



SLOVENSKI STANDARD
SIST EN 818-3:2001+A1:2008
01-julij-2008

Short link chain for lifting purposes - Safety - Part 3: Medium tolerance chain for chain slings - Grade 4

Short link chain for lifting purposes - Safety - Part 3: Medium tolerance chain for chain slings - Grade 4

Kurzgliedrige Rundstahlketten für Hebezwecke - Sicherheit - Teil 3: Mitteltolerierte Rundstahlketten für Anschlagketten - Güteklasse 4

Chaînes de levage à maillons courts - Sécurité - Partie 3: Chaînes de tolérance moyenne pour élingues en chaînes - Classe 4

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English Version

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Classe 4

Kurzgliedrige Rundstahlketten für Hebezwecke - Sicherheit
- Teil 3: Mitteltolerierte Rundstahlketten für Anschlagketten
- Güteklasse 4

This European Standard was approved by CEN on 16 April 1999 and includes Amendment 1 approved by CEN on 10 February 2008.

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Foreword

This document (EN 818-3:1999+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of an identical text or by endorsement, at the latest by October 2008 and conflicting national standards shall be withdrawn at the latest by October 2008.

This document includes Amendment 1, approved by CEN on 2008-02-10.

This document supersedes EN 818-3:1999.

The start and finish of text introduced or altered by amendment is indicated in the text by tags \square_{A1} \square_{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).

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

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The other Parts of EN 818 are:

- Part 1 : General conditions of acceptance
- Part 2 : Medium tolerance chain for chain slings - Grade 8
- Part 4 : Chain slings - Grade 8
- Part 5 : Chain slings - Grade 4
- Part 6 : Chain slings - Specification for information for use and maintenance to be provided by the manufacturer
- Part 7 : Fine tolerance chains for hoists, Grade T (types T, DAT, DT).

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 be a harmonized standard to provide one means of conforming with the essential safety requirements of the Machinery Directive and associated EFTA regulations.

The Directive stipulates that where chain with welded links is used for lifting accessories it is to be of short link type and for the purposes of this standard this is chain having a ratio of nominal pitch to nominal size of 3:1.

The extent to which hazards are covered is indicated in the scope. In addition, lifting equipment shall conform as appropriate to A1 EN ISO 12100 A1 for hazards which are not covered by this standard.

A1 This standard is a Type C standard as stated in EN ISO 12100.

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 equipment that have been designed and built according to the provisions of this type C standard. A1

1 Scope

A1 This part of EN 818 specifies the requirements related to safety for short link chains, grade 4, of medium tolerance for use in chain slings to EN 818-4:1996+A1 and for general lifting purposes. A1 The standard is applicable to electrically welded round steel short link chains, conforming to A1 EN 818-1:1996+A1 A1 , which are intended for lifting objects, materials or goods.

The range of nominal sizes of chain covered by this Part of EN 818 is from 7 mm to 45 mm.

The hazards covered by this Part of EN 818 are identified in clause 4.

Annex A contains the bases for calculation of tabulated values for dimensions, working load limits and mechanical properties.

Annex B gives information on the mass/metre of chain.

Annex C gives an example of a designation system for chains of grade 4.

Annex ZA gives the relationship with EU Directives.

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.

A1 *deleted text* A1

A1 EN 818-1:1996+A1:2008 A1 , *Short link chain for lifting purposes - Safety – Part 1: General conditions of acceptance*

EN 818-6:2000+A1, *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 for risk assessment*

EN 10025 (all parts), *Hot rolled products of structural steels*

EN 10088-3, *Stainless steels – Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes*

EN ISO 12100-1, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

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

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

3 Terms and definitions

For the purposes of this document, the terms, definitions and symbols given in EN 818-1:1996+A1 and the following apply.

4 Hazards

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Accidental release of a load, or release of a load due to failure of lifting accessories such as chain slings or their component parts puts at risk either directly or indirectly the safety or health of those persons within the danger zone of lifting equipment.

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In order to provide the necessary strength and durability of lifting accessories this Part of EN 818 lays down requirements for the design, manufacture and testing to ensure that specified levels of performance are met.

Fatigue failure has not been identified as being a hazard when chain, having the specified levels of performance given in this Part of EN 818, is used in general lifting service.

