

# INTERNATIONAL STANDARD

# ISO 1834

Second edition  
1999-10-15

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## Short link chain for lifting purposes — General conditions of acceptance

*Chaîne de levage à maillons courts — Conditions générales de réception*

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Reference number  
ISO 1834:1999(E)

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International Organization for Standardization  
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Printed in Switzerland

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1834 was prepared by Technical Committee ISO/TC 111, *Round steel link chains, chain slings, components and accessories*, Subcommittee SC 1, *Chains and chain slings*.

This second edition cancels and replaces the first edition (ISO 1834:1980), which has been technically revised.

Annex A forms a normative part of this International Standard.

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## Introduction

Chains covered by this International 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). The letter or number indicates the mean stress at the minimum breaking force as shown in Table 1.

**Table 1 — Basis of grade symbols**

Grade		Mean stress at the specified minimum breaking force  N/mm <sup>2</sup>
Fine tolerance	Medium tolerance	
M	4	400
P	5	500
S	6	630
T	8	800
V	10	1 000

NOTE Chains of these grades may all not be the subjects of International Standards.

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The stresses in a chain link are not uniform and at the extrados, particularly at the crown, 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.

Attention is drawn to the fact that repairs to chain should be carried out in accordance with ISO 3056, in the case of medium tolerance chain, and ISO 7592, in the case of fine tolerance chain.

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

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# Short link chain for lifting purposes — General conditions of acceptance

## 1 Scope

This International Standard specifies the general conditions of acceptance for electrically welded round steel short link chain for lifting purposes. It includes medium tolerance chain for use in chain slings and for general lifting purposes, and fine tolerance chain for use with chain hoists and other similar lifting appliances.

It is applicable to short link lifting chain in accordance with ISO 1835, ISO 3075, ISO 3076 and ISO 3077.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1835:—<sup>1)</sup>, *Short link chain for lifting purposes — Grade M(4), non-calibrated, for chain slings, etc.*

ISO 3075:—<sup>2)</sup>, *Short link chain for lifting purposes — Grade S(6), non-calibrated, for chain slings, etc.*

ISO 3076:—<sup>3)</sup>, *Short link chain for lifting purposes — Grade T(8), non-calibrated, for chain slings, etc.*

ISO 3077:—<sup>4)</sup>, *Short link chain for lifting purposes — Grade T(8), calibrated, for chain hoists and other lifting appliances.*

ISO 7500-1:1999, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system.*

## 3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

### 3.1

#### nominal size

$d_n$

nominal diameter of the round section steel wire or bar from which the chain is made

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<sup>1)</sup> To be published. (Revision of ISO 1835:1980)

<sup>2)</sup> To be published. (Revision of ISO 3075:1980)

<sup>3)</sup> To be published. (Revision of ISO 3076:1984)

<sup>4)</sup> To be published. (Revision of ISO 3077:1984)

**3.2  
material diameter**

$d_m$   
diameter of the material in the chain link as measured

**3.3  
weld diameter**

$d_w$   
measured diameter of the material at the weld (type 1 welded chain) or weld dimension perpendicular to the plane of the link (type 2 welded chain)

**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**

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**

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

EXAMPLES      heat treatment, polishing or dimensional calibration.

**3.11  
lot**

specified quantity from which test sample(s) is/are selected

**3.12  
competent person**

designated person, suitably trained qualified by knowledge and practical experience, and with the necessary instructions to enable the required tests and examination to be carried out

NOTE      ISO 9002:1994, 4.18 gives guidance on training.

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## 4 Dimensions

### 4.1 Material diameter

The material diameter of any section of a finished link shall be equal to the nominal size, within the tolerances stated in the International Standard for the particular chain. It shall be taken as the mean of two measurements of the section at right angles in the same plane. The measurements shall be made away from the weld and on the straight side of the link to avoid the effect of measuring any flattening of the section, due to contact with the forming mandrel.

### 4.2 Other link dimensions

The length and the width of a chain link, and the pitch and length of a number of links of fine tolerance chain, shall be as specified in the International Standard for that particular chain.

