



SLOVENSKI STANDARD
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Tekstilne obese - Varnost - 4. del: Dvigalne obese iz naravnih in umetnih vlaken za splošno uporabo

Textile slings - Safety - Part 4: Lifting slings for general service made from natural and man-made fibre ropes

Textile Anschlagmittel - Sicherheit - Teil 4: Anschlag-Faserseile für allgemeine Verwendung aus Natur- und Chemiefaserseilen

Elingues textiles - Sécurité - Partie 4: Elingues de levage en cordage en fibres naturelles et chimiques pour service général

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ICS:

53.020.30 Pribor za dvigalno opremo Accessories for lifting equipment

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1492-4:2004+A1

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Textile slings - Safety - Part 4: Lifting slings for general service made from natural and man-made fibre ropes

Elingues textiles - Sécurité - Partie 4: Elingues de levage
en cordage en fibres naturelles et chimiques pour service
général

Textile Anschlagmittel - Sicherheit - Teil 4: Anschlag-
Faserseile für allgemeine Verwendung aus Natur- und
Chemiefaserseilen

This European Standard was approved by CEN on 12 February 2004 and includes Amendment 1 approved by CEN on 11 September 2008.

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 CEN 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 CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 1492-4:2004+A1:2008) 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 May 2009 and conflicting national standards shall be withdrawn at the latest by December 2009.

This document supersedes EN 1492-4:2004.

This document includes Amendment 1, approved by CEN on 2008-09-11.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A_1}$ $\boxed{A_1}$.

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).

$\boxed{A_1}$ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. $\boxed{A_1}$

This European Standard is one of a series of standards related to safety for textile slings as listed below:

- Part 1: Specification for flat woven webbing slings, made of man-made fibres, for general purpose use
- Part 2: Specification for roundslings, made of man-made fibres, for general purpose
- Part 4: Specification for lifting slings for general service made from natural and man-made fibre rope

In this standard:

Annex A is normative, and gives the requirements for information on use and maintenance to be provided by the manufacturer with fibre rope slings conforming to this standard.

Annex B is informative, and gives the working load limits for different configurations and types of material for fibre rope slings to this standard.

Annex C is informative, and provides some detailed information for use and maintenance which may be appropriate in compiling the information in accordance with annex A.

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, 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 and United Kingdom.

EN 1492-4:2004+A1:2008 (E)**Introduction**

This European Standard has been prepared to be a harmonized standard providing one means of complying with the essential safety requirements of the Machinery Directive and associated EFTA regulations.

This European Standard is a type C standard as specified in EN ISO 12100-2. The lifting accessories concerned and the extent to which hazards are covered is indicated in the scope of this standard.

NOTE For hazards that are not covered by this standard, lifting accessories should be in accordance with EN ISO 12100-2.

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1 Scope

This European Standard specifies the requirements related to safety, including methods of rating and testing single-, two-, three-, four-leg and endless slings, with or without fittings, made of sisal, hemp and manila 3- and 4-strand laid construction natural fibre ropes and polyamide, polyester and polypropylene 3- and 4-strand laid construction and 8-strand plaited construction man-made fibre ropes having a reference number in the range of 16 to 48 inclusive.

The fibre rope slings covered by this part of EN 1492 are intended for general purpose lifting operations, i.e. when used for lifting objects, materials or goods which require no deviations from the requirements, safety factors or working load limits specified. Lifting operations not covered by this standard would include the lifting of persons, potentially dangerous materials such as molten metal and acids, glass sheets, fissile materials, nuclear reactors and where special conditions apply.

Fibre rope slings conforming to this European Standard are suitable for use and storage in the following temperature ranges:

- a) polyester and polyamide -40°C to 100°C,
- b) manila, sisal, hemp and polypropylene -40°C to 80°C.

This European Standard does not apply to fibre rope sling assemblies rated by the trigonometric method.

This European Standard deals with the technical requirements to minimize the hazards listed in clause 4 which can arise during the use of fibre rope slings when carried out in accordance with the instructions and specification given by the manufacturer or authorized representative.

