BS EN 10264-1:2012

BSI Standards Publication

Steel wire and wire products — Steel wire for ropes

Part 1: General requirements

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National foreword

This British Standard is the UK implementation of EN 10264-1:2012. It supersedes BS EN 10264-1:2002, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/106, Wire Rod and Wire.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Stahldraht und Drahterzeugnisse - Stahldraht für Seile - Teil 1: Allgemeine Anforderungen

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Contents

Page

Foreword

This document (EN 10264-1:2012) has been prepared by Technical Committee ECISS/TC 106 “Wire rod and wires”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by July 2012, and conflicting national standards shall be withdrawn at the latest by July 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 10264-1:2002.

This European Standard for wire for ropes is made up of the following parts:

— *Part 1: General requirements*

— *Part 2: Cold drawn non alloy steel wire for ropes for general applications*

— *Part 3: Round and shaped non alloyed steel wire for high duty applications*

— *Part 4: Stainless steel wire*

This European Standard has been technically revised to incorporate the following changes:

a) other tensile strength grades than those specified in EN 10264 parts 2, 3 and 4, have been allowed subject to an agreement between supplier and user at the time of order (see 5.2.1);

b) the length of the test sample given in the procedure for tensile test has been deleted in order to avoid misunderstanding (see 5.2.2);

c) the reverse bend test has been allowed for wires under 0,5 mm diameter, subject to an agreement between customer and supplier at the time of order (see 5.3);

d) the torsion test has been allowed for wires below 0,5 mm diameter, subject to an agreement between parties (see 5.4);

e) additional specifications have been added concerning the result of tensile test on knotted wire (see 5.5);

f) the clause on inspection documents has been simplified (see Clause 6);

g) for sampling and compliance criteria, the usage of statistical methods has been recommended, in order to reduce the number of tests required (see Clause 7);

h) the values of Table 2 "Size of batches and samples and number of results" have been modified as well as the titles of the third and fourth column concerning the number of results for compliance and non-compliance. The footnote b) has also been updated;

i) a general clause has been added for explaining the purpose of Annex A "Definition of terms relating to sampling and acceptance".

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This part of this European Standard defines the general requirements for wire intended for mechanical steel ropes. Additional requirements are given in the following parts of this European Standard, which are specific to each category of wire.

This part of this European Standard specifies:

— dimensional tolerances;

— mechanical characteristics;

— requirements relating to the chemical composition of the steel wire;

— conditions to be satisfied by any coating.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10021, *General technical delivery requirements for steel products*

EN 10204, *Metallic products — Types of 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 10244-2, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 2: Zinc or zinc alloy coatings*

EN 10264-2, *Steel wire and wire products — Steel wire for ropes — Part 2: Cold drawn non alloy steel wire for ropes for general applications*

EN 10264-3, *Steel wire and wire products — Steel wire for ropes — Part 3: Round and shaped non alloyed steel wire for high duty applications*

EN 10264-4, *Steel wire and wire products — Steel wire for ropes — Part 4: Stainless steel wire*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
nominal diameter d
diameter used to designate the wire, expressed in millimetres and specified by the purchaser

NOTE It is the basis for the determination of the values of all the characteristics of the wire for acceptance purposes.

3.2
actual diameter
arithmetic mean of the perpendicular measurements on one section, in accordance with EN 10218-1

3.3
out of roundness
arithmetic difference between the maximum diameter and the minimum diameter measured perpendicularly on one section of wire

4 Information to be supplied by the client

In the order, the purchaser shall specify clearly the product, the delivery conditions and the type of inspection document to be supplied.

The product is clearly defined by the designations described in EN 10264 parts 2, 3 and 4.

For a clear definition of a delivery of rope wire, the following additional information should be given:

— mass and length of delivery (total mass);

— unit mass;

— type of packaging.

