INTERNATIONAL STANDARD

ISO 1275

Fourth edition
2006-07-01

Double-pitch precision roller chains, attachments and associated chain sprockets for transmission and conveyors

Chaînes de précision à rouleaux à pas double, plaques-attaches et pignons dentés correspondants pour transmission et manutention

Reference number
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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1275 was prepared by Technical Committee ISO/TC 100, *Chains and chain sprockets for power transmission and conveyors*.

This fourth edition cancels and replaces the third edition (ISO 1275:1995), which has been technically revised.

Introduction

This International Standard has been established to cover a range of chains used in the majority of countries in the world by unifying dimensions, strengths and other data from current national standards.

The principal feature of these chains is their derivation from the ISO 606 series by using the standard round parts in links that are double the standard pitch.

Chains have been adopted from the ANSI, BS and DIN double-pitch series to form a range from 25,4 mm to 101,6 mm pitch. Versions of chains are included with normal and with thicker plate materials, with the alternatives of smaller or larger rollers, as well as a range of attachments and sprockets.

The dimensions of the chains provide for complete interchangeability of individual links, and the sprocket dimensions allow complete interchangeability of chains of the same pitch and the same chain designation (either A or B series).

Double-pitch precision roller chains, attachments and associated chain sprockets for transmission and conveyors

1 Scope

This International Standard specifies requirements for double-pitch precision roller chains suitable for the mechanical transmission of power and for conveyors, together with those for their associated sprockets. It covers dimensions, tolerances, length measurement, preloading and minimum tensile strengths.

These double-pitch chains have been derived from some of the short-pitch transmission precision roller chains covered by ISO 606 having certain common dimensions but of double the pitch.

The chains are intended for use under less onerous conditions with respect to speed and power transmitted than are the base chains from which they are derived.

This International Standard primarily applies to sprockets with 5 to 75 teeth inclusive (with intermediate numbers of teeth 5 1/2 to 74 1/2 inclusive).

The preferred numbers of teeth are 7, 9, 10, 11, 13, 19, 27, 38 and 57.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 286-2, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

ISO 606, *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

3 Transmission chains

3.1 Assembly and component nomenclature

The nomenclature of the chain assemblies and their component parts is illustrated in Figures 1 and 2.

NOTE The figures do not define the actual form of the chain plates.

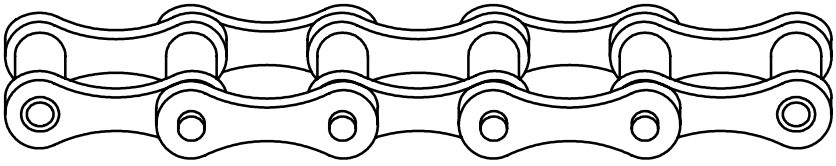
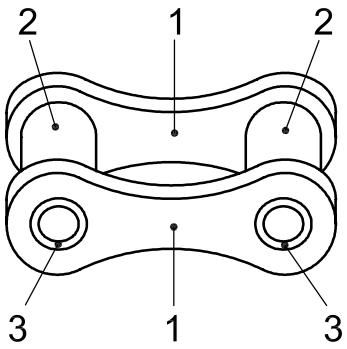


