



SLOVENSKI STANDARD
SIST EN 818-2:1999+A1:2008
01-julij-2008

Short link chain for lifting purposes - Safety - Part 2: Medium tolerance chain for chain slings - Grade 8

Short link chain for lifting purposes - Safety - Part 2: Medium tolerance chain for chain slings - Grade 8

Kurzgliedrige Rundstahlketten für Hebezwecke - Sicherheit - Teil 2: Mitteltolerierte Rundstahlketten für Anschlagketten - Güteklasse 8

Chaînes de levage à maillons courts - Sécurité - Partie 2: Chaîne de tolérance moyenne pour élingues en chaînes - Classe 8

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English Version

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Classe 8

Kurzgliedrige Rundstahlketten für Hebezwecke - Sicherheit
- Teil 2: Mitteltolerierte Rundstahlketten für Anschlagketten
- Güteklasse 8

This European Standard was approved by CEN on 7 March 1996 and includes Amendment 1 approved by CEN on 10 February 2008.

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Foreword

This document (EN 818-2:1996+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of an identical text or by endorsement, at the latest by October 2008 and conflicting national standards shall be withdrawn at the latest by October 2008.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 818-2:1996.

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

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

The other parts of EN 818 are:

Part 1: General conditions of acceptance

Part 3: Medium tolerance chain for chain slings - Grade 4

Part 4: Chain slings - Grade 8

Part 5: Chain slings - Grade 4

\square_{A1} Part 6: Chain slings - Specification for information for use and maintenance to be provided by the manufacturer \square_{A1}

\square_{A1} Part 7: Fine tolerance hoist chain, Grade T (Types T, DAT and DT) \square_{A1}

A further part or parts will cover fine tolerance chains for chain hoists and other lifting appliances.

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.

This 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 of this Part of EN 818. In addition, lifting equipment shall comply as appropriate with $\square A_1$ EN ISO 12100 $\square A_1$ for hazards which are not covered by this standard.

Annex C gives a designation system for recording the identifying features of grade 8 short link chain. Since this system is not widely used it has been included in this first edition of this standard as an informative annex, however, should its use become more generally accepted then the status of the information would need to be reviewed.

$\square A_1$ 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 build according to the provisions of this type C standard. $\square A_1$

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1 Scope

A1 This part of EN 818 specifies the requirements related to safety for short link chains, grade 8, of medium tolerance for use in chain slings according to **A1** EN 818-4:1996+A1 **A1** and for general lifting purposes. **A1** They are electrically welded round steel short link chains, heat treated and tested and complying with the general conditions of acceptance in **A1** EN 818-1:1996+A1 **A1**.

The range of nominal sizes of chain covered by this Part of EN 818 is from 4 mm to 45 mm.

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

The bases for calculation of tabulated values for dimensions, working load limits and mechanical properties are given in annex A.

Annex B gives information on weight/metre of chain.

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

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 revisions to or amendments 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 **A1**, *Short link chain for lifting purposes – Safety – Part 1: General conditions of acceptance*

A1 EN 818-6:2000+A1 **A1**, *Short link chain for lifting purposes – Safety – Part 6: Chain slings – Instructions for use and maintenance*

A1 EN 1050 **A1**, *Safety of machinery – Risk assessment*

A1 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)* **A1**

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

3 **A1** Terms and definitions **A1**

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

4 Hazards

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

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

Fatigue failure has not been identified as 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 Ⓐ) all those hazards Ⓐ), which require action to reduce risk identified by risk assessment as being specific and significant for short link chain (medium tolerance) grade 8 for lifting purposes.

Table 1 — Hazards and associated requirements

| Hazards identified in annex A of Ⓐ) EN 1050 Ⓐ) | | Relevant clause/sub-clause of this standard |
|--|---|---|
| Ⓐ) 1 e) Ⓐ) | Mechanical hazard due to inadequacy of strength <small>SIST EN 818-2:1999+A1:2008 https://standards.iteh.ai/catalog/standards/sist/6d9e0904-2999-46db-ad10-768f4af10aef/sist-en-818-2-1999a1-2008 Ⓐ) deleted text Ⓐ)</small> | 5 6 7 |

5 Safety requirements

5.1 General

The chain shall also comply with the appropriate requirements of Ⓐ) EN 818-1:1996+A1 Ⓐ).