5 Characteristics of and requirements for wire

5.1 Diameter tolerances

All the diameter values measured in accordance with EN 10218-2 on one section of wire shall be within the tolerance limits given in the respective tables. The level of tolerance corresponds to level T4 of EN 10218-2 for drawn wire and level T1 for class A coated wire. The out of roundness shall not be greater than half the tolerance specified in the respective tables referred to in EN 10264 parts 2, 3 and 4.

5.2 Tensile strength

5.2.1 Tensile strength grade - permitted variations

The tensile strength grades are specified in EN 10264 parts 2, 3 and 4. Additional grades are possible by agreement between supplier and user at the time of order. All other mechanical property requirements are for the next highest tensile grade. These values are the lower limits for tensile strength of each grade. The permitted upper limit for non alloy steel wire for ropes for each grade shall not exceed the lower limit by a value greater than the values given in Table 1.

Table 1 — Permitted tensile strength variations

Nominal dimension wire diameter: d or profile: h mm	**Permitted plus tolerance over the numerical value of tensile strength grade** MPa [a]
$0,2 \leq d$ or $h < 0,5$	390
$0,5 \leq d$ or $h < 1,0$	350
$1,0 \leq d$ or $h < 1,5$	320
$1,5 \leq d$ or $h < 2,0$	290
$2,0 \leq d$ or $h < 3,5$	260
$3,5 \leq d$ or $h < 8,0$	250
[a] 1 MPa = 1 N/mm^2.	

In the case of alloy steel wire for ropes, the maximum value shall not be greater than the minimum value plus 15 %.

5.2.2 Procedure for tensile test

The tensile test shall be carried out in accordance with EN 10218-1. The loading rate may be greater than that specified in EN 10218-1, depending on the number of tests to be carried out for the batch inspection. However, it shall not exceed the rate corresponding to a 25 % elongation between anchorage heads in 1 min. In the event of a dispute, the tensile test shall be carried out strictly in accordance with EN 10218-1, in particular with regard to the loading rate.

5.3 Reverse bend test

This test is specified for steel wire for ropes as specified in EN 10264 parts 2 and 3 with a diameter greater than 0,5 mm. It shall be carried out in accordance with EN 10218-1.

If agreed between customer and supplier at the time of order, this test can be used for wires under 0,5 mm diameter; values for acceptance will be agreed between parties.

5.4 Torsion test

This test applies only to non alloy steel wire, of diameter greater than or equal to 0,5 mm. It shall be carried out in accordance with EN 10218-1. The wire shall show no signs of breaking for a minimum number of turns as specified in EN 10264 parts 2 and 3.

If agreed between customer and supplier at the time of order, this test can be used for wires below 0,5 mm diameter; values for acceptance will be agreed between parties.

5.5 Tensile test on knotted wire

This test replaces the alternate bending and torsion tests for dimensions below 0,50 mm. It is a tensile test on a wire with a simple knot in the middle. This test shall be carried out in accordance with EN 10218-1 and the result shall be greater than or equal to 50 % of the nominal strength specified.

5.6 Coatings

The coatings generally used are zinc and zinc alloy. The standard coatings shall be classes A and B in accordance with EN 10244-2. If another class of coating is requested or if other metallic coatings are required, these shall be the subject of agreement at the time of ordering. The coating method is not specified. The class of the coating is defined by the minimum mass per unit of surface area (usually g/m^2) and its adherence.

The mass of coatings shall be in accordance with the requirements specified in EN 10264 parts 2 and 3.

6 Inspection documents

In accordance with the purchaser's order, inspection documents shall be drafted in accordance with EN 10204.

7 Sampling and compliance criteria

These parameters shall satisfy the requirements of EN 10021.

If the rope manufacturer wants acceptance tests to be carried out, the sample sizes and acceptance criteria shall be in accordance with the minimum requirements of Table 2 unless otherwise specified by agreement between the purchaser and the supplier. To ensure representative sampling, the samples shall be taken at random. Usage of statistical methods is recommended, in order to reduce the number of tests required.

