INTERNATIONAL STANDARD 1395

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Short pitch transmission precision bush chains and chain wheels

Chaînes de transmission de précision à douilles, à pas court, et roues dentées correspondantes

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Descriptors : precision equipment, chains, chain wheels, chain drives, specifications, dimensions, designation.

Price based on 10 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the technical committees were published as ISO Recommendations; these documents are in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 100, *Chains and chain wheels for power transmission and conveyors*, has reviewed ISO Recommendation R 1395-1970 and found it technically suitable for transformation. International Standard ISO 1395 therefore replaces ISO Recommendation R 1395-1970, to which it is technically identical.

ISO Recommendation R 1395 had been approved by the member bodies of the following countries :

Austria	Greece	Sweden
Belgium	India	Switzerland
Brazil	Israel	Thailand
Czechoslovakia	Italy	Turkey
Chile	Japan	United Kingdom
Finland	Korea, Rep. of	Yugoslavia
France	Romania	
Germany	South Africa, Rep. of	

The member bodies of the following countries had expressed disapproval of the Recommendation on technical grounds :

U.S.A.*
U.R.S.S.

* Subsequently, this member body approved the Recommendation.

No member body disapproved the transformation of the Recommendation into an International Standard.

Printed in Switzerland

Short pitch transmission precision bush chains and chain wheels

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the characteristics of short pitch precision bush chains of simple and multiplex construction suitable for the mechanical transmission of power and allied applications, together with the tooth gap forms and rim profiles of their associated chain wheels. It covers dimensions, tolerances, measuring loads and minimum breaking loads.

It applies to chains of two pitches only, namely 0.25 in (6,35 mm and 0.375 in (9,525 mm).

The dimensions of chains specified ensure complete interchangeability of any given size and provide interchangeability of individual links of chains for repair purposes.

2 REFERENCE

ISO/R 286, *ISO system of limits and fits — Part I : General, tolerances and deviations.*

3 CHAINS

3.1 Nomenclature

Figures 1, 2 and 3 do not define the actual form of the chain plates. Dimensional definitions are contained in tables 1 and 1M.

3.2 Designation

Transmission precision bush chains are designated by the ISO chain numbers given in tables 1 and 1M, first column, the first two digits expressing the pitch in sixteenths of an inch. The chain numbers in tables 1 and 1M are supplemented by a hyphenated suffix, 1 for simple chain, 2 for duplex chain, 3 for triplex chain, etc. (for example 04C-1, 04C-2, 04C-3, etc.).

3.3 Dimensions

Chains shall conform to the dimensions given in tables 1 and 1M. The maximum and minimum dimensions are specified to ensure interchangeability of links as produced by different makers of chain. They represent limits for interchangeability, but are not the actual tolerances to be used in manufacture.

3.4 Breaking loads

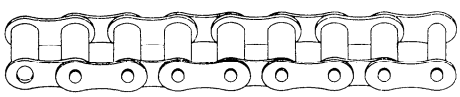
The test length shall have a minimum of five free pitches. The ends shall be attached to the testing machine shackles by a pin through the plate holes or through the bushes or by the bush common to an inner and outer link. The shackles shall be so designed as to allow universal movement; the actual method to be used is left to the discretion of the manufacturer.

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

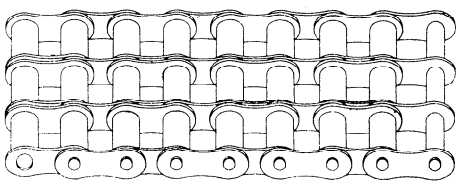
The minimum tensile breaking loads shall be those given in tables 1 and 1M.

3.5 Proof loading

All chains shall be proof loaded to one-third of the minimum tensile breaking load given in tables 1 and 1M.

