

SLOVENSKI STANDARD

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Nadomešča:

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Jeklene žične vrvi - Varnost - 5. del: Pramenaste vrvi za dvigala (lifte)

Steel wire ropes - Safety - Part 5: Stranded ropes for lifts

Drahtseile aus Stahldraht - Sicherheit - Teil 5: Litzenseile für Aufzüge

Câbles en acier - Sécurité - Partie 5: Câbles à torons pour ascenseurs

Ta slovenski standard je istoveten z: EN 12385-5:2021

ICS:

53.020.30	Pribor za dvigalno opremo	Accessories for lifting equipment
77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains

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EUROPEAN STANDARD

EN 12385-5

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English Version

Steel wire ropes - Safety - Part 5: Stranded ropes for lifts

Câbles en acier - Sécurité - Partie 5 : Câbles à torons
pour ascenseurs

Drahtseile aus Stahldraht - Sicherheit - Teil 5:
Litzenseile für Aufzüge

This European Standard was approved by CEN on 15 February 2021.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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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

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European foreword

This document (EN 12385-5:2021) has been prepared by Technical Committee CEN/TC 168, “Chains, ropes, webbing, slings and accessories – Safety”, 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of an identical text or by endorsement, at the latest by September 2021 and conflicting national standards shall be withdrawn at the latest by September 2021.

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

This document supersedes EN 12385-5:2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA and Annex ZB, which are integral parts of this document.

This document includes amendment to Annex ZB – Machinery Directive related – and inclusion of Annex ZA – Lift Directive related.

The other Parts of EN 12385 are:

- STANDARD PREVIEW**
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- *Part 1: General requirements;*
 - *Part 2: Definitions, designation and classification;*
 - *Part 3: Information for use and maintenance;*
 - *Part 4: Stranded ropes for general lifting applications;*
 - *Part 6: Stranded ropes for mine shafts;*
 - *Part 7: Locked coil ropes for mine shafts;*
 - *Part 8: Stranded hauling and carrying-hauling ropes for cableway installations designed to carry persons;*
 - *Part 9: Locked coil carrying ropes for cableway installations designed to carry persons;*
 - *Part 10: Spiral ropes for general structural applications.*

Part 1 provides the general requirements of Parts 4 to 10.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 12385-5:2021 (E)**Introduction**

This document is a type C standard as stated in EN ISO 12100.

This document has been prepared to be a harmonized standard to provide a means of complying with the essential safety requirements of the Lifts Directive and the Machinery Directive.

During the preparation of this standard, it was assumed that a negotiation would take place between the purchaser and the manufacturer concerning the intended purpose of the rope.

Although tables of breaking forces and masses are provided for a number of the more common classes, diameters and rope grades, this Part of this standard is not limited to those given, providing all of the other requirements are met.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards for wire ropes that have been designed and produced according to the provisions of this type C standard.

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1 Scope

This document specifies the particular materials, manufacturing and testing requirements for stranded ropes for suspension, compensating and governor duties for traction drive and hydraulic lifts moving between guides and similar applications.

The particular hazards covered by this Part are identified in Clause 4.

This document does not establish requirements for information for use other than those given in Clause 7 of Part 1. Neither does it cover the requirements for ropes fitted with terminations.

Minimum breaking force values for the more common classes, sizes and grades of rope are provided in Tables 6 to 10.

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 10264-2:2012, *Steel wire and wire products — Steel wire for ropes — Part 2: Cold drawn non alloy steel wire for ropes for general applications*

EN 12385-1:2002+A1:2008, *Steel wire ropes — Safety — Part 1: General requirements*

EN 12385-2:2002+A1:2008, *Steel wire ropes — Safety — Part 2: Definitions, designation and classification*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

ISO 4346:1977, *Steel wire ropes for general purposes — Lubricants — Basic requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and EN 12385-2:2002+A1:2008 apply.

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

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

4 List of hazards

In addition to the general hazards identified in Clause 4 of Part 1, Table 1 contains all the particular hazards which require action to reduce risk as being specific and significant for steel wire ropes for lifts.

Table 1— Hazards and associated requirements

Hazards relevant to this standard identified by reference to EN ISO 12100:2010	Relevant clause of this standard
Inadequate mechanical strength	5.1 5.2 5.3 5.5 6 Annex A
Inadequate dimensional tolerances	5.4
Inadequate information about the handling, storage, cutting and packaging of the wire rope	7
Inadequate information about the specification, designation and performance of the wire rope	5.6 6 7
Inadequate information for the selection of ropes suitable for the particular application	Annex B
NOTE For the purposes of this Part of EN 12385, inadequate strength of parts means failure to achieve the minimum breaking force of the rope.	

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5 Safety requirements and/or measures

5.1 General

In addition to the requirements given in 5.2 to 5.6, the requirements shall also conform to those given in part 1 of this standard.

5.2 Materials

5.2.1 Wire

All wires, before ropemaking, shall conform to EN 10264-2:2012.

For rope grades 1180/1770 (dual tensile), 1370/1770 (dual tensile) and 1570/1770 (dual tensile), the tensile strength grades of the outer wires shall be 1 180 N/mm², 1 370 N/mm² and 1 570 N/mm² respectively. The tensile strength grade of the inner wires shall be 1 770 N/mm².

For rope grades 1570 (single tensile) and 1770 (single tensile), the wire tensile strength grades shall be 1 570 N/mm² and 1 770 N/mm² respectively.