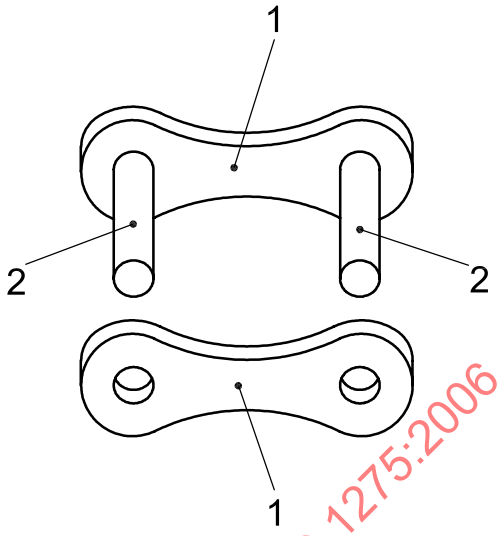
Figure 1 — Chain assembly



Key

1 inner plate
2 roller
3 bush

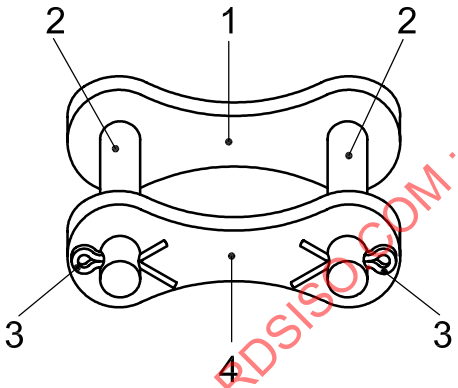
a) Inner link



Key

1 outer plate
2 pin

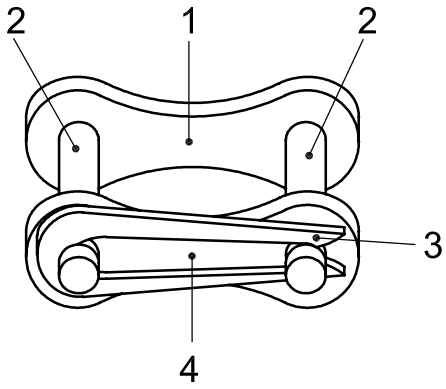
b) Outer link



Key

1 outer plate
2 cottered connecting pin
3 cotter
4 detachable plate

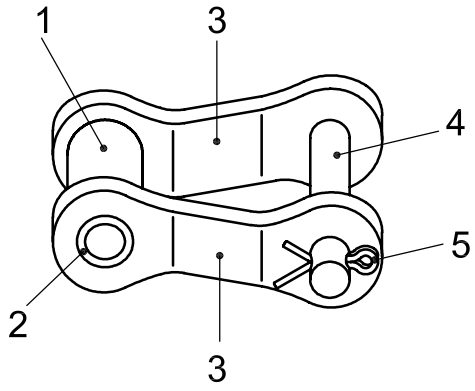
c) Connecting pin with cottered pin



Key

1 outer plate
2 spring clip connecting pin
3 spring clip
4 detachable plate

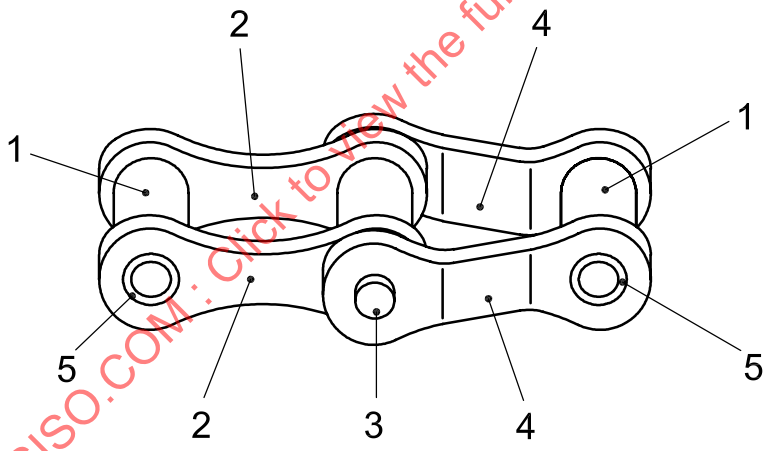
d) Spring clip connecting link



Key

1 roller
2 bush
3 cranked plate
4 cranked link pin
5 cotter

e) Single cranked link



Key

1 roller
2 inner plate
3 pin, riveted
4 cranked plate
5 bush

f) Double cranked link

NOTE 1 Plate dimensions are shown in Table 1.

NOTE 2 Fasteners can be of various designs. Figures give examples.

Figure 2 — Types of link

3.2 Designation

Double-pitch transmission precision roller chains are designated by the standard ISO chain numbers given in Table 1. These chain numbers have been obtained by taking the standard ISO chain number for the base chain (given in ISO 606) and adding the prefix 2.

EXAMPLE Chain ISO 1275-208B

3.3 Dimensions

Chains shall conform to the dimensions shown in Figure 3 and given in Table 1. Maximum and minimum dimensions are specified to ensure the interchangeability of links produced by different makers of chain. They represent limits for interchangeability, but are not the manufacturing tolerances.

In this International Standard, only double-pitch simplex chain dimensions are shown.

3.4 Tensile testing

3.4.1 General

The minimum tensile strength is that value which shall be exceeded when a tensile force is applied to a sample tested to destruction as defined in 3.4.2. This minimum tensile strength is not a working load but is intended primarily as a comparative figure between chains of various constructions.

These testing requirements do not apply to cranked links, connecting links or chains with attachments as their tensile strength could be reduced.

3.4.2 Testing

A tensile force 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 centre-line, 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 force, i.e. the summit of the force/extension diagram. The force at this point must exceed the minimum tensile strength stated in Table 1.

