SLOVENSKI STANDARD
SIST EN 1677-4:2001+A1:2009

01-januar-2009

Sestavni deli obes - Varnost - 4. del: Členi, kakovostni razred 8

Components for slings - Safety - Part 4: Links, Grade 8

Einzelteile für Anschlagmittel - Sicherheit - Teil 4: Einzelglieder, Güteklasse 8

Accessoires pour élingues - Sécurité - Partie 4: Mailles, Classe 8

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN 1677-4:2000+A1:2008**

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

ICS:

53.020.30	Pribor za dvigalno opremo	Accessories for lifting equipment

SIST EN 1677-4:2001+A1:2009 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

SIST EN 1677-4:2001+A1:2009

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

SIST EN 1677-4:2001+A1:2009

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1677-4:2000+A1

November 2008

ICS 53.020.30

Supersedes EN 1677-4:2000

English Version

Components for slings - Safety - Part 4: Links, Grade 8

Accessoires pour élingues - Sécurité - Partie 4: Mailles, Classe 8

Einzelteile für Anschlagmittel - Sicherheit - Teil 4: Einzelglieder, Güteklasse 8

This European Standard was approved by CEN on 30 September 2000 and includes Amendment 1 approved by CEN on 9 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.

iTeh STANDARD PREVIEW

CEN members are the national standards bodies of 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.

(standards.iteh.ai)

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

© 2008 CEN All rights of exploitation in any form and by any means reserved worldwide for CEN national Members.

SIST EN 1677-4:2001+A1:2009

Contents

Page

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c0990e-b5af-4301-b51e-a7c60c244fc2/sist-en-1677-4-2001a1-2009

SIST EN 1677-4:2001+A1:2009

Foreword

This document (EN 1677-4:2000+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 1677-4:2000.

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

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

This European Standard 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⟩

iTeh STANDARD PREVIEW
(standards.iteh.ai)

It is a Part of a products standard related to safety for components for slings.

The other Parts of EN 1677 for components for slings are:

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60e244fc2/sist-en-1677-4-2001a1-2009

- Part 1: Forged steel components - Grade 8
- Part 2: Forged steel lifting hooks with latch - Grade 8
- Part 3: Forged steel self-locking hooks - Grade 8
- Part 5: Forged steel lifting hooks with latch - Grade 4
- Part 6: Links - Grade 4

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.

SIST EN 1677-4:2001+A1:2009

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.

The links covered by this Part of EN 1677 are normally supplied to be part of a sling, but they may also be used for other applications. In such instances it is important that the link design is checked to ensure its fitness for the intended use.

The extent to which hazards are covered is indicated in the scope. In addition, lifting equipment shall conform as appropriate to EN 292 for hazards that are not covered by this standard.

1 Scope

This part of EN 1677 specifies requirements for forged or welded steel master links, intermediate master links, master link assemblies and lower terminal links of grade 8 up to 132 t WLL, mainly for use in:

- chain slings according to EN 818-4
- steel wire rope slings
- textile slings according to EN 1492-1:2000, EN 1492-2:2000.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

intended for lifting objects, materials or goods.

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c0002f9fe2/sist-en-1677-4-2001a1-2009

This Part of EN 1677 does not apply to hand forged links.

The hazards covered by this Part of EN 1677 are identified in clause 4.

[A1) Annexes ZA and ZB give the relationship with EU-Directives. (A1]

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, Safety of machinery - Basic concepts - General principles for design - Part 1: Basic terminology, methodology

EN 292-2:1991/A1:1995, Safety of machinery - Basic concepts - General principles for design - Part 2: Technical principles and specifications (Amendment 1: 1995)

EN 818-4:1996, Short link chain for lifting purposes – Safety - Part 4: Chain slings - grade 8

EN 818-6:2000, Short link chain for lifting purposes – Safety - Part 6: Chain slings - Specification for information for use and maintenance to be provided by the manufacturer.

EN 1050:1996, Safety of machinery - Principles of risk assessment.