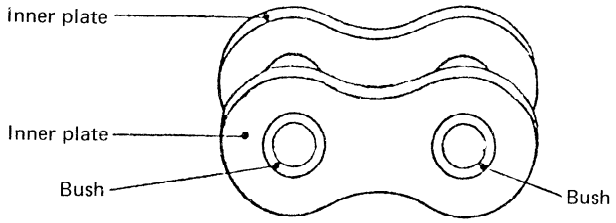


Bush chain, simple

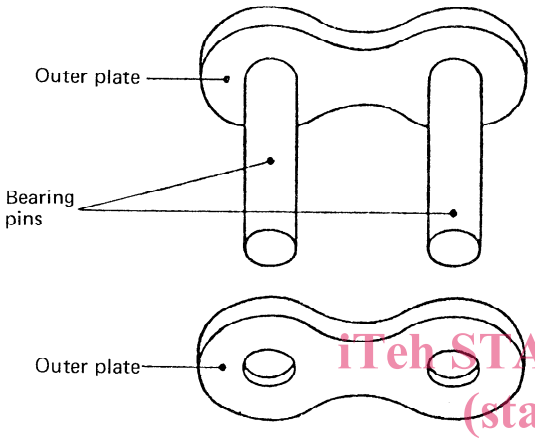


Bush chain, multiple (triplex)

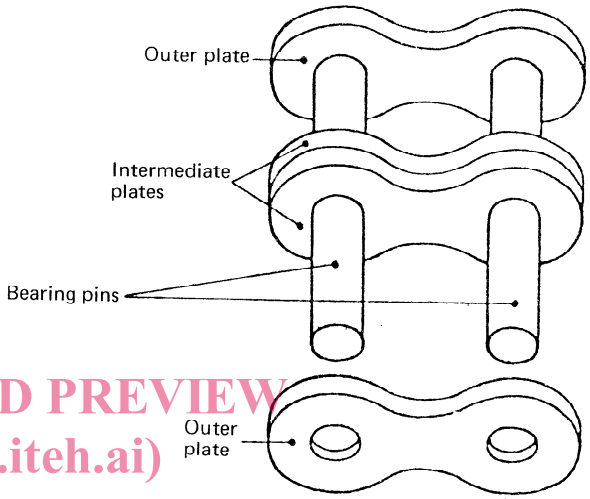
FIGURE 1 — Types of chains



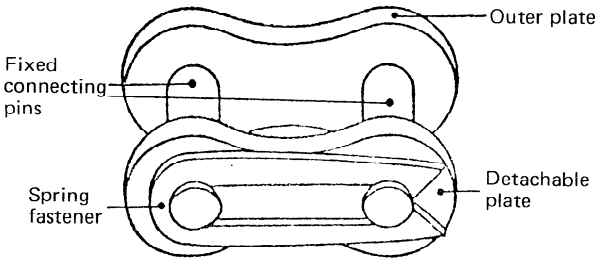
Inner link



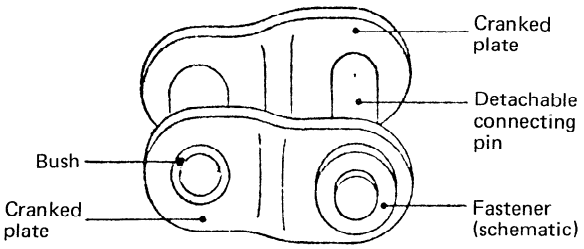
Outer link, simple



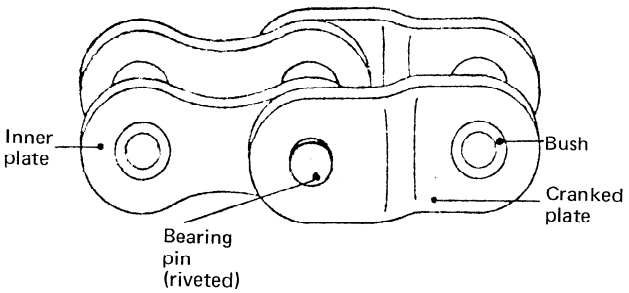
Outer link, duplex



Connecting link with spring fastener



Cranked link, single



Cranked link, double

FIGURE 2 — **Types of links**

3.6 Length accuracy

Finished chains shall be measured after proof loading (where applicable) but before lubricating.

The standard length for measurement shall be 49 times the pitch of the chain and shall terminate at each end in an inner link.

The chain shall be supported throughout its entire length, and the measuring load given in tables 1 and 1M shall be applied.