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

The tensile test shall be considered a destructive test. Even though a chain may not visibly fail when subjected to a force equivalent to the minimum tensile strength, it will have been stressed beyond the yield point and will be unfit for service.

3.5 Preloading

It is recommended that all chains be preloaded by applying a minimum tensile force equivalent to 30 % of the minimum tensile strength given in Table 1.

Table 1 — Principal chain dimensions, measuring forces and tensile strengths (see Figure 3)

ISO Chain number	Pitch	Maximum roller diameter (small) [a]	Maximum roller diameter (large) [a]	Minimum width between inner plates	Maximum bearing pin body diameter	Minimum bush bore	Minimum chain path depth	Maximum plate depth	Minimum cranked link [b]	Maximum width over inner link	Minimum width between outer plates	Maximum width over bearing pin	Maximum additional width for joint fastener [c]	Measuring force	Minimum tensile strength
	p	d_1	d_7	b_1	d_2	d_3	h_1	h_2	l_1	b_2	b_3	b_4	b_7		
	mm													N	kN
208A	25,4	7,92	15,88	7,85	3,98	4,00	12,33	12,07	6,9	11,17	11,31	17,8	3,9	120	13,9
208B	25,4	8,51	15,88	7,75	4,45	4,50	12,07	11,81	6,9	11,30	11,43	17,0	3,9	120	17,8
210A	31,75	10,16	19,05	9,40	5,09	5,12	15,35	15,09	8,4	13,84	13,97	21,8	4,1	200	21,8
210B	31,75	10,16	19,05	9,65	5,08	5,13	14,99	14,73	8,4	13,28	13,41	19,6	4,1	200	22,2
212A	38,1	11,91	22,23	12,57	5,96	5,98	18,34	18,10	9,9	17,75	17,88	26,9	4,6	280	31,3
212B	38,1	12,07	22,23	11,68	5,72	5,77	16,39	16,13	9,9	15,62	15,75	22,7	4,6	280	28,9
216A	50,8	15,88	28,58	15,75	7,94	7,96	24,39	24,13	13	22,60	22,74	33,5	5,4	500	55,6
216B	50,8	15,88	28,58	17,02	8,28	8,33	21,34	21,08	13	25,45	25,58	36,1	5,4	500	60,0
220A	63,5	19,05	39,67	18,90	9,54	9,56	30,48	30,17	16	27,45	27,59	41,1	6,1	780	87,0
220B	63,5	19,05	39,67	19,56	10,19	10,24	26,68	26,42	16	29,01	29,14	43,2	6,1	780	95,0
224A	76,2	22,23	44,45	25,22	11,11	11,14	36,55	36,20	19,1	35,45	35,59	50,8	6,6	1 110	125,0
224B	76,2	25,4	44,45	25,40	14,63	14,68	33,73	33,40	19,1	37,92	38,05	53,4	6,6	1 110	160,0
228B	88,9	27,94	—	30,99	15,90	15,95	37,46	37,08	21,3	46,58	46,71	65,1	7,4	1 510	200,0
232B	101,6	29,21	—	30,99	17,81	17,86	42,72	42,29	24,4	45,57	45,70	67,4	7,9	2 000	250,0

a Large rollers are principally for conveyor chains but are sometimes used on transmission chains; add suffix "L" to the chain number.

b Cranked links are not recommended for use in highly stressed applications.

c The actual dimensions will depend on the type of fastener used but should not exceed the dimensions given and should be obtained by the purchaser from the manufacturer.

3.6 Length validation

Measurement of chains shall take place after preloading but before lubricating.

The standard length for measurement shall be a minimum of

a) 610 mm for ISO chain numbers 208A to 210B inclusive,

b) 1 220 mm for ISO chain numbers 212A to 232B inclusive.

