVC coated wire

Part 3 : PE coated wire

Part 4: Polyester coated wire

In writing this series of standards consideration has been given to the nomenclature and transformation of organic coating materials as applied to steel wire products. These organic coating materials may on application to wire and by their integration into the finished wire product change their characteristics and properties.

This standard specifies characteristics and tests not only for the organic coating but also for the coating materials both before and after their application to steel wire and wire products. In addition it specifies the requirements for performance levels and testing methods on organic coating material which have become an integral and permanent part of the finished wire product. Therefore it has proven not to be practical to put all requirements in one clause and all the tests in another one.

To aid continuity and in order to limit complexity following structure has been chosen for this standard.

**Clause 4** Deals with the characteristics and testing methods of organic coating material as supplied by the manufacturer for the purposes of its application to the wire product.

Tests described in this section are intended to be carried out by the organic coating material manufacturer or the applicator **before** the coating operation.

**Clause 5** relates to the characteristics and testing methods for the "organic coating" when the organic coating material has been applied to and has become an integral part of the finished wire. Consequently tests are intended to be in the main carried out by the coating "applicators".

**Clause 6** defines the performance requirements and testing methods on the "organic coating" of the finished wire product, and where this is not possible, tests will be carried out on "coated" panels.

## 1 Scope

Complementary to EN 10245-1, this Part of EN 10245 specifies the characteristics and requirements for steel wire and wire products coated with PVC.

## 2 Normative references

This European Standard incorporates by dated and undated reference, provisions from other publications. The 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 10021, *General technical delivery requirements for steel and iron products*

EN 10204, *Metallic materials — Inspection documents*

EN 10218-1, *Steel wire and wire products — General — Part 1: Test methods*

EN 10218-2, *Steel wire and wire products — General — Part 2: Wire dimensions and tolerances*

EN 10245-1, *Steel wire and wire products — Organic coating on steel wires — Part 1 : General rules*

ISO 527-2, *Plastics — Determination of tensile test — Part 2: Test conditions for moulding and extrusion plastics*

ISO 527-3, *Plastics — Determination of tensile test — Part 3: Test conditions for films and sheets*

ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (shore hardness)*

ISO 1183, *Plastics — Methods of determining the density and relative density of non cellular plastics*

ISO 2579, *Plastics — Instrumental evaluation of colour differences*

ISO 2813, *Paints and varnishes — Determination of specular gloss of non metallic paint films at 20°, 60° and 85°*

ISO 3668, *Paints and varnishes — Visual comparison of the colour of paints*

ISO 4582, *Plastics — Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or artificial light*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc sources*

## 3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EN 10245-1 and the following term and definition apply.

### 3.1

#### PVC coating

a coating on wire and wire products made from organic coating material consisting primarily of vinylchloride homopolymer or copolymer obtained by various polymerisation process. The coating material may also contain plasticisers, pigments, stabilisers, lubricants and other substances. The coating material is in the form of powder or granules

## 4 Methods of application and classes of PVC coatings

The organic coating material shall be applied from granules by extrusion or from powders by the fluidised bed method or powder spraying.

PVC coatings are classified on the basis of their method of application: either by extrusion or by fluidised bed or powder spraying and on the basis of their degree of adherence to the base wire

**class1a:** Wire with a PVC coating applied by direct extrusion onto the base wire. This process usually produces a non-adherent tube covering the wire.

**class1b:** Wire with PVC coating applied by extrusion and made to adhere to the base wire by the use of a primer which may be thermally cured or by the use of organic glues.

**class2a:** PVC powder material applied by thermal fusion or electrostatic spray which is adherent to the base wire.

**class2b:** Wire that has been pretreated with a primer, thermally cured and then covered with a PVC powder applied thermally or electrostatically to give an adherent coating

## 5 Requirements and testing methods for the PVC coating material

### 5.1 Requirements

The requirements for the coating material are summarized in Table 1.

#### 5.1.1 The PVC organic coating composition

The composition shall be agreed between manufacturer and the applicator and shall take account of the latter's method of application. However the PVC organic coating material shall fulfil the requirements of this standard.

The processing of the PVC coating material shall be at the manufacturer's discretion. 

#### 5.1.2 PVC organic coating material consistency

The manufacturer shall ensure that the organic coating material composition and its characteristics remain constant from batch to batch and unchanged from that as agreed at the time of ordering. The processing of the PVC coating material shall be at the manufacturer's discretion.



The manufacturer shall immediately notify the applicator of any subsequent change in the type and quantity of the constituent parts of the composition once this has been agreed between the two parties. At the request of the specifier/purchaser the presence of certain elements may be limited. **In any case**, the compound shall be cadmium free.

## 5.2 Test methods

The tests shall be performed in accordance with EN 10245-1 and Table 1 below

**Table 1 — Requirements and testing methods for PVC coating material**

Characteristics	Requirements	Test methods
Density	$\leq 1,5 \text{ g/cm}^3$	ISO 1183
Hardness (shore)	Min. 38 Scales D	ISO 868
Tensile strength	Min. 17 MPa	ISO 527
Elongation	Min. 200 %	ISO 527

## 6 Requirement and test on the PVC coating on wire

### 6.1 Requirements

The coating requirements are summarized in Table 2.

### 6.2 Test methods

Unless otherwise specified in this Part 2 the test methods shall be in accordance with EN 10245-1.

An overview of the test methods is given in Table 2.

**Table 2 — Requirements and testing methods for PVC coating on wire**

Characteristics	Requirements		Test methods
Appearance	see EN 10245-1		Visual - With the naked eye
Colour	see product standard <sup>a</sup>		ISO 3668 & ISO 2579
Gloss	see product standard <sup>a</sup>		ISO 2813
coating thickness	see product standard		EN 10245-1
concentricity of the coating	60 % minimum		EN 10245-1
Adherence	PVC class 1b or 2b PVC class 2a	0 or 1 3 or 4	EN 10245-1
<sup>a</sup> In the absence of a product specification the requirements shall be agreed at the time of enquiry and order.			

## 7 Performance requirements and testing methods for PVC coatings on wire

### 7.1 Performance requirements

The coating shall satisfy the coating requirements as specified in EN 10245-1 and the provisions of this Part 2. Table 3 gives an overview of these requirements.

### 7.2 Test methods for performance appraisal

The conditions of the tests and testing cycles refer to the relevant clauses of EN 10245-1 and are completed with the specific provisions of this Part 2. Table 3 gives an overview of the most important test procedures.

**Table 3 — Performance and requirements and testing methods for PVC coated wire**

Characteristics	Requirements	Test method
Colour stability	QUV (A) : 2500 hr ΔE:5	Xenon arc; ISO 4892-2 ISO 4582
Artificial weathering	To be agreed between the parties	Xenon arc; ISO 4892-2 ISO 4582

## 8 Retests

The retest procedure shall be in accordance with the relevant clauses of EN 10021.

## **9 Inspection and quality assurance**

Inspection shall be in accordance with the procedures defined in EN 10021. Compliance with these requirements may be based on a certificate of compliance submitted by the manufacturer or the applicator, or on test certificates drawn up at the time of inspection by the applicator or wire product manufacturer or any other similar document based on the quality assurance and quality control system operated by the applicator or wire products manufacturers. In any case it is recommended that for purposes of traceability that the batch number and inspection reference be given — see EN 10204.

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