To comply with this International Standard, the length shall be the nominal length subject to the tolerance :

$$^{+\,0,15\ \%}_{\ \ 0}$$

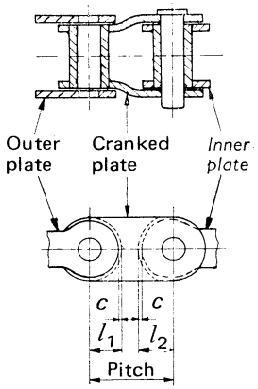
The length accuracy of chains which have to work in parallel shall be within the above limits but matched by agreement with the manufacturer.

3.7 Marking

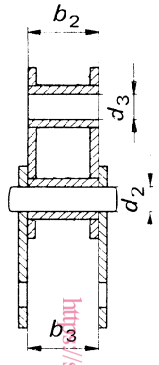
The chains should be marked with :

a) the manufacturer's name or trade mark;

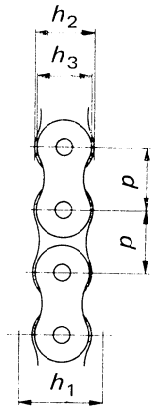
b) the ISO chain number (column 1 of tables 1 and 1M).



Cranked link



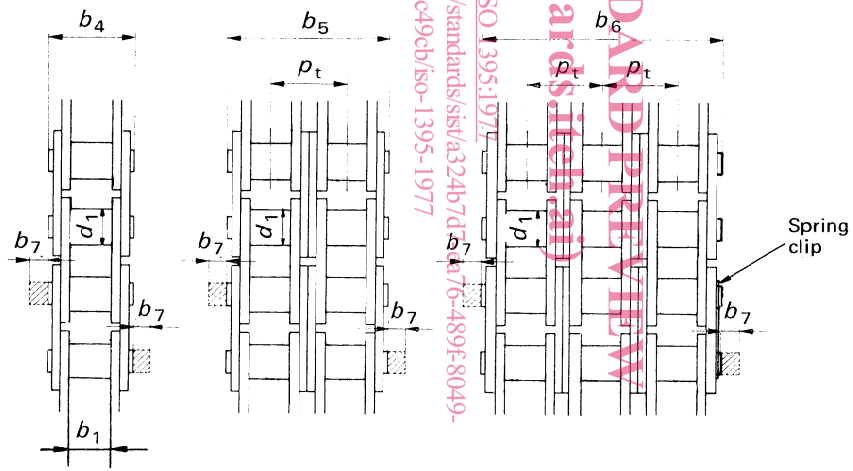
Section through chain



Depths and pitch

Dimension c represents the clearance between the cranked link plates and the straight plates available during articulation.

The chain path depth h_1 is the minimum depth of channel through which the assembled chain should be able to pass.



Simple **Duplex** **Triplex**

The overall width of a chain with a joint-fastener is equal to the width over the bearing pins, b_4, b_5 or b_6, plus b_7, for riveted pin (or plus 1,6 b_7 for headed pin end) if fastener is on one side only, or plus 2 b_7, if fastener is on both sides.

The width over bearing pins for chains wider than triplex = $b_4 + p_t$ (number of strands in chain − 1).

FIGURE 3 — **Key to tables 1 and 1M**

TABLE 1 — **Chain dimensions, measuring loads and breaking loads** (Inch-pound units)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ISO chain number	Pitch	Bush diameter	Width between inner plates	Bearing pin body diameter	Bush bore	Chain path depth	Inner plate depth	Outer/ intermediate plate depth	Cranked link dimensions*			Transverse pitch	Width over inner link	Width between outer plates	Width over bearing pins			Additional width for joint fastener	Measuring load			Breaking load		
															Simple	Duplex	Triplex		Simple	Duplex	Triplex	Simple	Duplex	Triplex
	p	d_1 max.	b_1 min.	d_2 max.	d_3 min.	h_1 min.	h_2 max.	h_3 max.	l_1 min.	l_2 min.	c	p_1	b_2 max.	b_3 min.	b_4 max.	b_5 max.	b_6 max.	b_7 max.				min.	min.	min.
	in	in	in	in	in	in	in	in	in	in	in	in	in	in	in	in	in	in	lbf	lbf	lbf	lbf	lbf	lbf
04 C	0.250	0.130	0.125	0.091	0.092	0.247	0.237	0.205	0.104	0.121	0.003	0.252	0.189	0.194	0.36	0.61	0.86	0.10	10	20	30	780	1 560	2 340
06 C	0.375	0.200	0.188	0.141	0.143	0.366	0.356	0.307	0.156	0.181	0.003	0.399	0.294	0.299	0.52	0.92	1.32	0.13	16	32	48	1 750	3 500	5 250