If the number of non-complying results is greater than that defined in the 3rd column of Table 2, all the units (product units) shall be 100 % inspected, but only with regard to the defective characteristic(s).

If one or more of these new tests prove unsatisfactory, the non-complying units shall be rejected.

The acceptance or rejection of a non-complying batch shall be decided by agreement between the parties involved.

Table 2 — Size of batches and samples and number of results

Size [a]		Number of results for:	
of batch	of sample	compliance (below and up to)	non-compliance (from and above)
N	n [b]		
$2 \le N \le 15$	8	0	1
$16 \le N \le 50$	10	0	1
$51 \le N \le 90$	12	1	2
$91 \le N \le 150$	15	1	2
$151 \le N \le 280$	20	2	3
$281 \le N < 500$	25	3	4

[a] The definition of batch size and sample size is given in Annex A.

[b] If the number of delivery unit in the batch is less than n, a test shall be carried out on each unit.

8 Marking

Each unit supplied shall be marked and identified by a durable label, attached firmly to the wire coil or reel, indicating clearly as a minimum the information given in Table 3.

Table 3 — Marking of products [a]

Item type	Non-alloy steel wire	Stainless steel wire
Designation	+	+
Producer	+	+
Nominal dimension	+	+
Tensile strength grade	+	+
Surface condition	+	-
Grade of steel	-	+
Cast number	+	+
Order number	+	+
Identification number [b]	+	+
Mass or length per unit supplied	(+)	(+)

[a] Meaning of symbols used:
+ : the product shall be marked;
(+) : the product shall be marked if requested;
- : the product does not need to have this marking.

[b] The marking shall be such as to ensure traceability and shall contain reference to the inspection documents.

9 Protection against corrosion and type of packaging

Unless otherwise agreed, the wire shall be shipped unpackaged, with the ends firmly attached and apart from the reels, the units shall be encircled by at least three binders.

When the transport and shipping conditions require special protection against possible mechanical, corrosive or other deterioration, the two parties shall define adequate packaging.

In particular in the case of bright, zinc or zinc alloy coated wire, when protection against rust is requested, the two parties shall define the appropriate anti-corrosive protection to be used.

Annex A
(informative)

Definition of terms relating to sampling and acceptance

A.1 General

This Annex A is given as an information, in case the parties do not agree on a specific sampling and acceptance procedure. It can be used to define the number of samples to be taken for assessing the quality of the batch (see Clause 7).

A.2 Batch

A defined quantity of wire of the same diameter, the same grade, the same finish presented for inspection and manufactured in conditions assumed to be identical and uniform.

A.3 Unit, production unit

— Coil of a single length of wire, the mass or length of which may be variable, fixed, or;

— reel: variable or fixed quantity of a single length of wire wound on a reel or;

— flat coil: variable or fixed quantity of a single length of wire wound on a cardboard drum;

— other wire packaging: variable or fixed quantity of a single length of wire.

A.4 Base unit for sampling (m_1)

A mass expressed in kilograms conventionally with a value equal to 100 d, where "d" is the diameter of the wire expressed in mm.

A.5 Size of batch (N)

Number given by the following equation:

$$N = \frac{m}{10^{-3} \text{ x } m_1}$$

where

m is the mass of the batch in tonnes;

m_1 is the mass of the base unit in kilograms.

Knowing that conventionally:

$m_1 = 100d$

where "d" is the nominal diameter of the wire.

It follows that

$$N = \frac{m}{10^{-3} \text{ x } 100d}$$

$$= \frac{10m}{d}$$

A.6 Sample for testing

A sufficient length of wire for measurement of a characteristic.

A.7 Sampling length

A sufficient length of wire to produce the necessary samples for testing all characteristics.

A.8 Sampling

Taking all necessary samples to supply information on the batch.

A.9 Sample size (n)

Number of samples for tests.

A.10 Defect

Result of a test not complying with the requirements for a characteristic.

A.11 Defective length

A sample length showing one or more defects.

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