



SLOVENSKI STANDARD

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Jeklena žica in žični izdelki - Jeklena žica za vrvi - 3. del: Okrogla in oblikovana nelegirana jeklena žica za velike obremenitve

Steel wire and wire products - Steel wire for ropes - Part 3: Round and shaped non alloyed steel wire for high duty applications

Stahldraht und Drahterzeugnisse - Stahldraht für Seile - Teil 3: Runder und profilierter Draht aus unlegiertem Stahl für hohe Beanspruchungen

Fils et produits tréfilés en acier - Fils en acier pour câbles - Partie 3: Fils ronds et profilés, en acier non aillé, pour fortes sollicitations

Ta slovenski standard je istoveten z: **prEN 10264-3**

ICS:

77.140.45	Nelegirana jekla	Non-alloyed steels
77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains

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English Version

Steel wire and wire products - Steel wire for ropes - Part 3: Round and shaped non alloyed steel wire for high duty applications

Fils et produits tréfilés en acier - Fils en acier pour câbles - Partie 3: Fils ronds et profilés, en acier non aillé, pour fortes sollicitations

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 459/SC 6.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

prEN 10264-3:2022 (E)

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European foreword

This document (prEN 10264-3:2022) has been prepared by Technical Committee CEN/TC 459 “ECISS – European Committee for Iron and Steel Standardization”¹, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10264-3:2012.

This document 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 document has been technically revised to incorporate the following changes:

- replace “zinc alloy coatings” and “Zn95/Al5” with “Zn/Al alloy coating” (see EN 10264-2 N387);
- add tensile strength 2260 and 2360 for “round – class B” (see ISO 2232 N544 2019-08-04);
- add tensile strength 1960 for “round – class A” (see ISO 2232 N544 2019-08-04);
- replace data Table 8 with data table 4B from ISO 2232;
- the same paragraph added as in EN 10264-2 N387 about “Coating requirements to salt-spray test”.

¹ Through its sub-committee SC 6 “Wire rod and wires” (secretariat: AFNOR).

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1 Scope

This document specifies round and shaped non alloyed steel wire for use in the manufacture of ropes for mine hoisting, man-riding haulage, cableways for the transportation of passengers and other high duty applications. Heavy duty refers to situations where the stresses applied to the rope are either high or vary by a large amount during service.

This document refers to round wires and three types of shaped wire: full lock (Z), half lock (H) and trapezoidal (T).

It does not apply to steel wire taken from manufactured ropes.

This document specifies the following for cold drawn non alloyed steel wire for ropes for high duty applications:

- 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1179, *Zinc and zinc alloys — Primary zinc*

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

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

EN 10264-1, *Steel wire and wire products — Steel wire for ropes — Part 1: General requirements*

EN ISO 16120-1, *Non-alloy steel wire rod for conversion to wire — Part 1: General requirements (ISO 16120-1)*

EN ISO 16120-2, *Non-alloy steel wire rod for conversion to wire — Part 2: Specific requirements for general purpose wire rod (ISO 16120-2)*

EN ISO 16120-4, *Non-alloy steel wire rod for conversion to wire — Part 4: Specific requirements for wire rod for special applications (ISO 16120-4)*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/>

4 Designation of the product

The designation of wire for ropes manufactured in accordance with this document shall be based on the nominal dimension, surface appearance and tensile strength.

The indicator of dimension for round wire is the nominal diameter; for shaped wire it is the value of the height (h), followed by a letter specifying the profile. In the case of H profiles, this indicator shall be followed by the value of the narrowing.

The surface appearance shall be indicated as defined in EN 10264-1 with U for uncoated or bright wire, with a letter indicating the class of coating (A, B, ...) and in the case of Zn/Al alloy coatings, indicating in brackets (Zn/Al).

EXAMPLE 1 2,0 mm wire for rope with thick zinc layer, class A, tensile strength grade 1 570 MPa, in accordance with EN 10264-3.

Designation: wire for rope EN 10264-3 — 2,0 — A — 1 570

EXAMPLE 2 Wire for rope, trapezoidal profile, $h = 3,5$ mm, class B zinc coated, tensile strength grade 1 770 MPa, in accordance with EN 10264-3.

Designation: wire for rope EN 10264-3 — T3,5 — B — 1 770

EXAMPLE 3 H shaped wire for rope $h = 3,0$ mm, $w = 1,8$ mm, coated with class A Zn/Al alloy, tensile strength grade 1 370 MPa, in accordance with EN 10264-3.

Designation: wire for rope EN 10264-3 — H — 3,0 × 1,8 — A (Zn/Al) — 1 370

5 General conditions of manufacture

The drawn wire shall be manufactured from rod in accordance with EN ISO 16120-1 and EN ISO 16120-2 for ropes for static applications, and in accordance with EN ISO 16120-1 and EN ISO 16120-4 for ropes for dynamic applications.

The drawn wire shall show no surface defects or internal defects prejudicial to its use.

When specified, the drawn wire shall be supplied with a coating applied by a hot dipping or electrolytic method. The coatings commonly used are zinc or Zn/Al alloy coatings.