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

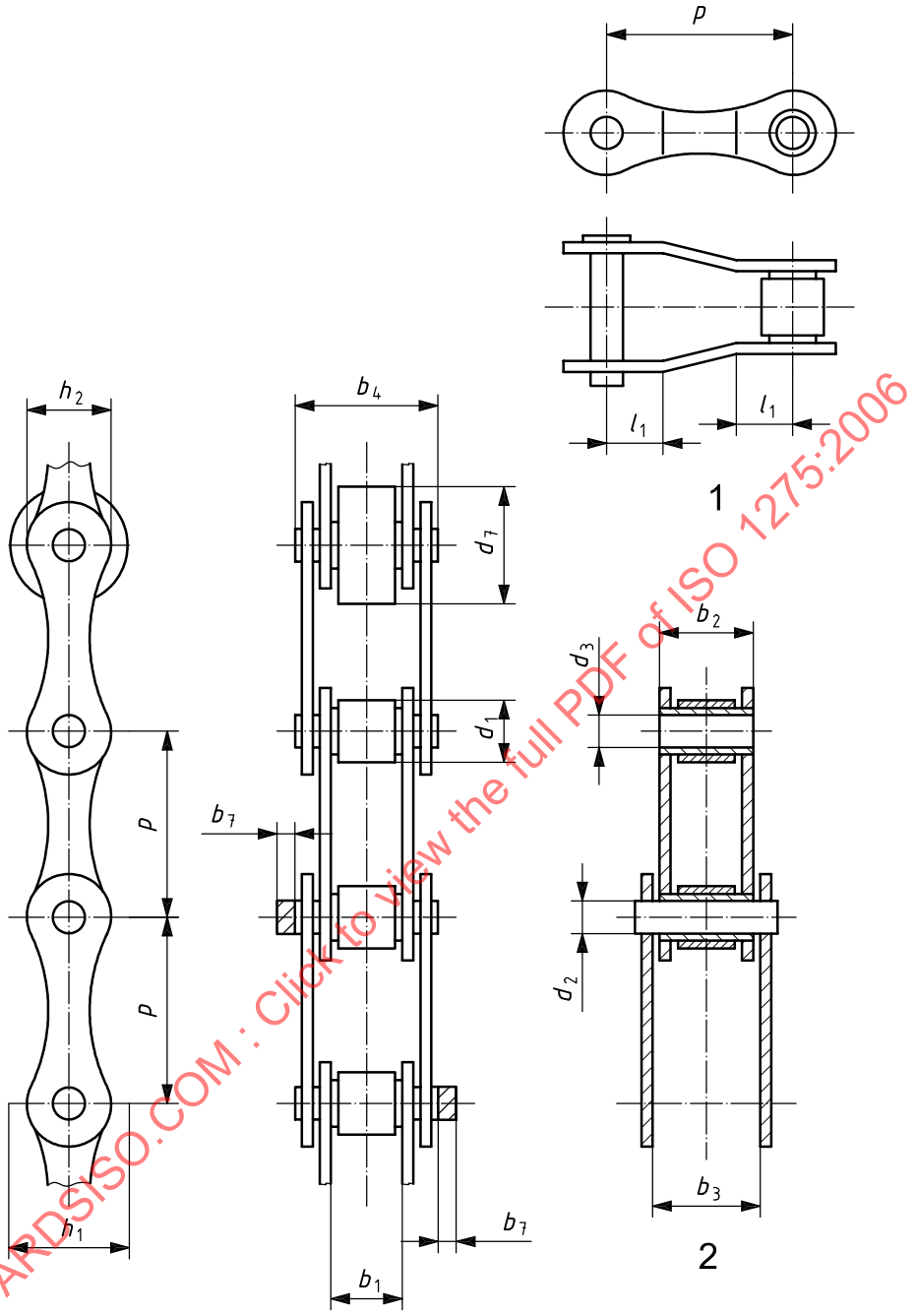
The measured length shall be the nominal length subject to tolerance of $^{+0,15}_{0}$ %.

The length accuracy of chains which have to work in parallel may be matched within closer tolerances.

3.7 Marking

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

The chain number quoted in Table 1 should be marked on the chain.



Key

1 single cranked link

2 chain section

The chain path depth, h_1, is the minimum depth of channel through which the assembled chain with small rollers will pass.

The overall width of a chain with a joint fastener is given by

$b_4 + b_7$ for riveted pin end and fastener on one side,

$b_4 + 1{,}6b_7$ for headed pin end and fastener on one side, and

$b_4 + 2b_7$ for fasteners on both sides.

Figure 3 — Chains

4 Conveyor chains

4.1 General

Except where otherwise stated, the shapes, dimensions and test details for the chain and sprockets shall conform to the requirements of Clauses 3 and 5, respectively, substituting reference to Table 2 in place of Table 1 where appropriate.

It is usual for chains used for conveyor purposes to have straight-sided (not waisted) side plates. Additionally, an alternative large roller of diameter d_7 may be adopted. These features are illustrated in Figure 4.

4.2 Nomenclature

The nomenclature of Figure 2 is also applicable to conveyor chains. Figures 2 and 4 do not define the actual form of the chain plates.

