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Cycle chains — Characteristics and test methods

Chaînes pour cycles — Caractéristiques et méthodes de contrôle

Reference number
ISO 9633:1992(E)

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.

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

Annex A of this International Standard is for information only.

International Organization for Standardization
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Introduction

The chains dealt with in this International Standard were specified in table 2 of ISO 606:1982, *Short-pitch transmission precision roller chains and chain wheels*, under ISO chain numbers 081 and 082. The chains dealt with in this International Standard are specifically for use on cycles and carry the additional letter C in their chain number.

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Cycle chains — Characteristics and test methods

1 Scope

This International Standard specifies the dimensions and mechanical properties of cycle chains.

It also describes test methods for determining these mechanical properties, i.e. twist, lateral deviation, stiff link and side bow.

The dimensions of chain wheels for cycle chains are specified in clause 5 of ISO 606:—.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 606:—[1], *Short-pitch transmission precision roller chains and chain wheels.*

3 Definitions

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

3.1 lateral deviation: Condition when the actual centreline of the chain is not straight.

3.2 side bow: Condition which is 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

Only chains complying with all the requirements of this International Standard designated by the ISO chain number quoted in table 1 are exclusively intended for cycles.

4.2 Dimensions

Cycle chains shall comply with the dimensions shown in figure 1 and given in table 1. These dimensions ensure interchangeability of complete chains produced by different manufacturers.

4.3 Tensile testing

4.3.1 The minimum tensile strength of each chain shall be as given in table 1. The values are only valid for the test lengths and conditions given below.

A tensile force, not less than the tensile strength given 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.

1) To be published. (Revision of ISO 606:1982)

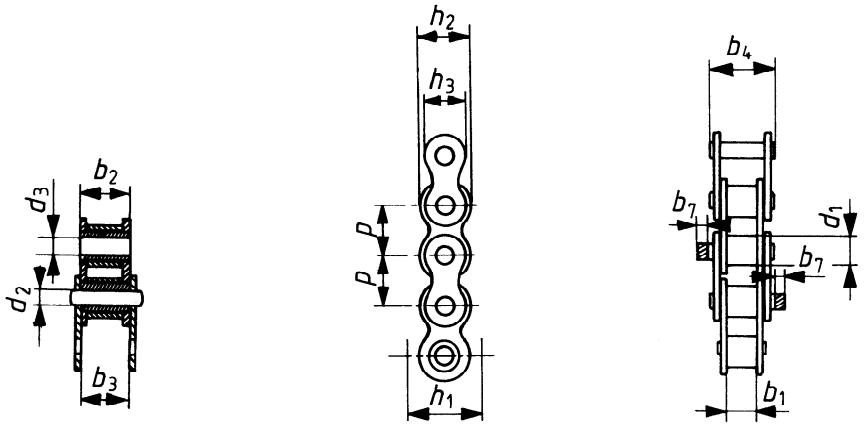


Figure 1 — Chain

Table 1 — Principal dimensions, measuring forces and tensile strengths of chains (see figure 1)

ISO chain number	Pitch	Roller diameter	Width between inner plates	Bearing pin body diameter	Bush bore	Chain path depth	Inner plate depth	Outer plate depth	Cranked link dimensions[1]			Width over inner link	Width between outer plates	Width over bearing pins	Additional width for joint fastener[2]	Measuring force	Tensile strength
	p	d_1	b_1	d_2	d_3	h_1	h_2	h_3	l_1	l_2	c	b_2	b_3	b_4	b_7		
		max.	min.	max.	min.	min.	max.	max.	min.	min.		max.	min.	max.	max.		min.
	mm															N	
081 C	12,7	7,75	3,30	3,66	3,71	10,17	9,91	9,91	5,36	5,36	0,08	5,6	5,7	10,2	1,5	125	8 000
082 C	12,7	7,75	2,38	3,66	3,71	10,17	9,91	9,91	3)	3)	3)	4,6	4,73	8,2	--	125	9 800

1) Cranked links are not recommended for use on chains which are intended for onerous applications.

2) The actual dimension will depend on the type of fastener used but it should not exceed the dimension given, details of which should be obtained by the purchaser from the manufacturer.

3) 082 C chains are normally assembled with straight links and not with cranked links.

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

4.4 Proof testing

All chains shall be subjected to a tensile force not less than one-third of the minimum tensile strength given in table 1.

4.5 Length accuracy

The length of finished chains shall be measured after proof testing (4.4) 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 $^{+0,15}_{0}$ %.

4.6 Marking

The chain shall be marked with the following:

a) the manufacturer's name or trade-mark;

b) the ISO chain number quoted in table 1.

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 1 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 2 and shall meet the geometric requirements demonstrated in figure 3.