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 696, *Fibre ropes for general service – Polyamide*

EN 697, *Fibre ropes for general service – Polyester*

EN 698, *Fibre ropes for general service – Manila and sisal*

EN 699, *Fibre ropes for general service - Polypropylene*

EN 1050:1996, *Safety of machinery – Principles of risk assessment*

EN 1261, *Fibre ropes for general service - Hemp*

EN 1677-1, *Components for slings – Safety – Part 1: Forged steel components, Grade 8*

EN 1677-2, *Components for slings – Safety – Part 2: Forged steel lifting hooks with latch, Grade 8*

EN 1677-3, *Components for slings – Safety – Part 3: Forged steel self-locking hooks, Grade 8*

EN 1677-4, *Components for slings – Safety – Part 4: Links, Grade 8*

EN 1677-5, *Components for slings – Safety – Part 5: Forged steel lifting hooks with latch, Grade 4*

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EN 1677-6, *Components for slings – Safety – Part 6: Links, Grade 4*

EN 13411-1, *Terminations for steel wire ropes – Safety – Part 1: Thimbles for steel wire rope slings*

EN ISO 1968:2004, *Fibre ropes and cordage - Terms and definitions (ISO 1968:2004)*

EN ISO 7500-1:1999, *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines (ISO 7500-1:1999)*

EN ISO 12100-2, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003)*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 1968:2004 and the following apply.

3.1**fibre rope sling**

flexible sling comprising one or more parts of identical fibre rope, terminating in spliced eyes with or without thimbles and fittings, or in the case of an endless sling, joined to itself with a splice

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3.2**multi-leg sling**

fibre rope sling assembly, consisting of two three or four identical legs attached to a master link

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3.3**splice**

specified method of laying the tail end strands of the rope into the strands of the standing part of the rope to form an eye or join the ends of the rope together

3.4**soft eye**

eye made by forming the end of the rope into a loop and by splicing the free end to the standing part

3.5**thimble or hard eye**

spliced eye containing a rigid thimble

3.6**thimble**

rigid, shaped component for insertion into an eye for the purpose of protecting the eye from contact damage, abrasion and deformation, see Figure 1



Figure 1 — Thimble

3.7**fitting**

loadbearing metal component, designed to be fitted and supplied as part of the sling, so as to permit the sling to be attached to other lifting accessories or connected to the load

NOTE Thimbles are not included within the term 'fitting'.

3.8**master link**

link, or link assembly, forming the upper terminal fitting of a multi-leg sling assembly by means of which the sling assembly is attached to the hook of a crane, other lifting machine or accessory

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3.9**reference number**

number quoted in documentation which specifies the mass/metre, breaking force and other parameters of the fibre rope. The reference number corresponds to the approximate diameter in millimetres; minimum breaking force in daN.

NOTE See EN 696, 697, 698, 699 and 1261.

3.10**nominal diameter**

specified diameter of the rope, which is usually used as the reference value for a given product

3.11**nominal length**

specified length of the sling, inclusive of fittings, from bearing point to bearing point

NOTE See figures 2 to 5.

3.12**effective working length (EWL)**

actual finished length of the fibre rope sling, inclusive of fittings, from bearing point to bearing point

EN 1492-4:2004+A1:2008 (E)**3.13****coefficient of utilization**

ratio of the specified tensile strength of the rope to the WLL of the single part of spliced rope, taking into account the acceleration due to gravity ($9,80665 \text{ m/s}^2$) and is equal to 7

NOTE 1 Fittings may have a different coefficient of utilization from that of the rope to which they are connected.

NOTE 2 This term has the same meaning as the term 'working coefficient' used in the Machinery Directive.