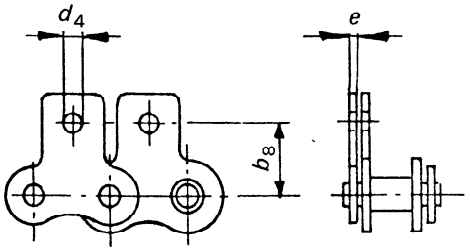
TABLE 1M — **Chain dimensions, measuring loads and breaking loads** (Metric units)

	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	daN	daN	daN	daN	daN	daN
04 C	6,35	3,30	3,18	2,311	2,34	6,27	6,02	5,21	2,64	3,06	0,08	6,40	4,80	4,93	9,1	15,5	21,8	2,5	5	10	15	350	700	1 050
06 C	9,525	5,08	4,77	3,580	3,63	9,30	9,05	7,80	3,96	4,60	0,08	10,13	7,47	7,60	13,2	23,4	33,5	3,3	7	14	21	790	1 580	2 370

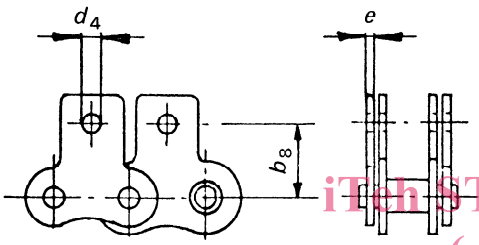
* Cranked links are not recommended for use on chains which are intended for onerous applications.

4 ATTACHMENTS

Standard attachments for use with 06 C size chain are shown in figures 4, 5 and 6. Dimensions shall conform to those shown in tables 2, 3 and 4.



a) extension one side of chain

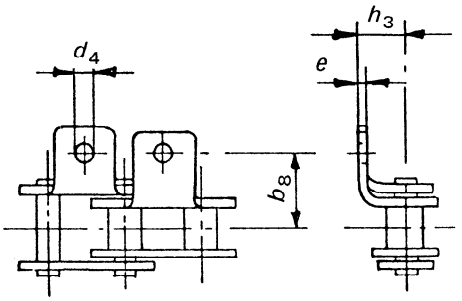


b) extension both sides of chain

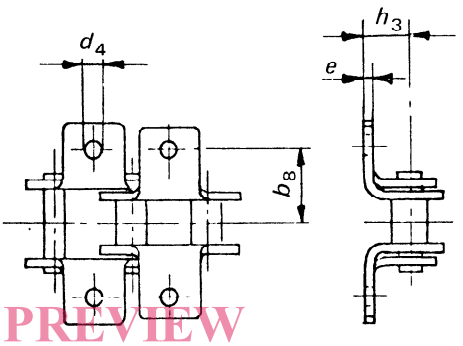
FIGURE 4 – Straight link plate extension

TABLE 2 – Dimensions of straight link plate extension

ISO chain number	d_4 min.		b_8		e	
	in	mm	in	mm	in	mm
06 C	0.102	2,59	0.375	9,53	0.050	1,27



a) extension one side of chain



b) extension both sides of chain

FIGURE 5 – Bent link plate extension

TABLE 3 – Dimensions of bent link plate extension

ISO chain number	d_4 min.		h_3		b_8		e	
	in	mm	in	mm	in	mm	in	mm
06 C	0.102	2,59	0.25	6,35	0.375	9,53	0.050	1,27