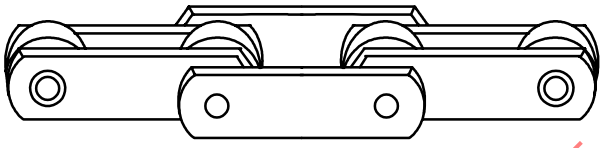


Figure 4 — Conveyor chain with large rollers

4.3 Designation

Double-pitch precision roller chains suitable for conveyor purposes are designated additionally with the prefix C when straight-sided chain plates (see Figure 4) are used, and with the suffix L when the alternative large size roller (d_7) is adopted. When necessary for the purpose of distinguishing between the chain roller sizes adopted, the optional suffix S may be applied to chains with the smaller roller.

4.4 Dimensions

When the large roller size is adopted, dimension d_1 shall be replaced by d_7 in sprocket formula. Dimensions shall be in accordance with Table 2.

4.5 Length validation

The measured length of plain chain shall be the nominal length subject to a tolerance of $^{+0,15}_{0}$ %.

The measured length of the chain with attachments shall be the nominal length subject to a tolerance of $^{+0,30}_{0}$ %.

The length accuracy of chains which have to work in parallel may be matched within closer tolerances.

4.6 Marking

Chains shall be marked with the manufacturer's name or trademark. The chain number quoted in Table 2 should be marked on the chain.

Table 2 — Principal conveyor chain dimensions, measuring forces and tensile strengths

ISO Chain number [a]	Pitch	Maximum roller diameter (small)	Maximum roller diameter (large)	Minimum width between inner plates	Maximum bearing pin body diameter	Minimum bush bore	Minimum chain path depth	Maximum plate depth	Minimum cranked link [b]	Maximum width over inner link	Minimum width between outer plates	Maximum width over bearing pin	Maximum additional width for joint fastener [c]	Measuring force	Minimum tensile strength
	p	d_1	d_7	b_1	d_2	d_3	h_1	h_2	l_1	b_2	b_3	b_4	b_7	N	kN
	mm														
C208A	25,4	7,92	15,88	7,85	3,98	4,00	12,33	12,07	6,9	11,17	11,31	17,8	3,9	120	13,9
C208B	25,4	8,51	15,88	7,75	4,45	4,50	12,07	11,81	6,9	11,30	11,43	17,0	3,9	120	17,8
C210A	31,75	10,16	19,05	9,40	5,09	5,12	15,35	15,09	8,4	13,84	13,97	21,8	4,1	200	21,8
C210B	31,75	10,16	19,05	9,65	5,08	5,13	14,99	14,73	8,4	13,28	13,41	19,6	4,1	200	22,2
C212A	38,1	11,91	22,23	12,57	5,96	5,98	18,34	18,10	9,9	17,75	17,88	26,9	4,6	280	31,3
C212A-H	38,1	11,91	22,23	12,57	5,96	5,98	18,34	18,10	9,9	19,43	19,56	30,2	4,6	280	31,3
C212B	38,1	12,07	22,23	11,68	5,72	5,77	16,39	16,13	9,9	15,62	15,75	22,7	4,6	280	28,9
C216A	50,8	15,88	28,58	15,75	7,94	7,96	24,39	24,13	13	22,60	22,74	33,5	5,4	500	55,6
C216A-H	50,8	15,88	28,58	15,75	7,94	7,96	24,39	24,13	13	24,28	24,41	37,4	5,4	500	55,6
C216B	50,8	15,88	28,58	17,02	8,28	8,33	21,34	21,08	13	25,45	25,58	36,1	5,4	500	60,0
C220A	63,5	19,05	39,67	18,90	9,54	9,56	30,48	30,17	16	27,45	27,59	41,1	6,1	780	87,0
C220A-H	63,5	19,05	39,67	18,90	9,54	9,56	30,48	30,17	16	29,10	29,24	44,5	6,1	780	87,0
C220B	63,5	19,05	39,67	19,56	10,19	10,24	26,68	26,42	16	29,01	29,14	43,2	6,1	780	95,0
C224A	76,2	22,23	44,45	25,22	11,11	11,14	36,55	36,20	19,1	35,45	35,59	50,8	6,6	1 110	125,0
C224A-H	76,2	22,23	44,45	25,22	11,11	11,14	36,55	36,20	19,1	37,18	37,31	55,0	6,6	1 110	125,0
C224B	76,2	25,4	44,45	25,40	14,63	14,68	33,73	33,40	19,1	37,92	38,05	53,4	6,6	1 110	160,0
C232A-H	101,6	28,58	57,15	31,55	14,29	14,31	48,74	48,26	25,2	46,88	47,02	69,4	7,9	2 000	222,4

NOTE The basic chain dimensions are identical to those of Table 1, with the addition of the large roller diameters. Normally, the side plates are straight (not waisted).