## 5 Material, heat treatment and manufacture

### 5.1 Material

The material shall conform to the requirements of the International Standard for the particular chain.

Within these limitations, the manufacturer shall select a steel such that the finished chain, complies with the mechanical properties specified in the International Standard for the particular chain.

### 5.2 Heat treatment

All chain shall be subjected to the heat treatment specified in the International Standard for the particular chains before the application of the manufacturing proof force.

### 5.3 Manufacture

#### 5.3.1 Workmanship

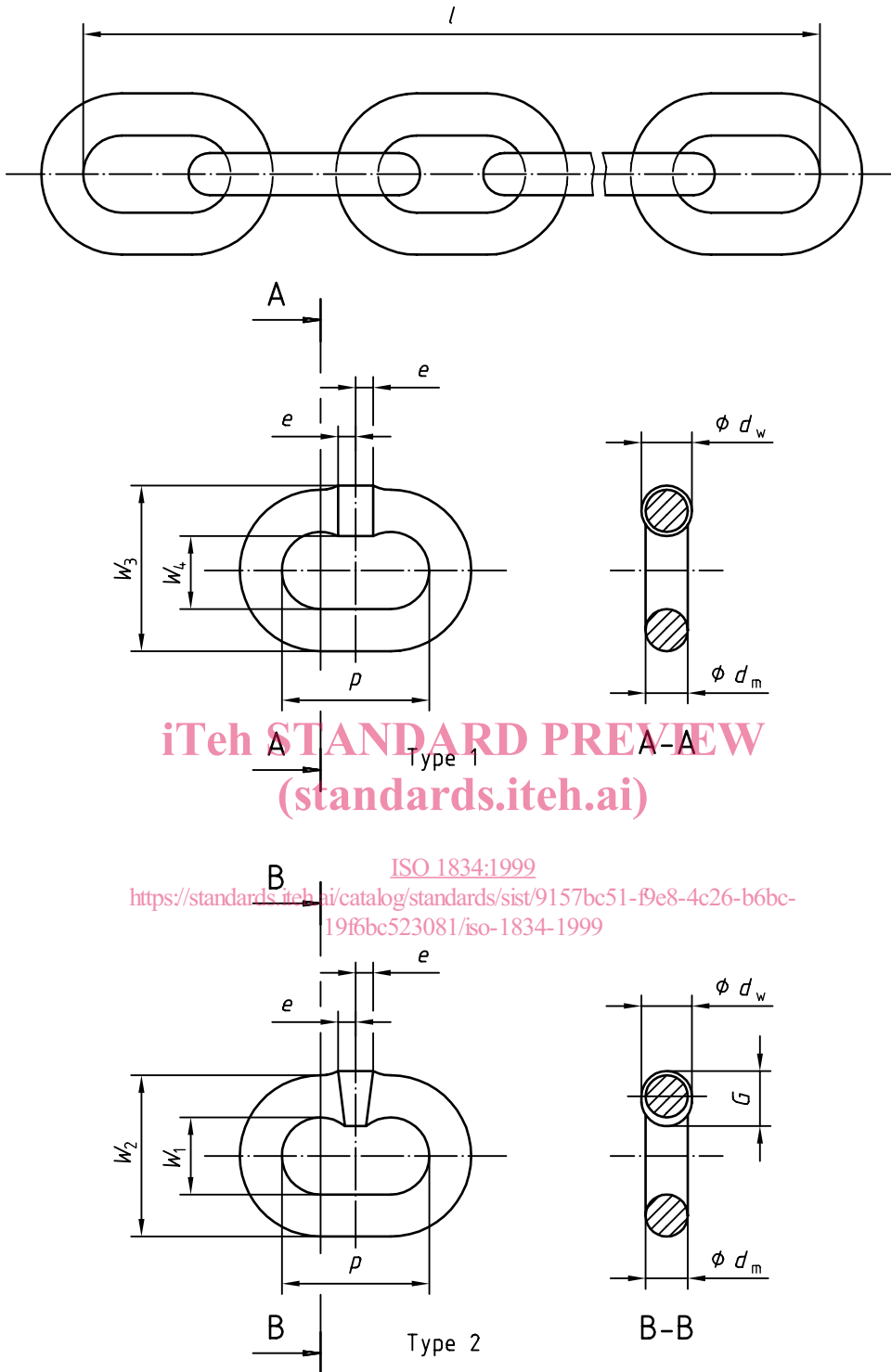
The weld, which may be of the smooth or asymmetric type shall be positioned in the centre of the link as shown in Figure 1. The material affected dimensionally by welding shall not extend on either side of the centre of the leg more than the amount specified in the International Standard for the particular chain.