Unless otherwise specified, the zinc used for coating shall have a purity of 99,95 % according to EN 1179, Z3; other zinc alloys may be agreed at the time of enquiry and order.

If required by the purchaser, the quality of the zinc or Zn/Al alloy used for the coating material should be certified by the manufacturer. Because of the reaction between the base material and coating material, which is inherent to the process, the composition of the coating on the wire is different to that used in the coating bath.

6 Characteristics of the wire

6.1 Tensile strength grades

The tensile strength grades are defined in Table 1.

NOTE The nominal values are the minimum tensile strength limits. The upper limits (maximum) are equal to these minimum values increased with the tolerances specified in EN 10264-1.

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Table 1 — Tensile strength grade

Quality of wire ^a		Nominal tensile strength grade MPa ^b									
Round	Bright or coated Class B	—	—	—	1 570	—	1 770	1 960	2 160	2 260	2 360
	Zinc or Zn/Al alloy coating -Class A	—	—	—	1 570	—	1 770	1 960	—	—	—
Shaped	Bright or coated Class B or class D ^c	—	1 370	—	1 570	—	1 770	—	—	—	—
		1 270	1 370	1 470	1 570	1 670	1 770	—	—	—	—
	Zinc or Zn/Al alloy coating -Class A	—	1 370	—	1 570	—	—	—	—	—	—
NOTE Subject to agreement between the manufacturer and the purchaser, other tensile strength grades can be used.											
^a Coated means zinc or Zn/Al alloy coating. ^b 1 MPa = 1 N/mm ² . ^c Mss of coatings for static and dynamic applications are specified in Table 11.											

6.2 Profiles

6.2.1 Definition of shaped wire

For shaped wire, the characteristic sections of the wire are shown in Figure 1 for full lock Z, half lock H and trapezoidal T wires.

The nominal dimensions and tolerances shall be agreed between the supplier and the purchaser at the time of ordering. The conventional characteristic values are as follows:

- h* height: difference between the radii of the 2 concentric boundary circles;
- b* width: maximum width of upper part perpendicular to a radial line passing through the centre of the width (as shown in Figure 1);
- w* minimum narrowing: smallest width of the profile;
- e* distance taken diagonally across the transverse section of the profile (essentially T or Z profiles).

The designation of a full lock wire is established using the letter Z and the height (*h*), that of a half lock wire by H followed by the height (*h*) and the minimum narrowing (*w*) (*h* × *w*) and that of a trapezoidal wire by the letter T followed by the height (*h*).

Table 2 gives the design criteria for the shaped wire shown in Figure 1. These are the relation between the height of the shaped wires and the other major characteristic dimensions.