[a] The chain numbers are derived from the basic ISO chain numbers of Table 1 with the prefix C (for conveyor) and adding, as appropriate, the suffix S (for small roller) or L (for large roller). Heavy or higher-strength chains are designated with the suffix H.

[b] Cranked links are not recommended for use in highly stressed applications.

[c] The actual dimensions will depend on the type of fastener used but should not exceed the dimensions given and should be obtained by the purchaser from the manufacturer.

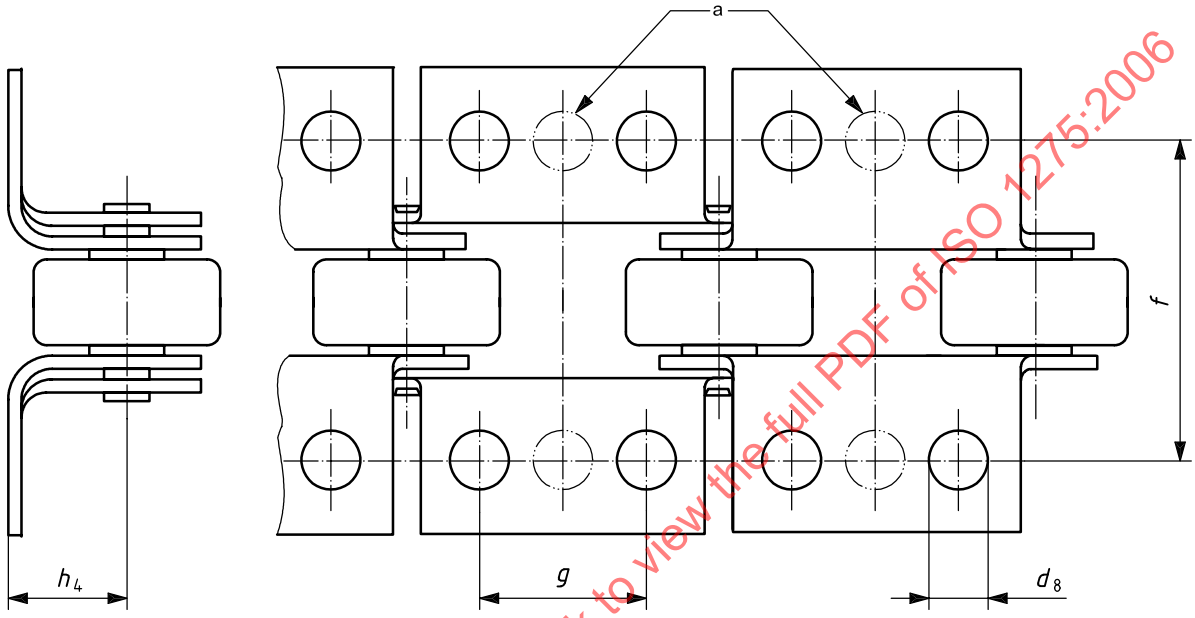
4.7 Attachments

4.7.1 General

Except where otherwise stated, the dimensions and test details for the chain with attachments shall conform to the requirements of Clause 3.

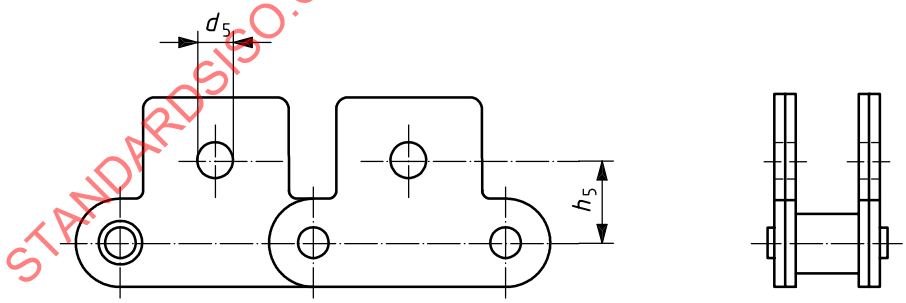
4.7.2 Nomenclature

The nomenclature for chain attachments is given in Figures 5, 6, 7, 8 and 9.