The weld metal shall nowhere be displaced so that it undercuts the contours of the link (see Figure 2).

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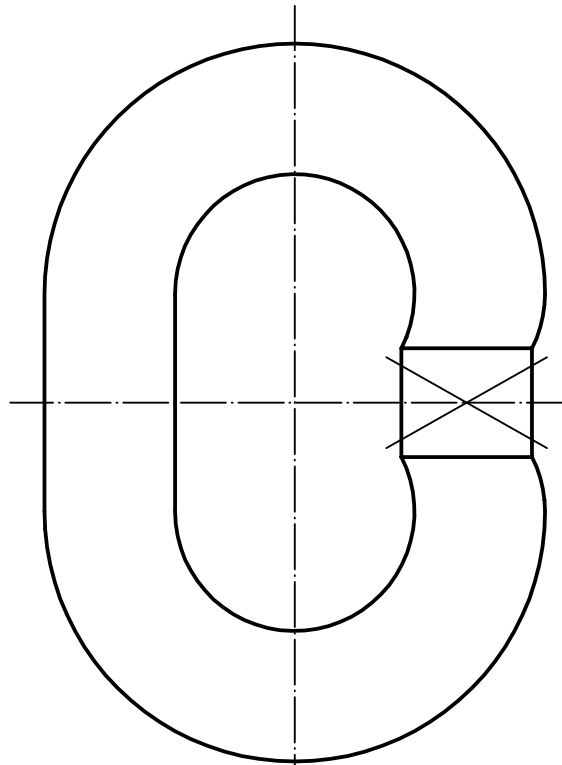


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- |  |   |
|--|---|
| $l$ = multiple pitch length  | $e$ = length affected by welding, on either side of the centre link |
| $p$ = pitch (internal link length)   | $W_1$ = internal link width away from the weld                      |
| $d_m$ = measured diameter of the material, except at the weld  | $W_2$ = external link width away from the weld                      |
| $d_w$ = measured diameter of the material at the weld (type 1) or weld dimension perpendicular to the plane of the link (type 2) | $W_3$ = external link width over the weld                           |
| $G$ = dimension in other planes as per individual chain specification (type 2)   | $W_4$ = internal link width at the weld                             |

Figure 1 — Types of weld finish and link dimensions



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Figure 2 — Undercut at weld (not permissible)

### 5.3.2 Finish

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#### 5.3.2.1 Smooth welded chain

The fins caused by welding shall be removed.

#### 5.3.2.2 Asymmetric welded chain

The fins caused by welding shall be removed from the outside of the link surface leaving the projection on the inside.

### 5.4 Surface condition

The "finished" condition (see 6.1) for chain shall include the surface coating, if any.

### 5.5 Manufacturing proof force (MPF)

After heat treatment and complete processing, the finished chain shall be subjected to the manufacturing proof force specified in the International Standard for that particular chain. The testing machine shall conform to the requirements given in annex A. The chain shall be placed in the testing machine without twisting. After the force is withdrawn, the chain shall be carefully examined by the competent person and any faulty links replaced (see 5.6). The chain shall articulate freely when manipulated by the examiner.

Where surface finishing processes are used which involve the risk of chain embrittlement, e.g. acid cleaning or electroplating, the manufacturing proof force shall be re-applied in the finished condition.

Adequate facilities shall be provided, with suitable lighting, for the purpose of examining the chains after they have been subjected to the proof force.