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**Cycle chains — Characteristics and test  
methods**

*Chaînes pour cycles — Caractéristiques et méthodes de contrôle*

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Reference number  
ISO 9633:2001(E)

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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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 9633 was prepared by Technical Committee ISO/TC 100, *Chains and chain wheels for power transmission and conveyors*.

This second edition cancels and replaces the first edition (ISO 9633:1992), which has been revised to reflect improvements in the design and manufacture of cycle chains. This edition specifies a lower minimum tensile strength for 082 C chains and deals with the measurement of pin push-out resistance.

Annex A of this International Standard is for information only.

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# Cycle chains — Characteristics and test methods

## 1 Scope

This International Standard specifies the dimensions and mechanical properties of cycle chains, as well as test methods for determining these mechanical properties (i.e. twist, lateral deviation, stiff link and side bow).

NOTE The dimensions of sprockets for cycle chains are specified in ISO 606.

## 2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 606:1994, *Short-pitch transmission precision roller chains and chain wheels*.

## 3 Terms and definitions

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

### 3.1

#### **lateral deviation**

condition when the actual centreline of the chain is not straight

### 3.2

#### **side bow**

condition characterized by the height of an arc assumed by the chain in a plane parallel to the plane of the chain pins, when the chain is laterally deflected to the maximum extent permitted by its internal tolerances

### 3.3

#### **stiff link**

condition when a chain link cannot be articulated smoothly through an angle of 60°, to the right and to the left, from the alignment axis of the two adjacent links

### 3.4

#### **twist**

condition when the axes of articulation of the chain links are not in the same plane

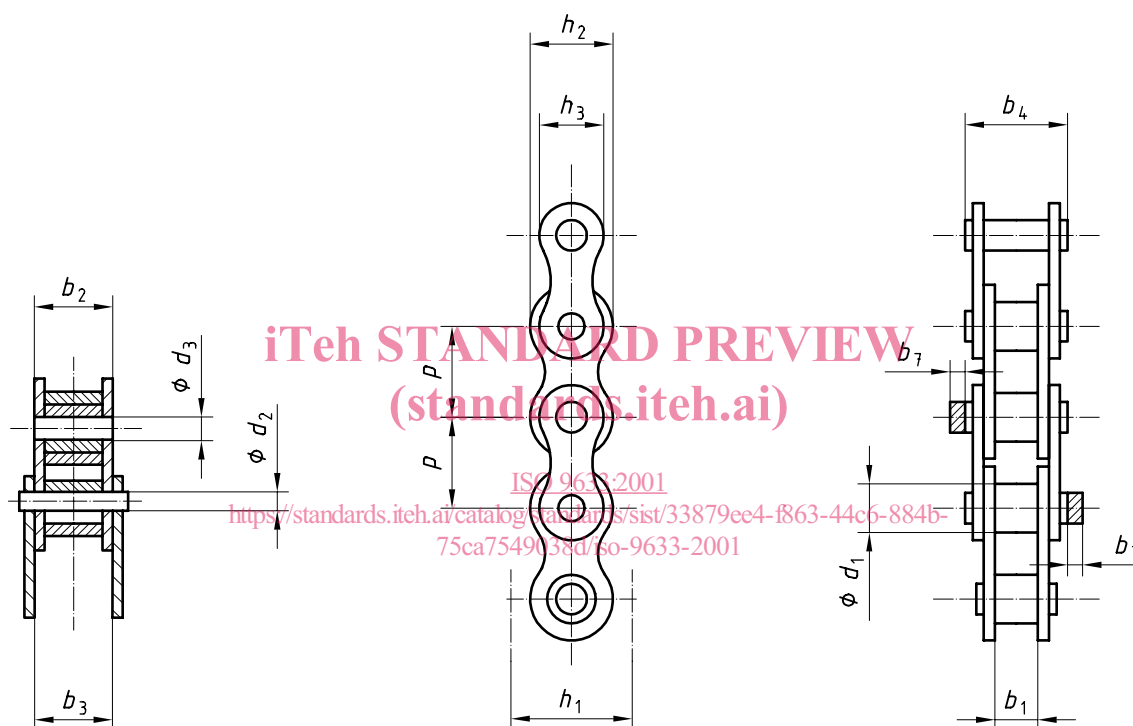
## 4 Cycle chains

### 4.1 Designation

Chains complying with all the requirements of this International Standard are exclusively intended for use on cycles. Cycle chains, denoted by the suffix C, shall be designated by the standard ISO chain numbers given in Table 1.

### 4.2 Dimensions

Cycle chains shall comply with the dimensions shown in Figure 1 and specified in Table 1. These dimensions ensure interchangeability of complete chains produced by different manufacturers.



Type I: regular roller chain

Type II: non-bush chain

Figure 1 — Chain (see Table 1)

**Table 1 — Principal dimensions, measuring forces, push-out forces and tensile strengths of chains (Figure 1)**

ISO chain number	Chain structure	Pitch	Roller diameter	Width between inner plates	Bearing pin body diameter	Bush bore	Chain path depth	Inner plate depth	Outer plate depth	Clearance between inner and outer link	Width over bearing pins <sup>a</sup>	Additional width for joint fastener <sup>b</sup>	Measuring force	Push-out force	Tensile strength
		<i>p</i>	<i>d</i> <sub>1</sub> max.	<i>b</i> <sub>1</sub> min.	<i>d</i> <sub>2</sub> max.	<i>d</i> <sub>3</sub> min.	<i>h</i> <sub>1</sub> min.	<i>h</i> <sub>2</sub> max.	<i>h</i> <sub>3</sub> max.	<i>b</i> <sub>3</sub> – <i>b</i> <sub>2</sub> min.	<i>b</i> <sub>4</sub> max.	<i>b</i> <sub>7</sub> max.			
mm													N		
<b>081 C</b>	Type I	12,7	7,75	3,3	3,66	3,69	10,2	9,9	9,9	0,05	10,2	1,5	125	—	8 000
<b>082 C</b>	Type I	12,7	7,75	2,38	3,66	3,69	10,2	9,9	9,9	0,1	8,2	—	125	780	8 000 <sup>c</sup>
<b>082 C</b>	Type II	12,7	7,75	2,38	3,66	3,69	9	8,7	8,7	0,05	7,4	—	125	780	8 000 <sup>c</sup>

<sup>a</sup> The actual dimensions of 082 C chain will depend on the type of derailleur used but should not exceed the given dimension, details of which should be obtained by the purchaser from the manufacturer.