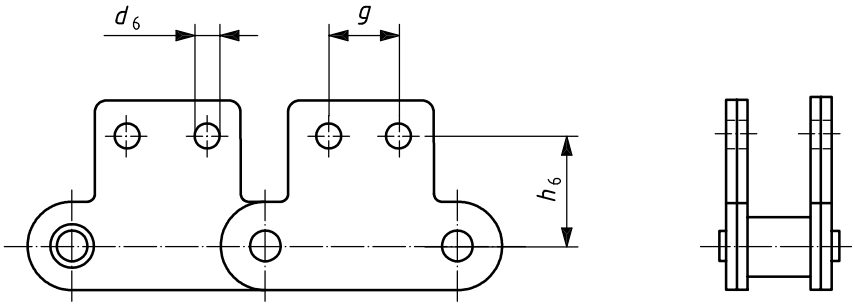
[a] K2 attachment plates each have two attachment holes. K1 plates are similar except that they have one centrally located hole (see 4.7.3)

Figure 5 — K attachment plates



NOTE M1 attachment plates can be positioned on either inner or outer links.

Figure 6 — M1 attachment plates



NOTE M2 attachment plates can be positioned on either inner or outer links.

Figure 7 — M2 attachment plates

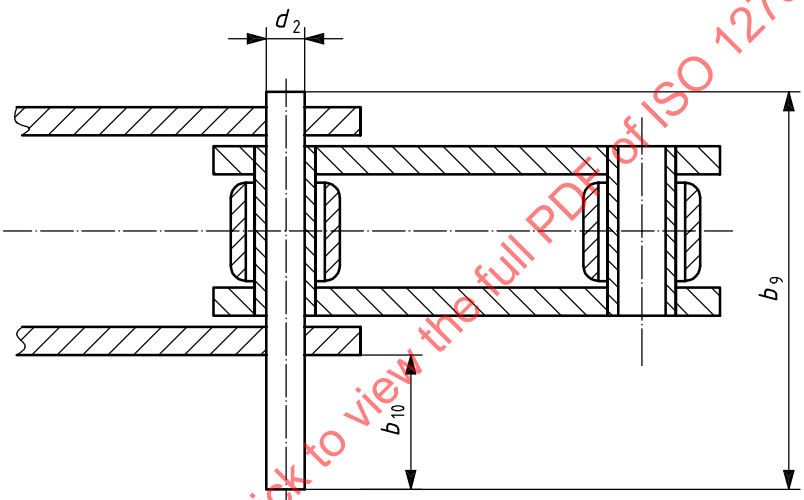


Figure 8 — Type X extended pin (figure based on duplex pin)

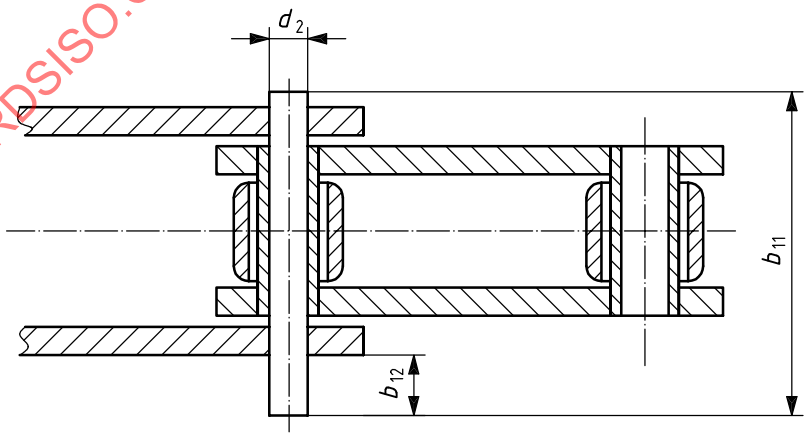


Figure 9 — Type Y extended pin (commonly used in “A” series chains)

4.7.3 Designation

Three types of attachment are given with the common dimensional basis as given in Tables 3, 4, 5 and 6. Their designation and distinguishing features are as follows.

a) K attachments (see Figure 5)

K1: with one attachment hole centrally located in each platform.

K2: with two attachment holes longitudinally located.

b) M attachments (see Figures 6 and 7)

M1: with one attachment hole centrally located in the plate.

M2: with two attachment holes longitudinally located.

c) Extended pin (see Figures 8 and 9)

with the bearing pin extended on one side of the chain.

4.7.4 Dimensions

Attachments shall conform to the dimensions given in Tables 3, 4, 5 and 6.