3.14**Assembly Factor (A)**

factor used in the calculation of the WLL of the sling assembly that takes into account the assembly of the sling, the number of legs and the inclination angles (β), see Figure 10

3.15**Mode Factor (M)**

factor to be applied by the user to the WLL of a fibre rope sling in order to arrive at the maximum load that maybe lifted for a given mode of use

3.16**Working load limit (WLL)**

maximum mass which a fibre rope sling is designed to sustain in straight pull or at the rated angle, in general service

3.17**competent person**

designated person, suitably trained and qualified by knowledge and practical experience, and with the necessary instructions to enable the required tests and examination to be carried out

4 Hazards

The accidental release of a load, or release of a load due to failure of a component puts at risk, either directly or indirectly, the safety or health of those persons within the danger zone. In order to provide the necessary strength and durability of lifting accessories this part of EN 1492 specifies requirements for the design, manufacture and testing to ensure the specified levels of performance are met.

Endurance has not been identified as a hazard when fibre rope slings having the specified levels of performance given in this part of EN 1492 are used in general lifting service.

Since failure can be caused by the incorrect choice of WLL and specification of lifting accessory. This Part of EN 1492 also gives the requirements for marking and the manufacturer's certificate.

Aspects of safe use associated with good practice are given in annex A (normative) and annex C (informative).

Table 1 lists those hazards in so far as they are dealt with in this standard that require action to reduce those risks identified by risk assessment as being specific and significant for fibre rope slings made of sisal, hemp, manila, polyamide, polyester and polypropylene.

Table 1 — Hazards and associated requirements

Hazards identified in annex A of EN 1050: 1996		Relevant clause of annex A of EN ISO 12100-2:2003	Relevant clause/sub-clause of this part of EN 1492
1.e)	Mechanical hazard due to inadequacy of strength	1.3.2	5
		4.1.2.3	5
		4.1.2.5	5
		4.2.4	6
		1.7.3	7
		4.3.2	7
		4.2.4	8
15	Error of fitting hazard	1.5.4	5
17	Falling or ejected objects hazard	1.3.3	annex A
26	Insufficient instruction for the driver/operator	1.7.4	9, annex A
		4.4.1	9, annex A
27.1.5	Inadequate holding devices/accessories hazard	4.4.1	5.7
27.6	Inadequate selection of lifting accessories hazard	4.1.2.5	5.7 and 6
		4.3.2	7

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5 Safety requirements

5.1 Materials

The fibre rope from which the sling is manufactured shall be from one of the materials and to the specification given in Table 2.

Table 2 — Types of fibre rope for sling manufacture

Type of fibre rope	Specification
Manila (Ma)	EN 698
Hemp (Ha)	EN 1261
Sisal (Si)	EN 698
Polyamide (PA)	EN 696
Polyester (PES)	EN 697
Polypropylene (PP)	EN 699

NOTE 1 The definitions of these fibres are given in ISO 2076 and ISO 6938. The constituent materials may be determined in accordance with ISO 1833.

NOTE 2 Attention is drawn to the differing resistance of fibres to chemicals, which is summarized in annex C.

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5.2 General requirements for types of fibre rope sling

5.2.1 Single leg sling

A single leg sling shall be formed from a single piece of rope and shall have eyes, with or without thimbles and fittings, spliced at each end. Figure 2 shows three typical examples of single leg slings.