<sup>b</sup> The actual dimension will depend on the type of fastener used but should not exceed the given dimension, details of which should be obtained by the purchaser from the manufacturer.

<sup>c</sup> Chains having a higher minimum tensile strength may be supplied if agreed between the purchaser and manufacturer.

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**4.3 Tensile testing**

The minimum tensile strength of each chain shall be as specified in Table 1. The values are only valid for the following test lengths and conditions.

A tensile force, not less than the minimum tensile strength specified in Table 1, shall be applied slowly to the ends of a chain length containing at least five free pitches, by means of shackles permitting free movement on both sides of the chain centreline in the normal plane of articulation.

Failure shall be considered to have occurred at the first point where increasing extension is no longer accompanied by increasing load, i.e. the summit of the force/extension diagram.

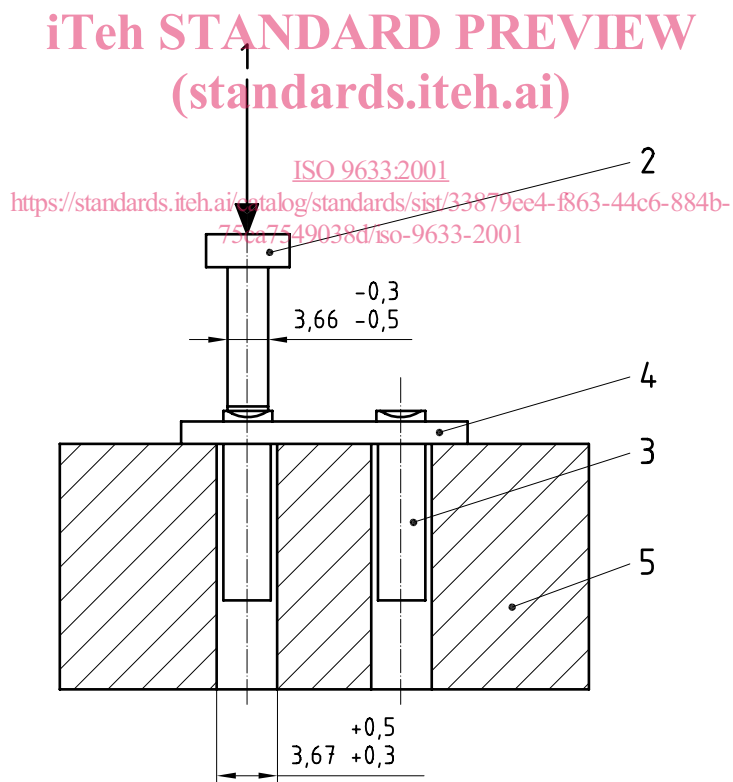
Tests in which failures occur adjacent to the shackles shall be disregarded.

The tensile test shall be considered a destructive test and the tested sample shall be discarded.

**4.4 Push-out force**

4.4.1 Select a pin link from a finished chain.

4.4.2 Place the pin link, consisting of an outer plate and two riveted pins, on the test apparatus shown in Figure 2.



- Key**
- 1 Load
  - 2 Pusher
  - 3 Bearing pins (2)
  - 4 Outer plate
  - 5 Tool

**Figure 2 — Test apparatus for measurement of pin push-out resistance**



4.4.3 Apply the load slowly to the pusher until the pin is pushed out of the outer plate.

4.4.4 The minimum load for pushing out a pin from an outer plate of 082 C chain shall be as specified in Table 1.

4.4.5 When taking a sample from a chain, care shall be taken to ensure that there is no extra strain between the outer plate and the two riveted pins.

#### 4.5 Pre-loading

Chains manufactured in accordance with this International Standard shall be pre-loaded by the application of a tensile force equivalent to one-third of the minimum tensile strength specified in Table 1.

#### 4.6 Length accuracy

The length of finished chains shall be measured after pre-loading (see 4.5) but before lubricating or after degreasing.

The standard length for measurement shall be a minimum of 610 mm and the chain shall terminate with an inner link at each end.

The chain shall be supported throughout its entire length and the measuring force given in Table 1 shall be applied.

The measured length shall be the nominal length  $\pm 0,15\%$  for chain 081 C and  $\pm 0,08\%$  for chain 082 C.

#### 4.7 Marking

The chain shall be marked with the manufacturer's name or trademark.

It is recommended that the ISO chain number specified in Table 1 be marked on the package.

### 5 Determination of twist

#### 5.1 Visual detection of twist

To detect twist visually, suspend the chain by one end and observe the alignment of the links.

NOTE This visual check detects localized faults, whereas the procedure described in 5.2 permits the determination of twist and gives an evaluation of the chain's ability to be twisted.

#### 5.2 Method of measuring twist

##### 5.2.1 Apparatus

The apparatus for measuring twist shall be as shown in Figure 3 and shall meet the geometric requirements demonstrated in Figure 4.

##### 5.2.2 Test sample

Choose a length of cycle chain 49 links long and free from grease, each end of which consists of an inner link.