

SVENSK STANDARD

SS-EN 13411-5+A1:2008

Fastställt/Approved: 2008-10-24

Publicerad/Published: 2008-12-01

Utgåva/Edition: 1

Språk/Language: engelska/English

ICS: 14.270; 21.060.70; 53.020.30; 77.140.99

Lininfästningar för ställinor – Säkerhet – Del 5: Bygellås

Terminations for steel wire ropes – Safety – Part 5: U-bolt wire rope grips

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Denna standard ersätter SS-EN 13411-5, utgåva 1.

The European Standard EN 13411-5:2003+A1:2008 has the status of a Swedish Standard. This document contains the official English version of EN 13411-5:2003+A1:2008.

This standard supersedes the Swedish Standard SS-EN 13411-5, edition 1.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13411-5:2003+A1

October 2008

ICS 21.060.70; 53.020.30

Supersedes EN 13411-5:2003

English Version

Terminations for steel wire ropes - Safety - Part 5: U-bolt wire rope grips

Terminaisons pour câbles en acier - Sécurité - Partie 5:
Serre-câbles à étrier en U

Endverbindungen für Drahtseile aus Stahldraht - Sicherheit
- Teil 5: Drahtseilklemmen mit U-förmigem Klemmbügel

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Foreword

This document (EN 13411-5:2003+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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document supersedes EN 13411-5:2003.

This document includes Amendment 1, approved by CEN on 2008-09-18.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

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).

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. A1

Annexes A and B are informative.

This European Standard also contains a Bibliography.

The other Parts of this European Standard are:

- Part 1: Thimbles for steel wire rope slings
- Part 2: Splicing of eyes for wire rope slings
- Part 3: Ferrules and ferrule-securing
- Part 4: Metal and resin socketing
- Part 6: Asymmetric wedge socket
- Part 7: Symmetric wedge socket

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.

Introduction

This European Standard has been prepared to provide a means of conforming with the essential safety requirements of the Machinery Directive and associated EFTA Regulations.

Purchasers ordering to this standard are advised to specify in their purchasing contract that the supplier operates a quality assurance system applicable to the relevant part of this standard (e.g. EN ISO 9001) to ensure themselves that products claimed to comply consistently achieve the required level of quality.

1 Scope

This European Standard specifies the minimum requirements for U-bolt wire rope grips manufactured from ferrous materials and the safe behaviour of eye terminations secured by U-bolt wire rope grips for use as intended by the manufacturer.

Suitable uses include suspending static loads and single use lifting operations which have been assessed by a competent person taking into account appropriate safety factors.

U-bolt wire rope grips are not suitable for use with spiral ropes.

This standard does not cover U-bolt wire rope grips as the primary securing devices on mine hoists, crane hoists or eye terminations for slings for general lifting service.

Examples of grips together with fitting instructions are given in informative annexes A and B.

The hazards covered by this standard are identified in clause 4.

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 292-2:1991, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications.*

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

EN 1562, *Founding – Malleable cast irons.*

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

EN 12385-2:2003, *Steel wire ropes – Safety – Part 2: Definitions, designation and classification.*

EN 20898-2, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values – Coarse thread (ISO 898-2:1992).*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs (ISO 898-1:1999).*

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EN ISO 4759-1, *Tolerances for fasteners Part 1: Bolts, screws, studs and nuts - Product grades A, B and C (ISO 4759-1:2000)*.

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

3 Terms and definitions

For the purposes of this European Standard the terms and definitions given in EN 12385-2:2003 and the following apply:

3.1 U-bolt wire rope grip

U-bolt wire rope grip: assembly consisting of a U-bolt, bridge and nuts that allow for two parts of rope to be pressed together when the nuts are tightened

3.2 grip-secured eye termination

grip-secured eye termination: eye termination secured by wire rope grips fitted in accordance with the manufacturer’s instructions

4 List of hazards

Accidental release of a load, or release of a load due to failure of a wire rope grip puts at risk either directly or indirectly the safety or health of those persons within the danger zone.

Temperature hazard is not covered as in use temperature is limited by the wire rope.

Table 1 contains those hazards that require action to reduce risk identified by risk assessment as being specific and significant for wire rope grips.

Table 1 — Hazards and associated requirements

Hazards identified in annex A of EN 1050:1996		Relevant clause of annex A of EN 292-2:1991	Relevant clause/subclause of this standard
1	Mechanical hazard due to inadequacy of strength	1.3.2 4.1.2.3 4.1.2.5 4.2.4 1.7.3 4.3.1 4.2.4	5 5 6 6
1.7	Puncture hazard	1.3	5
10.4	Errors of fitting hazard	1.5.4	7

5 Safety requirements and/or measures

5.1 Materials

5.1.1 U-bolt

Carbon steel with at least property class 5.8 but not more than property class 8.8 in accordance with EN ISO 898-1.

5.1.2 Bridge

Malleable cast iron grade W40-05 or B35-10 in accordance with EN 1562; or forged non-ageing carbon steel.

5.1.3 Nut

Carbon steel with at least property class 5 in accordance with EN 20898-2 and product grade A in accordance with EN ISO 4759-1.

5.2 Mechanical properties

5.2.1 Grip security/tensile efficiency of grip-secured eye termination

When tested in accordance with 6.2.2 the grip-secured eye termination shall withstand a force of at least 80% of the minimum breaking force of the rope held for 5 minutes without the rope slipping more than 1 mm at the grip-secured eye termination.

5.2.2 Pulsatory fatigue behaviour of grip-secured eye termination

When tested in accordance with 6.2.3 the grip-secured eye termination shall withstand a minimum of 20 000 cycles.

The same grip-secured eye termination subjected to the pulsatory test above shall then be tested in accordance with 6.2.2, after which the grips shall not exhibit any visible cracks, deformation or other damage.

6 Verification of safety requirements

6.1 Qualification of personnel

All testing and examination shall be carried out by a competent person.

6.2 Type testing

6.2.1 General

In order to prove the design, material and method of manufacture, testing shall be carried out on each class of rope for which the grips are designed. The grade of the rope shall be the highest for which the grips are designed.

Where grips are intended for use with single layer ropes with a fibre core and a steel core, testing shall be carried out on both.

At least three assemblies having a grip-secured eye termination at one end shall be tested.

NOTE The number of tests is regarded as two for assemblies having grip-secured eye terminations at both ends.