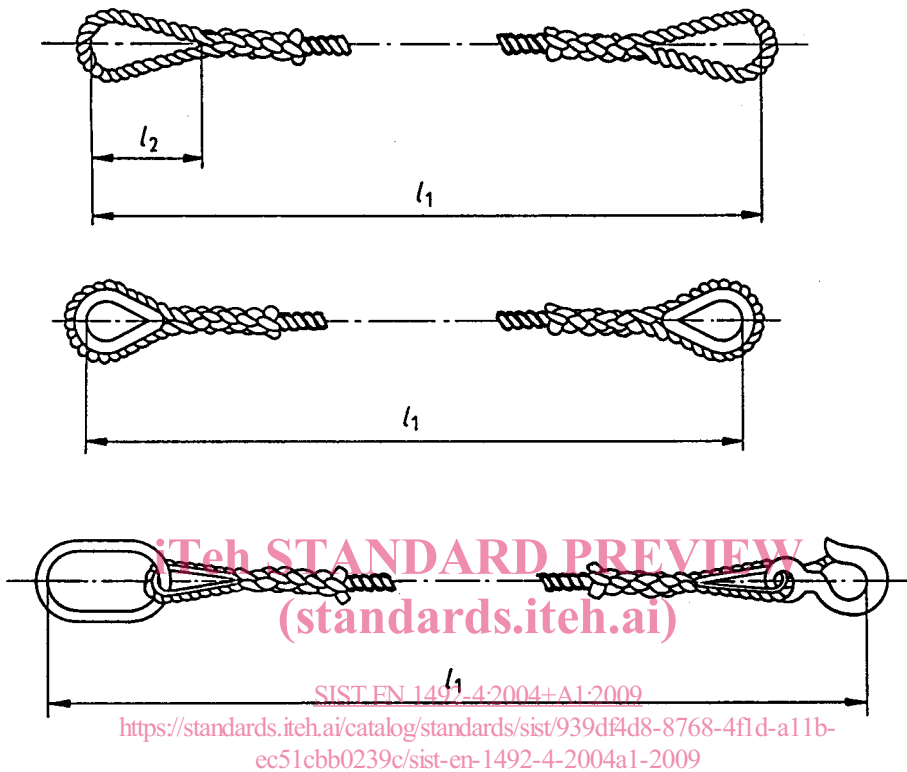


Figure 2 — Typical single leg slings

5.2.2 Endless sling

An endless sling shall be formed from a single piece of rope and shall have the ends joined together by a single splice. Figure 3 shows an endless sling.

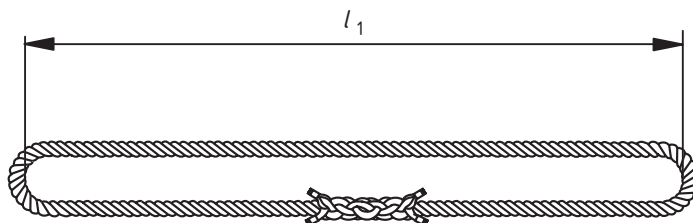
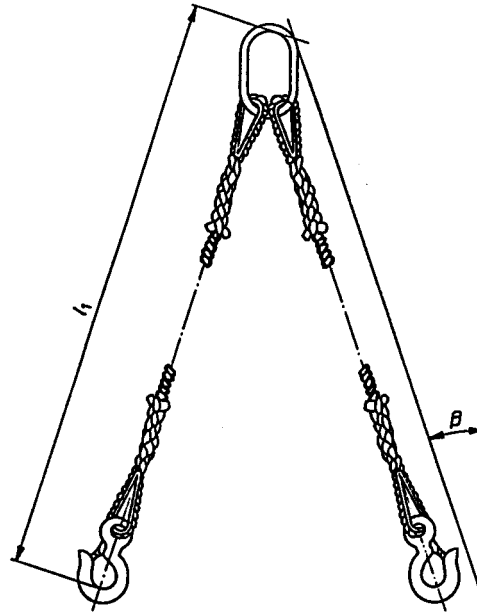


Figure 3 — Endless sling

Alternatively, an endless sling shall be laid as a grommet from a single strand of rope (see 5.5.5).

5.2.3 Two leg sling

A two leg sling shall comprise two identical sling legs, with or without thimbles and terminal fittings; the eye of one end of each leg shall be made around a master link. Figure 4 shows a typical two leg sling.



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 Figure 4 — Typical two leg sling
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5.2.4 Three and four leg slings

A four leg sling shall comprise four identical sling legs, with or without thimbles and terminal fittings, the eye of one end of each leg shall be made around an intermediate link so that two legs are attached to each intermediate link. The intermediate links shall be attached to a master link. Three leg slings shall be produced in the same way, but two legs shall be attached to one intermediate link and one leg to the other. Figure 5 shows a typical four leg sling.