SIST EN 1677-4:2001+A1:2009

EN 1492-1:2000, Textile slings – Safety - Part 1: Flat woven webbing slings made of man-made fibres

EN 1492-2:2000, Textile slings – Safety - Part 2: Round slings made of man-made fibres

EN ISO 9002:1994, Quality systems - Model for quality assurance in production, installation and servicing

EN 10002-2:1991, Metallic materials - Tensile test - Part 2: Verification of the force measuring system of the tensile testing machine

EN 10025:1990/A1:1993, Hot rolled products of non-alloy structural steels — Technical delivery conditions

EN 10228-1:1999, Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection

EN 10228-2:1998, Non-destructive testing of steel forgings - Part 2: Penetrant testing

EN 45012, General criteria for certification bodies operating quality system certification

ISO 643 Steels, Micrographic determination of the ferritic or austenitic grain size

3 Terms and definitions

For the purposes of this Part of EN 1677, the following terms and definitions apply.

3.1
working load limit (WLL)
maximum mass that a link is authorized to sustain in general lifting service.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

NOTE This term has the same meaning as the term maximum working load used in annex A of EN 292-2:1991/A1:1995.

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

3.2
manufacturing proof force (MPF)
force applied to the link during the manufacturing proof test.

3.3
breaking force (BF)
maximum force reached during the static tensile test of the link at the end of which the link fails to retain the load.

3.4
sling
assembly consisting of chain, wire rope or textile joined to upper and lower terminals suitable for attaching loads to the hook of a crane or other lifting machine.

3.5
master link
link forming the upper terminal of a sling by means of which the sling is attached to the hook of a crane or other lifting machine.

3.6
intermediate master link
link used to connect one or two legs of a sling to a master link.

3.7
master link assembly
assembly consisting of a master link together with two intermediate master links.

SIST EN 1677-4:2001+A1:2009

3.8
lower terminal
link, hook or other device fitted at the end of a leg of a sling, remote from the master link or upper terminal.

3.9
traceability code
series of letters and/or numbers marked on a link that enable its manufacturing history, including the identity of the cast of steel used, to be traced.

3.10
lot
specified number of links from which samples are selected for testing purposes and that have been manufactured from the same cast of steel and subjected to the same heat treatment process.

3.11
integral joining device
means of connection that does not depend on welding and is integrated with the link.

3.12
total ultimate elongation
total extension at the point of fracture of the link expressed as a percentage of the internal length of the test sample.

3.13
competent person
designated person, suitably trained, qualified by knowledge and practical experience, and with the necessary instruction to enable the required test and examination to be carried out.

NOTE 4.18 of EN ISO 9002:1994 gives guidance on training.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

4 Hazards

Accidental release of a load or, release of a load due to failure of a link 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 links, this Part of EN 1677 gives requirements for the design, manufacture and testing to ensure that specified levels of performance are met.

Since failure can be caused by the incorrect choice of grade and specification of link, this Part of EN 1677 also gives requirements for marking and the manufacturer's certificate.

Errors in fitting can also lead to failure and this Part of EN 1677 contains dimensional requirements to allow correct fit.

Risk of injury due to sharp edges, sharp angles or rough surfaces when handling is also covered by this standard.

Those aspects of safe use associated with good practice are given in prEN 818-6:1999.

Table 1 contains those hazards which require action to reduce risk identified by risk assessment as being specific and significant for links of grade 8.

SIST EN 1677-4:2001+A1:2009

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/A1: 1995	Relevant clause/subclause of this Part of EN 1677
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 1.7.4	5 5 5 5 7 9
1.3	Cutting hazard	1.3.4	5.4
1.8	Friction or abrasion hazard	1.3.4	5.4
15	Error of fitting hazard	1.5.4	9 5.2

5 Safety requirements

5.1 Design

Links shall be either:

a) parallel-sided links produced by forging or welding;

iTeh STANDARD PREVIEW

NOTE Forged links may be with or without integral joining devices.

(standards.iteh.ai)

b) pear shaped links with integral joining devices (i.e. links with unequal radii at either end) produced by forging.

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c80c244fc2/sist-en-1677-4-2001a1-2009

Parts of integral joining devices, such as pins and their securing elements, shall be so designed and manufactured that, after assembly, no unintended displacement can occur.

NOTE The effects of wear, corrosion of securing elements or rough usage should be considered.

5.2 Dimensions

The internal dimensions of links covered by this part of EN 1677 shall be such as to ensure articulation so that the force imposed is transmitted in the intended direction.

The cross-section of links shall be so as to conform to 5.5.

NOTE This requirement permits a varying shape and area of cross-section.

The internal length and internal width of parallel sided master links shall be as in table 2.