5.2.2 Test sample

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

5.2.3 Test sample installation

Suspend the chain by the upper pin CD of the attachment (see figure 3) by means of a shackle on the sliding head permitting free rotational movement on both sides of the chain centreline of 1° max.

The alignment of the attachment pins before commencement of the test shall be as follows:

$$-1° \leqslant \beta \leqslant +1°$$

$$-1° \leqslant \gamma \leqslant +1°$$

The inner link of the lower end of the test chain shall be gripped in the first shackle head.

5.2.4 Test procedure

Apply a tensile force of 5 N to the lower end of the chain by setting the balance weight.

NOTE 2 This force can be measured by means of a dynamometer.

Apply a torque of 0,2 N·m to the lower link of the chain, first in one angular direction then in the other.

Measure the angular displacement at both sides of the apparatus zero (see figure 4).

Angle α is a measure of the net twist of the chain under test about the apparatus zero in a clockwise or anticlockwise direction.

The angle α is in an anticlockwise direction from the apparatus zero, viewed from above, when positive and is in a clockwise direction from the apparatus zero, viewed from above, when negative. The net twist value α is calculated as half the difference between α_1 and α_2. A negative value of α or τ only indicates a net clockwise twist in the chain under test, viewed from above; it does not indicate a negative algebraic quantity.

5.2.5 Acceptance criteria

The values of α and τ shall be within the following limits:

$$\alpha \leqslant \pm 15°$$

where $\alpha = \dfrac{\alpha_1 - \alpha_2}{2}$

$$\tau \leqslant \pm 0{,}17$$

where $\tau = \dfrac{\alpha}{\delta}$

and $\delta = \alpha_1 + \alpha_2$

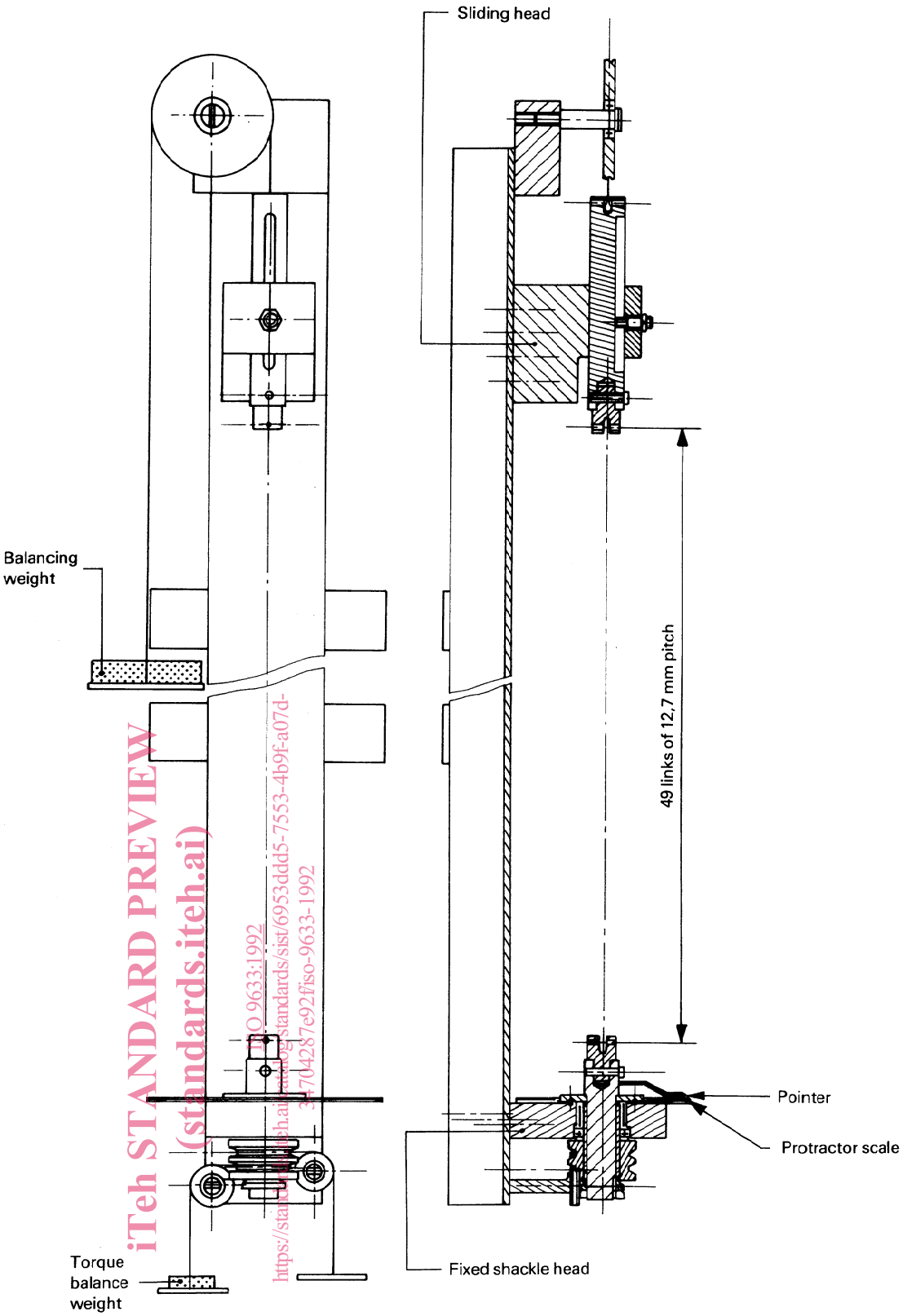
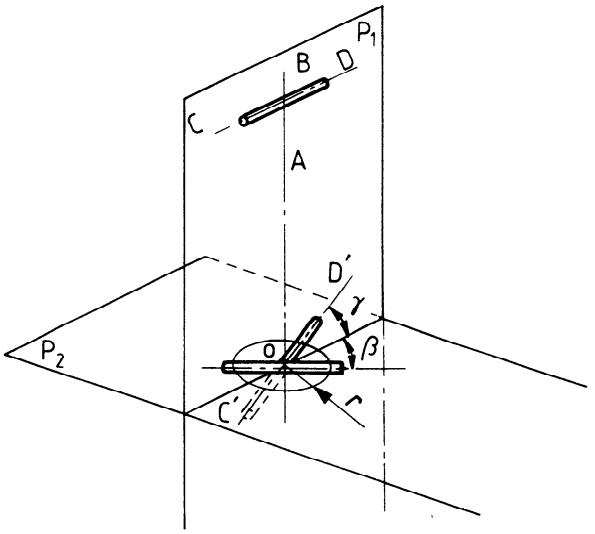