The tensile strength grades of centre wires, filler wires and core wires shall be determined by the manufacturer.

5.2.2 Core

The core shall be one of the following types:

- a) fibre;
- b) steel, as an independent wire rope (IWRC);
- c) steel based composite e.g. steel plus fibre, steel plus polymer; or
- d) non-metallic other than only of fibre.

5.2.3 Lubricant

Where used, the lubricant shall comply with ISO 4346:1977.

5.3 Rope manufacture

5.3.1 Lubrication

Lubrication shall be limited to the strands.

5.3.2 Construction

The rope construction shall be either:

- a) one of those covered by Tables 6, 7, 8, 9 and 10; or
- b) another construction as specified by the manufacturer.

5.3.3 Rope grade

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5.3.3.1 General

The rope grade shall reflect the tensile strength grades of the outer and inner wires respectively, e.g. rope grade 1370/1770 signifies a dual tensile rope having outer wires of tensile strength grade 1370 N/mm² and inner wires of tensile strength grade 1 770 N/mm² and rope grade 1570 signifies a single tensile rope having outer and inner wires of tensile strength grade 1 570 N/mm².

For the more common classes of rope, the rope grade, R_r , shall be used in the calculation of minimum breaking force of single tensile ropes and the rope value R_{dt} shall be used in the calculation of minimum breaking force of dual tensile ropes, see Annex A for values of R_{dt} .

The rope grades for the various duties shall be in accordance with 5.3.3.2 to 5.3.3.4.

5.3.3.2 Suspension ropes

The rope grade shall be one of the following:

- a) for traction drive lifts, see Tables 6 to 8

Rope with fibre core: 1180/1770; 1370/1770; 1570; 1770

Rope with steel core: 1370/1770; 1570/1770; 1570; 1770

- b) for roped hydraulic lifts, see Tables 6 to 8

Rope with fibre core: 1370/1770; 1770

Rope with steel core: 1370/1770; 1570/1770; 1770

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5.3.3.3 Governor ropes

The rope grade shall be one of the following: 1370/1770; 1570/1770; 1570 or 1770, see Tables 6 to 8.

5.3.3.4 Compensating ropes

The ropes grade shall be one of the following: 1370/1770; 1570 or 1770, see Tables 6, 7, 9 and 10.

5.4 Diameter

5.4.1 Tolerances

When measured in accordance with 6.3.1 of EN 12385-1:2002+A1:2008, the actual diameter under no load and under a load equivalent to 5 % or 10 % of the minimum breaking force of the rope shall not vary from the nominal diameter by more than the values given in Tables 2, 3 or 4, as appropriate.

Table 2 — Tolerances on diameter for suspension ropes for traction drive lifts and governor ropes with fibre and other non-metallic cores

Nominal rope diameter mm	Tolerances as percentage of nominal diameter		
	Maximum at no load	Minimum at 5 % of F_{min}	10 % of F_{min}
up to 10	+ 6	+ 1	0
greater than 10	+ 5	+ 1	0

Table 3 — Tolerances on diameter for suspension ropes for traction drive lifts and governor ropes with steel and steel-based composite cores

Nominal rope diameter mm	Tolerances as percentage of nominal diameter		
	Maximum at no load	Minimum at	
		5 % of F_{min}	10 % of F_{min}
up to 10	+ 3	0	- 1
greater than 10	+ 2	0	- 1

Table 4 — Tolerances on diameter for suspension ropes of roped hydraulic lifts and compensating ropes

Nominal rope diameter mm	Tolerance as percentage of nominal rope diameter
From 6 to < 8	+6 0
8 and greater	+5 0

5.4.2 Differences between diameter measurements

The difference between any two of the four measurements stated in EN 12385-1:2002+A1:2008, 6.3.1 at a load equivalent to 5 % or 10 % of the minimum breaking force shall not exceed the values given in Table 5 for diameter ovality.

The difference between the average of the two measurements taken at each of the two positions stated in EN 12385-1:2002+A1:2008, 6.3.1 at a load equivalent to 5 % or 10 % of the minimum breaking force shall not exceed the values given in Table 5 for average diameter variation.

Table 5 — Differences between diameter measurements

Nominal rope diameter mm	Diameter ovality as percentage of nominal diameter	Average diameter variation as percentage of nominal diameter
< 8	4	3
8 and greater	3	2
NOTE The values in the table apply irrespective of the type of core in the rope.		

5.5 Breaking force

The breaking force shall be specified only as minimum breaking force.

The values of minimum breaking force for the more common classes and grades of rope shall be not less than those given in Tables 6, 7, 8, 9 and 10. For intermediate rope diameters, the values shall be not less than those obtained using the formula given in Annex A with the factors given in the tables.

NOTE Refer to the definitions given in EN 12385-2:2002+A1:2008 for derivation of the formula for calculation of minimum breaking force.

5.6 Designation and classification

Rope designation and classification shall conform to EN 12385-2:2002+A1:2008.

6 Verification of safety requirements and /or measures

6.1 General

Verification of safety requirements and/or measures shall be in accordance with that given in EN 12385-1:2002+A1:2008, Clause 6 and the additional verification given in 6.2 to 6.5 below.

6.2 Lubricant

Compliance with the lubricant requirements shall be through a visual verification of the inspection documents supplied with the lubricant.

6.3 Lubrication

Compliance with the lubrication requirements shall be through a visual verification.

6.4 Construction

Compliance with the construction requirements shall be through a visual verification.