The internal length of pear shaped master links shall be $53\sqrt{WLL}$ minimum (in mm) and the internal width at the widest point $27\sqrt{WLL}$ minimum (in mm) where the WLL is given in tonnes.

Table 2 — Internal length and width of parallel sided master links

WLL	minimum internal length	minimum internal width
≤ 25 t	58 $\sqrt{\text{WLL}}$	31,5 $\sqrt{\text{WLL}}$
> 25 t	45 $\sqrt{\text{WLL}}$	25 $\sqrt{\text{WLL}}$

SIST EN 1677-4:2001+A1:2009

5.3 Materials and heat treatment

5.3.1 Quality of material

5.3.1.1 General

Within the limitations given in 5.3.1.2 to 5.3.1.4, the manufacturer shall select the type of steel to be used so that the finished links, when suitably heat-treated, conform to the mechanical properties specified in this Part of EN 1677.

5.3.1.2 Type of steel

The steel shall be produced by an electric process or by an oxygen blown process.

5.3.1.3 Deoxidation

The steel shall be fully killed as defined in EN 10025:1990/A1:1993, stabilized against strain-age embrittlement, and have an austenitic grain size of 5 or finer when tested in accordance with ISO 643.

This shall be accomplished by ensuring that the steel contains sufficient aluminium (minimum 0,025 %) to permit the manufacture of links stabilized against strain age embrittlement during service.

5.3.1.4 Chemical composition

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5.3.1.4.1 General

The steel shall contain alloying elements in sufficient quantities so that the finished link, when heat treated in accordance with 5.3.2 not only conforms to the mechanical properties specified in this Part of EN 1677, but also possesses adequate low temperature ductility in order to work satisfactorily in the temperature range -40 °C to 400 °C.

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

The steel shall contain no more sulfur and phosphorus than the limits given in table 3.

Table 3 — Sulfur and phosphorous content

Element	Maximum mass content as determined by	
	Cast analysis %	Check analysis %
Sulfur	0,025	0,030
Phosphorus	0,025	0,030

5.3.1.4.2 Forged links

The steel shall contain at least two of the three alloying elements, in the minimum percentages shown in table 4.

Table 4 — Chemical composition - alloying elements

Element	Minimum mass content as determined by cast analysis % (m/m)
Nickel	0,40
Chromium	0,40
Molybdenum	0,15

SIST EN 1677-4:2001+A1:2009

5.3.1.4.3 Welded links

The steel shall contain nickel and at least one of the other elements in the minimum percentage shown in table 4.

5.3.2 Heat treatment

Each link shall be hardened from a temperature above the AC3 point and tempered before being subjected to the manufacturing proof force. The tempering temperature shall be a minimum of 400 °C.

The tempering conditions shall be at least as effective as a temperature of 400 °C maintained for a period of 1 h.

NOTE A method of verification is as follows. After the links have been reheated to and maintained for 1 h at 400 °C and then cooled to room temperature; they should conform in the finished condition to 5.5.2 and 5.5.3.

Surface hardening shall not be used.

5.4 Manufacturing methods and workmanship

5.4.1 Manufacture

5.4.1.1 Forged links

Each forged link shall be hot forged in one piece. Excess metal from the forging operation shall be removed cleanly leaving the surface free from sharp edges. After heat treatment, furnace scale shall be removed.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Edges of machined surfaces shall be rounded to ensure attainment of mechanical properties and to eliminate cutting edges.

SIST EN 1677-4:2001+A1:2009
https://standards.iteh.ai/catalog/standards/sist/26c6990e-b5af-4301-b51c-a7c60c244fc2/sist-en-1677-4-2001a1-2009

5.4.1.2 Welded links

Each welded link shall be manufactured from steel of weldable quality.

Welds shall be produced using the resistance butt or flash butt processes and shall be positioned in the centre of the leg of the link (see figure 1).

The steel in the length affected by welding shall not be displaced at any point so as to undercut the contours of the link. The weld shall be smoothly finished all round.

The length affected by welding shall not extend by more than 0,6 of the material diameter to either side of the centre of the weld.

If the link has a flattened section this shall be on the leg of the link opposite to the weld.

5.4.2 Surface finish

The finished condition of links shall include any surface finish.

NOTE Links are supplied in various surface finishes, e.g. de-scaled, electroplated or painted.