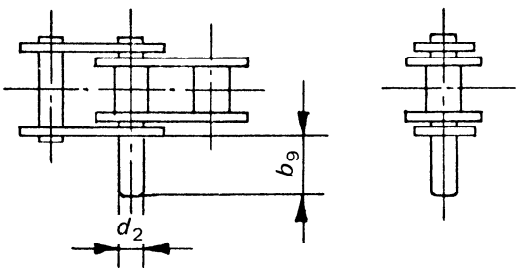


FIGURE 6 – Extended pin on one side of chain

TABLE 4 – Dimensions of extended pin

ISO chain number	d_2		b_9	
	in	mm	in	mm
06 C	0.141	3,58	0.375	9,53

5 CHAIN WHEELS

5.1 Nomenclature

The nomenclature for basic chain dimensions on which all wheel data are based will be found in figure 3. Chain wheel nomenclature is covered under the respective headings.

5.2 Diametral dimensions of wheel rim

5.2.1 *Nomenclature*

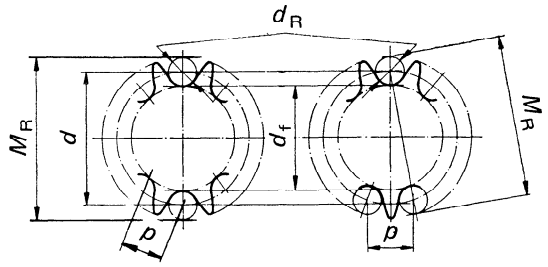


FIGURE 7 – **Diametral dimensions**

p = chordal pitch, equal to chain pitch

d_R = measuring pin diameter

z = number of teeth

d = pitch circle diameter

d_f = root diameter

M_R = measurement over pins

5.2.2 *Dimensions*

5.2.2.1 PITCH CIRCLE DIAMETER

$$d = \frac{p}{\sin \frac{180^\circ}{z}}$$ (see the annex for pitch circle diameters in relation to the number of teeth)

5.2.2.2 MEASURING PIN DIAMETER

$d_R = d_1$ (see 5.3.1) subject to tolerance limits

$$^{+\ 0.000\ 5\ \text{in}\ (0{,}01\ \text{mm})}_{\ 0}$$

5.2.2.3 ROOT DIAMETER

$d_f = d - d_1$ subject to the following tolerance limits :

Root diameter	Upper deviation	Lower deviation
$d_f \leqslant 5$ in (127 mm)	0	0.010 in (0,25 mm)
$d_f \leqslant 9.85$ in (250 mm)	0	0.012 in (0,30 mm)
$d_f > 9.85$ in (250 mm)	0	h11*

* See ISO/R 286.

5.2.2.4 MEASUREMENT OVER PINS

M_R for *even* numbers of teeth $= d + d_R$ min.

M_R for *odd* numbers of teeth $= d \cos \frac{90^\circ}{z} + d_R$ min.

The measurement over pins of wheels with *even* numbers of teeth shall be carried out over pins inserted in opposite tooth gaps.

The measurement over pins of wheels with *odd* numbers of teeth shall be carried out over pins in the tooth gaps most nearly opposite.

The limits of tolerance for the measurement over pins are identical to those for corresponding root diameters.

5.3 Wheel tooth gap forms

5.3.1 *Nomenclature*

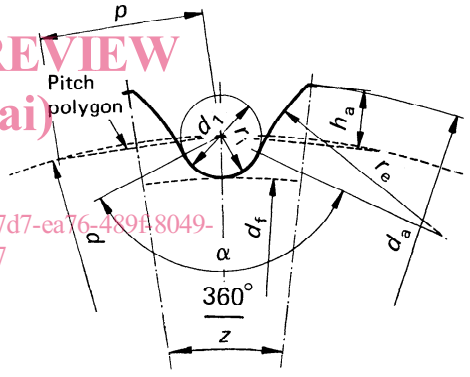


FIGURE 8 – **Tooth gap forms**

p = chordal pitch, equal to chain pitch

d = pitch circle diameter

d_1 = bush diameter, maximum

r_i = bush seating radius

α = bush seating angle

r_e = tooth flank radius

h_a = height of tooth above pitch polygon

d_a = tip diameter

d_f = root diameter

z = number of teeth

5.3.2 *Dimensions*

The limits of the tooth gap form are determined by the minimum and maximum tooth gap forms. The actual tooth gap form provided by cutting or an equivalent method shall