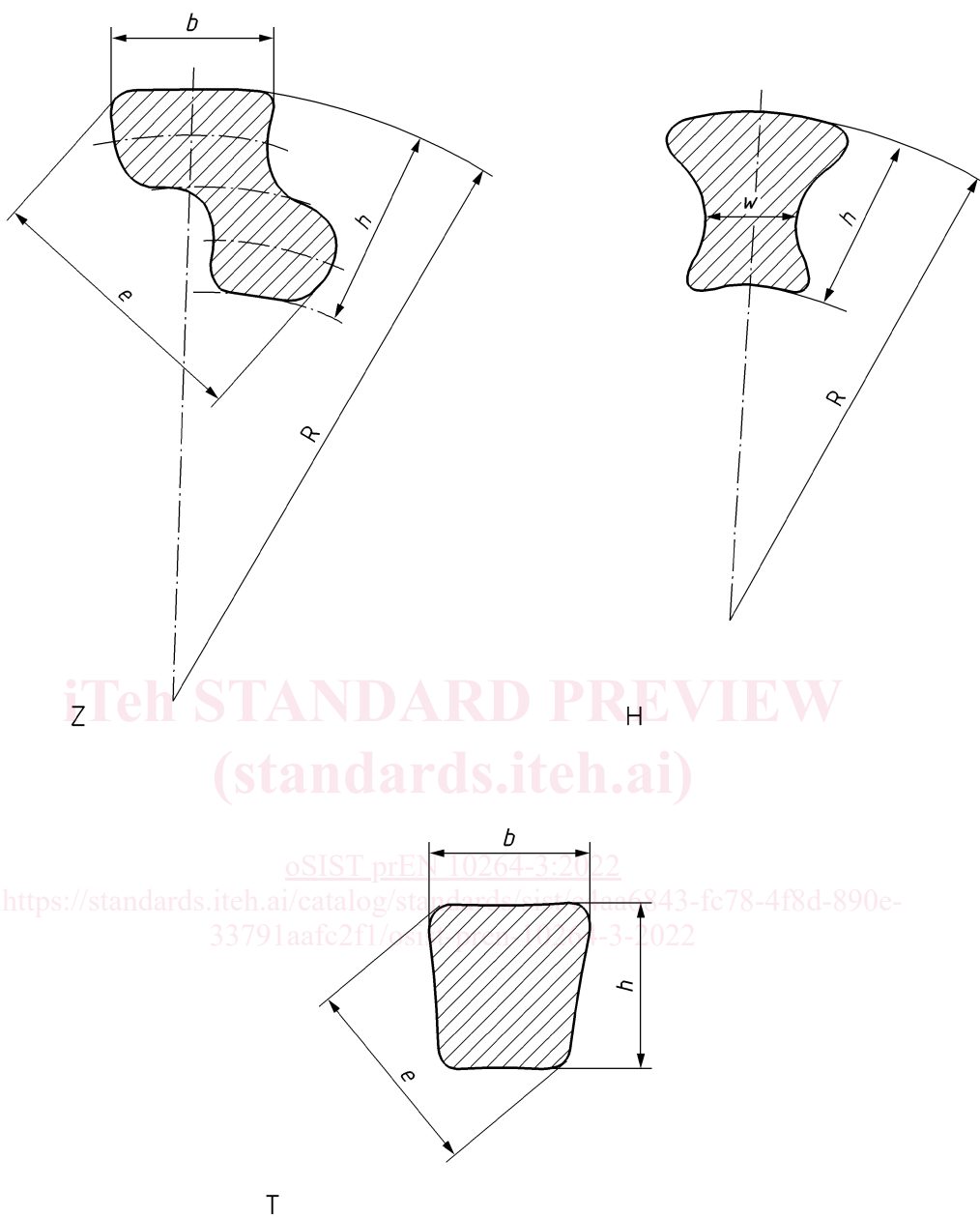


Figure 1 — Shaped wire sections

Table 2 — Design criteria for shaped wire

Ratio	Z profile	H profile	Trapezoidal profile T
$h : b$	0,9 to 1,55	—	1,0 to 1,3
$h : e$	0,55 to 0,80	—	0,75 to 0,90
$h : w$	—	0,8 to 2,3	

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6.2.2 Equivalent diameter

The definition of the equivalent diameter of shaped wire is as follows.

The diameter of the equivalent transverse circular section (ϕa) is the diameter of a circle with the same transverse section surface area as the shaped wire.

The diameter of the equivalent circular circumference (ϕc) is the diameter of the circle with the same perimeter as the shaped wire.

Nominal values may be measured by planimetry on the drawing of the shaped wire.

If the surface area of the transverse section of the shaped wire is A and the perimeter C , the equivalent values are calculated as follows:

$$\text{equivalent } \phi a = \sqrt{\frac{A}{\pi/4}} = 2\sqrt{\frac{A}{\pi}}$$

$$\text{equivalent } \phi c = \sqrt{\frac{C}{\pi}}$$

6.3 Minimum requirements for wire characteristics

6.3.1 Dimension — measured values

In addition to the requirements of this document, the requirements of EN 10264-1 also apply.

The measured values for the round wire shall satisfy the requirements of Table 3.

Ovality shall not be greater than half the tolerance specified in Table 3.

Table 3 — Dimensional tolerances on round wire diameter

Dimensions in millimetres

Nominal diameter of wire d	Tolerance on diameter (\pm)	
	Bright and coated ^a Class B	Coated ^a Class A
$0,50 \leq d < 1,00$	$\pm 0,015$	$\pm 0,030$
$1,00 \leq d < 1,65$	$\pm 0,020$	$\pm 0,040$
$1,65 \leq d < 1,80$	$\pm 0,020$	$\pm 0,050$
$1,80 \leq d < 2,05$	$\pm 0,025$	$\pm 0,050$
$2,05 \leq d < 2,80$	$\pm 0,025$	$\pm 0,060$
$2,80 \leq d \leq 4,00$	$\pm 0,030$	$\pm 0,070$

Wire diameters higher than those currently mentioned are possible with an agreement between the supplier and the user during the order. This agreement should specify the corresponding characteristics.

^a Coated means zinc or Zn/Al alloy coating.

In the case of shaped wire, the measured values for the characteristic "h" shall satisfy the tolerance requirements in Table 4.

The other dimensions shall be agreed at the time of enquiry and order.

Table 4 — Dimensional tolerances for shaped wire

Profile of wire	Nominal dimension (height of profile) h	Dimensional tolerance	
		Bright or coated Class B or D	Coated Class A
Z Profile	$2,0 \leq h < 3,0$	$\pm 0,08$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
	$3,0 \leq h < 5,0$	$\pm 0,10$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
	$5,0 \leq h \leq 8,0$	$\pm 0,12$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
H Profile	$1,5 \leq h < 3,0$	$\pm 0,08$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
	$3,0 \leq h < 5,0$	$\pm 0,10$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
	$5,0 \leq h \leq 8,0$	$\pm 0,12$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0
T Profile	$3,0 \leq h \leq 5,0$	$\pm 0,10$	Waist: + 0,25 - 0,05 Height, head, heel: + 0,15 0

NOTE In the case of the finished coated wire, variations in diameter exceeding the above limits on short lengths can be tolerated if they do not adversely affect rope manufacture.