



**SLOVENSKI STANDARD**  
**SIST EN 12385-10:2004**  
**01-junij-2004**

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Steel wire ropes - Safety - Part 10: Spiral ropes for general structural applications

Drahtseile aus Stahldraht - Sicherheit - Teil 10: Spiralseile für den allgemeinen Baubereich

Câbles en acier - Sécurité - Partie 10: Câbles spiraloidaux pour applications générales de structures

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**ICS:**

77.140.65	Jeklene žice, jeklene vrvi in verige	Steel wire, wire ropes and link chains
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ICS 77.140.65

English version

## Steel wire ropes - Safety - Part 10: Spiral ropes for general structural applications

Câbles en acier - Sécurité - Partie 10: Câbles spiraloïdaux  
pour applications générales de structures

Drahtseile aus Stahldraht - Sicherheit - Teil 10: Spiralseile  
für den allgemeinen Baubereich

This European Standard was approved by CEN on 3 November 2003.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

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## Foreword

This document (EN 12385-10:2003) 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 June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

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, see informative annex ZA, which is an integral part of this document.

The other Parts of this European Standard are:

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 5: Stranded ropes for lifts

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 1 of this European Standard provides the general requirements for each of the other Parts. For the relationship of this Part with EU Directives, see informative annex ZA of Part 1 and informative annex ZA of this part of the standard.

This is the first edition of this Part of this European Standard.

Annex A is normative. The annexes B, C and D are informative.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

This Part of this European Standard has been prepared to be a harmonized standard to provide one means of conforming to the essential safety requirements of the Machinery Directive.

This European Standard is a type C standard as stated in EN 1070.

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.

Specifiers, purchasers and users should recognise that spiral ropes for structural purposes are, more often than not, specially designed by the rope manufacturer to meet particular conditions.

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## 1 Scope

This Part of this European Standard specifies the additional materials, manufacturing and testing requirements to those given in Part 1 for spiral ropes incorporating zinc or zinc alloy coated wires for general structural applications.

This standard deals with all significant hazards, hazardous situations and events relevant to spiral ropes for general structural applications, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see clause 4 of EN 12385-1:2002).

This standard applies to spiral ropes for general structural applications which are manufactured after the date of its publication.

NOTE For information only, typical breaking forces for both full-locked coil rope and spiral strand rope are given in annexes B and C for some of the more common sizes.

## 2 Normative references

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 292-1:1991, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology.*

EN 292-2, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications.*

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EN 1070:1998, *Safety of machinery — Terminology.*

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

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 12385-1:2002, *Steel wire ropes — Safety — Part 1: General requirements.*

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

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 292-1:1991, EN 1070:1998 and EN 12385-2:2002 apply.

## 4 List of significant hazards

For the purposes of this European Standard, the hazards and associated requirements given in EN 292-2 and EN 12385-1 apply.

## 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 European Standard.

### 5.2 Wire

#### 5.2.1 General

Wires before ropemaking, shall conform to the requirements given in 5.2.2 and 5.2.3 taking into account the wire, shape and class of coating.

#### 5.2.2 Round wires

Wires of class A coating shall conform to EN 10264-2; or alternatively, in the case of final hot zinc coated wires, meet the diameter, tensile strength and coating requirements given in EN 10264-2 and the ductility and adherence wraps and % total elongation at fracture properties given in annex A of this Part of the standard.

Wires of class B coating shall conform to EN 10264-2.

#### 5.2.3 Shaped wires

Wires of class A and B coatings shall conform to EN 10264-3.

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### 5.3 Rope manufacture

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#### 5.3.1 Wire joints

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There shall be no planned joints in the outer layer of wires in any individual in-service rope length or assembly.

In any individual in-service rope length or assembly, welds of finished wire in the outer layer shall be no closer than 10 lay lengths of each other and no weld shall be within one lay length of the entry point of the rope into the termination.

The tensile strength of the weld shall be at least 50 % of the tensile strength grade of the wire. This shall be verified by testing a sample weld made in accordance with the same method as used to join the wire(s) in the rope.

Outer wire joints shall be protected against corrosion by coating.

#### 5.3.2 Wire finish

The finish of the wires shall be either zinc or zinc alloy coated or a combination of both provided that in any one layer of wires the finish is the same.

