



SLOVENSKI STANDARD

SIST EN 818-1:1999

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Short link chain for lifting purposes - Safety - Part 1: General conditions of acceptance

Short link chain for lifting purposes - Safety - Part 1: General conditions of acceptance

Kurzgliedrige Rundstahlketten für Hebezwecke - Sicherheit - Teil 1: Allgemeine Abnahmebedingungen

Chaînes de levage a maillons courts - Sécurité - Partie 1: Conditions générales de réception

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EUROPEAN STANDARD

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English version

Short link chain for lifting purposes - Safety - Part 1: General conditions of acceptance

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Kurzgliedrige Rundstahlketten für Hebezwecke -
Sicherheit - Teil 1: Allgemeine
Abnahmebedingungen

This European Standard was approved by CEN on 1996-03-07. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard 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publication of an identical text or by endorsement, at the latest by October 1996, and conflicting standards shall be withdrawn at the latest by October 1996.

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).

The other Parts of EN 818 are:

Part 2: Medium tolerance chain for chain slings - Grade 8

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

Part 4: Chain slings - Grade 8

Part 5: Chain slings - Grade 4

Part 6: Chain slings - Instructions for use and maintenance

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

This is the first edition of this Part of EN 818.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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0 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.

Chains covered by this European Standard are divided into grades which relate to the mechanical properties of the finished product and not simply to the strength of the material. Each grade is identified by a letter for fine tolerance chain or number for medium tolerance chain in the series: M,4; P,5; S,6; T,8; V,10; (see note 1 to table 0). The letter or number indicates the mean stress at the minimum breaking force as shown in table 0.

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 EN 292 for hazards which are not covered by this standard.

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Table 0: Basis of grade symbols

Grade		Mean Stress at the specified minimum breaking force, N/mm ²
Fine tolerance	Medium tolerance	
M	4	400
P	5	500
S	6	630
T	8	800
V	10	1000

NOTE: Chains in all of these grades may not be the subjects of European Standards.

This grading system has also been applied to hooks, links, shackles and other accessories, indicating their strength compatibility with the appropriate grade of chain.

The stresses in a chain link are not uniform and at the extrados at the crown particularly, the maximum fibre stress is considerably greater than the mean stress obtained by dividing the force by the total cross-sectional area of both legs of the link.

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1 Scope

This Part of EN 818 specifies the general conditions of acceptance related to safety for electrically welded round steel short link chain for lifting purposes. It includes:

- a) medium tolerance chain for use in chain slings and for general lifting service and;
- b) fine tolerance chain for use with hoists and other similar lifting appliances.

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

Annex C gives proposals for clauses covering inspection, inspection marking and steel makers cast analysis which may be included in a form of contract.

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.

EN 292-1	Safety of machinery - Basic concepts - General principles for design Part 1: Basic terminology, methodology
EN 292-2: 1991	Safety of machinery - Basic concepts - General principles for design Part 2: Technical principles and specifications
EN 292-2: 1991 /A1:1995	Safety of machinery - Basic concepts - General principles for design Part 2: Technical principles and specifications (Amendment 1:1995)
prEN 818-6	Short link chain for lifting purposes - Safety Part 6: Chain slings - Instructions for use and maintenance
prEN 1050	Safety of machinery Risk assessment
EN 10002-2	Metallic materials - Tensile testing Part 2: Verification of the force measuring system of the tensile testing machines

EN ISO 9001: 1994 Quality systems - Model for quality assurance in design/development, production, installation and servicing

3 Definitions

For the purposes of this Part of EN 818, the following definitions apply:

3.1 nominal size (d_n): Nominal diameter of the round section steel wire or bar from which the chain is made.

3.2 material diameter (d_m): Diameter of the material in the chain link as measured.

3.3 weld diameter (d_s): Diameter at the weld as measured.

3.4 length dimensionally affected by welding (e): Length on either side of the centre of the link, affected by welding.

3.5 pitch (p): Internal length of a link as measured.

3.6 manufacturing proof force (MPF) of chain: Force to which during manufacture the whole of the chain is subjected.

3.7 breaking force (BF): Maximum force which the chain withstands during the course of a static tensile test to destruction.

3.8 working load limit (WLL) of chain: Maximum mass which the chain hanging vertically is authorized to sustain in general lifting service.

3.9 total ultimate elongation (A): Total extension at the point of fracture of the chain expressed as a percentage of the internal length of the test sample.

3.10 processing: Any treatment of the chain subsequent to welding, for example, heat treatment, polishing or dimensional calibration.

3.11 lot: Specified quantity from which test sample(s) is/are selected.

3.12 competent person: A designated person, suitably trained (see 4.18 of EN ISO 9001: 1994) qualified by knowledge and practical experience, and with the necessary instructions to enable the required examination to be carried out.

4 Hazards

The 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 life 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 for all types of chain having the specified levels of performance given in this Part of EN 818 when 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 manufacturers certificate.

The risk of injury due to sharp edges, sharp angles or rough surfaces when handling is also covered by this Part of EN 818.

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

Table 1 contains all the hazards, which require action to reduce risk identified by risk assessment as being specific and significant for short link chain.

Table 1: Hazards and associated requirements

Hazards identified in annex A of prEN 1050		Relevant clause of annex A of EN 292-2: 1991/A1: 1995	Relevant clause/sub-clause of this Part of EN 818
1.1.5	Mechanical hazard due to inadequacy of strength	1.3.2 } 4.1.2.3 } 4.1.2.4 } 4.1.2.5 } 4.2.4 } 1.7.3 } 4.3.1 } 4.2.4 } 1.7.4 }	5 6 7 8 9
1.3.3	Cutting hazard	1.3.4	5.2
1.3.8	Friction or abrasion hazard	1.3.4	5.2

5 Safety requirements

5.1 Dimensions

The material diameter (d_m), the pitch (p) and the width (w_1, w_2) of a chain link, and the multiple pitch length (l) of a chain (see figure 1) shall be as specified in the Part of EN 818 for the particular type (medium or fine tolerance) and grade of chain.

5.2 Material, manufacture and heat treatment

5.2.1 Material

The material shall comply with the requirements of the Part of EN 818 for the particular type and grade of chain.

Within these limitations it shall be the chain manufacturer's responsibility to select a steel such that the finished chain, suitably heat treated, complies with the specified mechanical properties in the relevant Part of EN 818.

Check analysis, when required, shall be carried out on the basis of a complete transverse section of the material of a link which may be selected from a test sample of chain which has been tested to destruction.

5.2.2 Welding and trimming

The weld shall be produced using the resistance butt or flash butt processes and shall be positioned in the centre of one leg of the link as shown in figure 1. The length dimensionally affected by welding shall not extend on either side of the centre of the leg by more than the amount specified in the Part of EN 818 for the particular type and grade of chain.

The weld shall be smoothly finished all round. The diameter of the material at the weld (d_s) shall nowhere exceed the dimensions specified in the Part of EN 818 for the particular type and grade of chain.

The steel in the length affected by welding shall nowhere be displaced so as to undercut the contours of the link.

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5.2.3 Heat treatment

All the chain shall be subjected to the appropriate heat treatment specified in the Part of EN 818 for the particular type and grade of chain, before the application of the manufacturing proof force.