5.2 Dimensions

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) 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 [A1](#) EN 818-1:1996+A1 [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 weld w_1 min | External width over the weld W_2 max |
| | | | p_n | p max | p min | | |
| 4 | $\pm 0,16$ | 4,4 | 12 | 12,4 | 11,6 | 5,2 | 14,8 |
| 5 | $\pm 0,2$ | 5,5 | 15 | 15,5 | 14,6 | 6,5 | 18,5 |
| 6 | $\pm 0,24$ | 6,6 | 18 | 18,5 | 17,5 | 7,8 | 22,2 |
| 7 | $\pm 0,28$ | 7,7 | 21 | 21,6 | 20,4 | 9,1 | 25,9 |
| 8 | $\pm 0,32$ | 8,8 | 24 | 24,7 | 23,3 | 10,4 | 29,6 |
| 10 | $\pm 0,4$ | 11 | 30 | 30,9 | 29,1 | 13 | 37 |
| 13 | $\pm 0,52$ | 14,3 | 39 | 40,2 | 37,8 | 16,9 | 48,1 |
| 16 | $\pm 0,64$ | 17,6 | 48 | 49,4 | 46,6 | 20,8 | 59,2 |
| 18 | $\pm 0,9$ | 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 | $\pm 1,1$ | 24,2 | 66 | 68 | 64 | 28,6 | 81,4 |
| 23 | $\pm 1,2$ | 25,3 | 69 | 71,1 | 66,9 | 29,9 | 85,1 |
| 25 | $\pm 1,3$ | 27,5 | 75 | 77,3 | 72,8 | 32,5 | 92,5 |
| 26 | $\pm 1,3$ | 28,6 | 78 | 80,3 | 75,7 | 33,8 | 96,2 |
| 28 | $\pm 1,4$ | 30,8 | 84 | 86,5 | 81,5 | 36,4 | 104 |
| 32 | $\pm 1,6$ | 35,2 | 96 | 98,9 | 93,1 | 41,6 | 118 |
| 36 | $\pm 1,8$ | 39,6 | 108 | 111 | 105 | 46,8 | 133 |
| 40 | ± 2 | 44 | 120 | 124 | 116 | 52 | 148 |
| 45 | $\pm 2,3$ | 49,5 | 135 | 139 | 131 | 58,5 | 167 |

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 it is the responsibility of the chain manufacturer to 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.

5.3.1.2 Type of steel

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

5.3.1.3 Deoxidation

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

5.3.1.4 Chemical composition

The steel shall contain alloying elements in sufficient quantities so that the finished chain, when heat treated in accordance with 5.3.2, complies not only with the mechanical properties specified in this Part of EN 818 but also possesses adequate low temperature ductility and toughness to provide resistance to impact loading.

The steel shall contain nickel and at least one of the other elements in the minimum percentages shown in table 3.

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Table 3 — Chemical composition-alloying elements

| Element | Minimum mass content % as determined by cast analysis |
|------------|---|
| Nickel | 0,40 |
| Chromium | 0,40 |
| Molybdenum | 0,15 |

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 sulphur and phosphorous content than the limits given in table 4.

Table 4 — Sulphur and phosphorous content

| Element | Maximum mass content % as determined by | |
|-------------|---|----------------|
| | Cast analysis | Check analysis |
| Sulphur | 0,025 | 0,030 |
| Phosphorous | 0,025 | 0,030 |

5.3.2 Heat treatment

All the chain 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 at least 400 °C.

The tempering conditions shall be at least as effective as a temperature of 400 °C maintained for a period of 1 h. This requirement is the responsibility of the chain manufacturer. When proposed for verification, sample chains shall be tested after they have been reheated to and maintained for 1 h at 400 °C and then cooled to room temperature, they shall comply with the requirements of 5.4.2 and 5.4.3.

5.4 Mechanical properties

5.4.1 Manufacturing proof force (MPF)

All the chain shall be subjected to the manufacturing proof force specified in table 5, column 3 for the appropriate nominal size of chain. (standards.iteh.ai)

5.4.2 Breaking force (BF) and total ultimate elongation (A)

Samples of chain in the finished condition shall have a breaking force at least equal to that specified in table 5, column 4 for the appropriate nominal size of chain. On completion of the static tensile test the total ultimate elongation as defined in \square_{A1} EN 818-1:1996+A1 \square_{A1} shall not be less than 20 %.

5.4.3 Bend deflection

Single link samples shall withstand the minimum deflection specified in table 5, column 5 for the appropriate nominal size of chain and shall be free from visible defects.