Figure 2 — Test apparatus for determination of twist



P_1 is the vertical plane defined by the axis of displacement AB of the sliding head and the pin CD of the upper attachment of the chain;

NOTE — Pins CD and C′D′ are not the end pins of the chain; they are the attachment pins of the test apparatus.

P_2 is a horizontal plane perpendicular to P_1;

O is the projection of the axis AB in the plane P_2. It is the origin and the point of intersection of axis AB and the line of intersection of P_1 and P_2;

O′ is the centrepoint of symmetry of pin C′D′ of the lower attachment of the chain. It may

a) coincide with O;

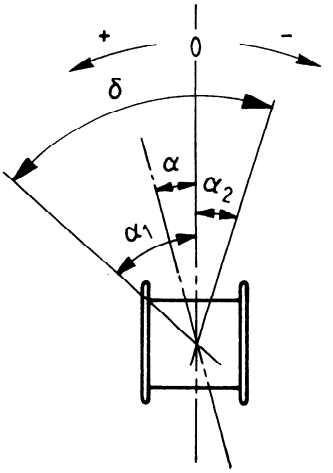
b) lie on the line of intersection of P_1 and P_2 at a maximum distance r from O;

c) lie in P_2 but not on the line of intersection of P_1 and P_2. In that case, O′ should not lie outside a circle of radius r, the centre of which coincides with O.

β is in P_2 and is the angle through which pin C′D′ can rotate in P_2;

γ is in P_1. If O′ lies on the line of intersection of P_1 and P_2, γ is the angle through which pin C′D′ can rotate in P_1; if O′ does not lie on the line of intersection of P_1 and P_2, γ lies in any plane P′ parallel to P_1 and crossing the area of the circle of radius r and centre O in P_2.

Figure 3 — Geometry of test apparatus and geometric requirements



$$\alpha = \frac{\alpha_1 - \alpha_2}{2} \qquad \tau = \frac{\alpha}{\delta}$$

Twist total value $\delta = \alpha_1 + \alpha_2$

Figure 4 — Measurement of twist

6 Determination of lateral deviation

6.1 Visual detection of lateral deviation

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

6.2 Method of determining lateral deviation

6.2.1 Apparatus

The apparatus for measuring lateral deviation shall comprise a straightedge whose surfaces are ground to the dimensions specified in table 2.

For convenience of handling, a straightedge for each size of chain may be incorporated into a holder (see figure 5).

6.2.2 Test procedure

Place a sample chain comprising a minimum of 49 links in a horizontal plane with its axes horizontal, and fix it at one of its ends. Apply a tensile force of 12,5 N at the other end (see figure 7). From the fixing point of the chain, slide the measuring straightedge inside the inner plates of the chain over the whole length of the sample, to check that the chain is correctly located.