NOTE The purchaser should specify any particular wire finish requirements, see Introduction.

### 5.4 Diameter

#### 5.4.1 Tolerance

When measured in accordance with 6.3.1 of EN 12385-1:2002 the measured diameter shall be within 0 % and +3 % of the nominal diameter.

NOTE Specifiers, purchasers and users should recognize that spiral ropes for structural applications are, more often than not, specially designed by the rope manufacturer to meet particular conditions and particular attention should be given to the selection of the correct size of rope and associated diameter tolerance for compatibility with other components, such as sockets.



#### 5.4.2 Differences between diameter measurements

The difference between any two of the four measurements taken in accordance with 6.3.1 of EN 12385-1:2002 shall not exceed 2 % of the nominal rope diameter.

#### 5.5 Breaking force

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

The specified minimum breaking force value for a given rope size, construction and grade shall be determined by the rope manufacturer.

NOTE Typical minimum values of breaking force for particular constructions of locked coil and spiral strand are given in annex B and annex C respectively.

The sampling and acceptance criteria for breaking force testing for all sizes of rope shall be in accordance with the alternative requirements given in A.2 of EN 12385-1:2002.

#### 5.6 Designation and classification

Rope designation and classification shall conform to EN 12385-2.

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## Annex A (normative)

### Ductility and adherence wraps and % total elongation at fracture properties of hot zinc coated round wires

#### A.1 Ductility wraps

Wires shall be capable of being wrapped in a close helix of at least 4 turns around a mandrel equal in diameter to those values listed in Table A.1 without fracturing.

**Table A.1 — Mandrel diameters for ductility wrap test**

Wire diameter (mm)		Mandrel diameter (2d = 2 × wire diameter) (mm)			
Including	Excluding	Up to and including wire tensile strength grade 1570 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1670 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1770 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1960 N/mm <sup>2</sup>
2,00	2,50	2d	2d	3d	4d
2,50	3,00	2d	2d	3d	4d
3,00	4,00	2d	3d	3d	4d
4,00	5,00	3d	3d	3d	4d
5,00	6,00	3d	3d	3d	4d
6,00	7,00	3d	3d	4d	4d

#### A.2 Adherence wraps

Wires shall be capable of being wrapped in a close helix of at least 4 turns around a mandrel equal in diameter to those values listed in Table A.2. The coating shall remain firmly adherent without cracking or flaking, such that it cannot be removed by rubbing with the finger.

**Table A.2 — Mandrel diameters for adherence wrap test**

Wire diameter (mm)		Mandrel diameter (2d = 2 × wire diameter) (mm)			
Including	Excluding	Up to and including wire tensile strength grade 1570 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1670 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1770 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1960 N/mm <sup>2</sup>
2,00	2,50	3d	3d	4d	5d
2,50	3,00	4d	4d	4d	5d
3,00	4,00	4d	4d	5d	5d
4,00	5,00	5d	5d	5d	5d
5,00	6,00	5d	5d	5d	5d
6,00	7,00	5d	5d	6d	6d

### A.3 Percentage total elongation at fracture ( $A_t$ )

The total elongation (elastic and plastic) of the gauge length at fracture, when tested in accordance with the method for tensile strength specified in EN 10264-1, shall be expressed as a percentage of the original gauge length.

NOTE This test may be carried out as part of the wire tensile test.

The % elongation tests shall be carried out over a gauge length of 250 mm to achieve the minimum values given in Table A.3.

**Table A.3 — Percentage total elongation at fracture**

Wire diameter mm		Percentage total elongation at fracture			
Including	Excluding	Up to and including wire tensile strength grade 1570 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1670 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1770 N/mm <sup>2</sup>	Up to and including wire tensile strength grade 1960 N/mm <sup>2</sup>
2,00	2,50	4,0	3,5	3,0	3,0
2,50	3,00	4,0	4,0	3,0	3,0
3,00	4,00	4,0	4,0	3,0	3,0
4,00	5,00	4,0	4,0	3,0	3,0
5,00	6,00	4,0	4,0	3,5	3,5
6,00	7,00	4,0	4,0	3,5	3,5

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