Since failure can be caused by the incorrect choice of grade and specification of lifting accessories this Part of EN 818 also gives the requirements for marking and the manufacturer's certificate.

Those aspects of safe use associated with good practice are given in EN 818-6:2000+A1.

Table 1 contains those hazards, which require action to reduce risk identified by risk assessment as being specific and significant for short link chain (medium tolerance) grade 4.

Table 1 — Hazards and associated requirements

Hazards identified in annex A of EN 1050: 1996			Relevant clause/subclause of this Part of EN 818
1 e)	Mechanical hazard due to inadequacy of strength	\square_{A1} <i>deleted text</i> \square_{A1}	5 5 5 6 7 8 9

5 Safety requirements

5.1 General

The chain shall also conform to the appropriate requirements of \square_{A1} EN 818-1:1996+A1:2008 \square_{A1} .

5.2 Dimensions

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5.2.1 Nominal size of chain, d_n

The nominal size of chain shall be one of the sizes listed in table 2, column 1.

5.2.2 Tolerance on material diameter (except at the weld)

The tolerance on material diameter for each nominal size of chain shall be in accordance with table 2, column 2.

5.2.3 Weld diameter

The maximum diameter at the weld for each nominal size of chain shall be in accordance with table 2, column 3.

The thickness of the steel at the weld shall nowhere be less than the actual diameter of the steel adjacent to the weld.

5.2.4 Length dimensionally affected by welding

The length dimensionally affected by welding e (see figure 1 of \square_{A1} EN 818-1:1996+A1:2008 \square_{A1}) shall not extend by more than $0,6 d_n$ to either side of the centre of the link.

5.2.5 Pitch and widths

The dimensions of the pitch and widths of the individual links and chain shall be as specified in table 2, columns 4 to 8, and illustrated in figure 1 of \square_{A1} EN 818-1:1996+A1:2008 \square_{A1} .

Table 2 — Dimensions

Dimensions in millimetres							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nominal size d_n	Material diameter tolerance	Weld diameter d_s max.	Pitch			Internal width away from the weld w_1 min.	External width over the weld w_2 max.
			p_n	p_{max}	p_{min}		
7	± 0,28	7,7	21	21,6	20,4	9,1	25,9
8	± 0,32	8,8	24	24,7	23,3	10,4	29,6
10	± 0,4	11	30	30,9	29,1	13	37
13	± 0,52	14,3	39	40,2	37,8	16,9	48,1
16	± 0,64	17,6	48	49,4	46,6	20,8	59,2
18	± 0,9	19,8	54	55,6	52,4	23,4	66,6
19	± 1	20,9	57	58,7	55,3	24,7	70,3
20	± 1	22	60	61,8	58,2	26	74
22	± 1,1	24,2	66	68	64	28,6	81,4
23	± 1,2	25,3	69	71,1	66,9	29,9	85,1
25	± 1,3	27,5	75	77,3	72,8	32,5	92,5
26	± 1,3	28,6	78	80,3	75,7	33,8	96,2
28	± 1,4	30,8	84	86,5	81,5	36,4	104
32	± 1,6	35,2	96	98,9	93,1	41,6	118
36	± 1,8	39,6	108	111	105	46,8	133
40	± 2	44	120	124	116	52	148
45	± 2,3	49,5	135	139	131	58,5	167

5.3 Materials and heat treatment

5.3.1 A1 General

The steel shall either

- a) meet the requirements of 5.3.2 and be heat treated in accordance with 5.3.3 or
- b) meet the requirements of 5.3.4. A1

5.3.2 Quality of material

5.3.2.1 General

Within the limitations given in A1 5.3.2.2 to 5.3.2.4 A1 the chain manufacturer shall select the type of steel to be used so that the finished chain, when suitably heat-treated meets the mechanical properties specified in this Part of EN 818.

5.3.2.2 Type of steel

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

5.3.2.3 Deoxidation

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

5.3.2.4 Chemical composition

To ensure that chain is stabilized against strain age embrittlement during service the steel shall contain at least 0,025 % aluminium.

The steel shall contain no more sulfur and phosphorus content 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

The silicon content shall be as specified in table 4.

NOTE The purpose of this requirement is to limit the detrimental effect when the chain is used in a galvanizing bath.