Table 3 — K type attachment plate dimensions (see Figure 5)

Dimensions in millimetres

ISO chain number [a]	Platform height h_4	Transverse distance between hole centres f	Minimum hole diameter d_8	Longitudinal distance between hole centres g
C 208A	9,1	25,4	3,3	9,5
C 208B	9,1	25,4	4,3	12,7
C 210A	11,1	31,8	5,1	11,9
C 210B	11,1	31,8	5,3	15,9
C 212A	14,7	42,9	5,1	14,3
C 212A-H	14,7	42,9	5,1	14,3
C 212B	14,7	38,1	6,4	19,1
C 216A	19,1	55,6	6,6	19,1
C 216A-H	19,1	55,6	6,6	19,1
C 216B	19,1	50,8	6,4	25,4
C 220A	23,4	66,6	8,2	23,8
C 220A-H	23,4	66,6	8,2	23,8
C 220B	23,4	63,5	8,4	31,8
C 224A	27,8	79,3	9,8	28,6
C 224A-H	27,8	79,3	9,8	28,6
C 224B	27,8	76,2	10,5	38,1
C 232A-H	36,5	104,7	13,1	38,1

[a] Heavy or higher-strength chains are designated with the suffix H.

Table 4 — M1 type attachment plate dimensions (see Figure 6)

Dimensions in millimetres

ISO chain number [a]	Height from chain centreline h_5	Minimum hole diameter d_5
C 208A	11,1	5,1
C 208B	13,0	4,3
C 210A	14,3	6,6
C 210B	16,5	5,3
C 212A	17,5	8,2
C 212A-H	17,5	8,2
C 212B	21,0	6,4
C 216A	22,2	9,8
C 216A-H	22,2	9,8
C 216B	23,0	6,4
C 220A	28,6	13,1
C 220A-H	28,6	13,1
C 220B	30,5	8,4
C 224A	33,3	14,7
C 224A-H	33,3	14,7
C 224B	36,0	10,5
C 232A-H	44,5	19,5

[a] Heavy or higher-strength chains are designated with the suffix H.

Table 5 — M2 attachment plate dimensions (see Figure 7)

Dimensions in millimetres

ISO chain number [a]	Height from chain centreline h_6	Minimum hole diameter d_6	Longitudinal distance between hole centres g
C 208A	13,5	3,3	9,5
C 208B	13,7	4,3	12,7
C 210A	15,9	5,1	11,9
C 210B	16,5	5,3	15,9
C 212A	19,0	5,1	14,3
C 212A-H	19,0	5,1	14,3
C 212B	18,5	6,4	19,1
C 216A	25,4	6,6	19,1
C 216A-H	25,4	6,6	19,1
C 216B	27,4	6,4	25,4
C 220A	31,8	8,2	23,8
C 220A-H	31,8	8,2	23,8
C 220B	33,0	8,4	31,8
C 224A	37,3	9,8	28,6
C 224A-H	37,3	9,8	28,6
C 224B	42,7	10,5	38,1
C 232A-H	50,8	13,1	38,1

[a] Heavy or higher-strength chains are designated with the suffix H.

Table 6 — Extended pin dimensions (see Figures 8 and 9)

Dimensions in millimetres

ISO chain number [a]	Pin extension				Pin diameter
	Type "X"		Type "Y"		
	b_{10} max.	b_9 max.	b_{12} max.	b_{11} max.	d_2 max.
C 208A	—	—	10,2	26,3	3,98
C 208B	15,5	31,0	—	—	4,45
C 210A	—	—	12,7	32,6	5,09
C 210B	18,5	36,2	—	—	5,08
C 212A	—	—	15,2	40,0	5,96
C 212A-H	—	—	15,2	43,3	5,96
C 212B	21,5	42,2	—	—	5,72
C 216A	—	—	20,3	51,7	7,94
C 216A-H	—	—	20,3	55,3	7,94
C 216B	34,5	68,0	—	—	8,28
C 220A	—	—	25,4	63,8	9,54
C 220A-H	—	—	25,4	67,2	9,54
C 220B	39,4	79,7	—	—	10,19
C 224A	—	—	30,5	78,6	11,11
C 224A-H	—	—	30,5	82,4	11,11
C 224B	51,4	101,8	—	—	14,63
C 232A-H	—	—	40,6	106,3	14,29

[a] Heavy or higher-strength chains are designated with the suffix H.

4.7.5 Manufacture

The actual form of the attachment plates is left to the discretion of the manufacturer.

The length of the attachment plate is also left to the discretion of the manufacturer, but it should be sufficient to accommodate the two attachment holes longitudinally. In the case of attachment type K2, it should not interfere with the working of the adjoining links. A common length is normally adopted for both one and two hole attachments.

4.7.6 Marking

It is not a requirement that K and M attachment plates are marked.

The marking of the extended pin chain shall be the same as for a chain with no attachments (see 4.6).

5 Sprockets

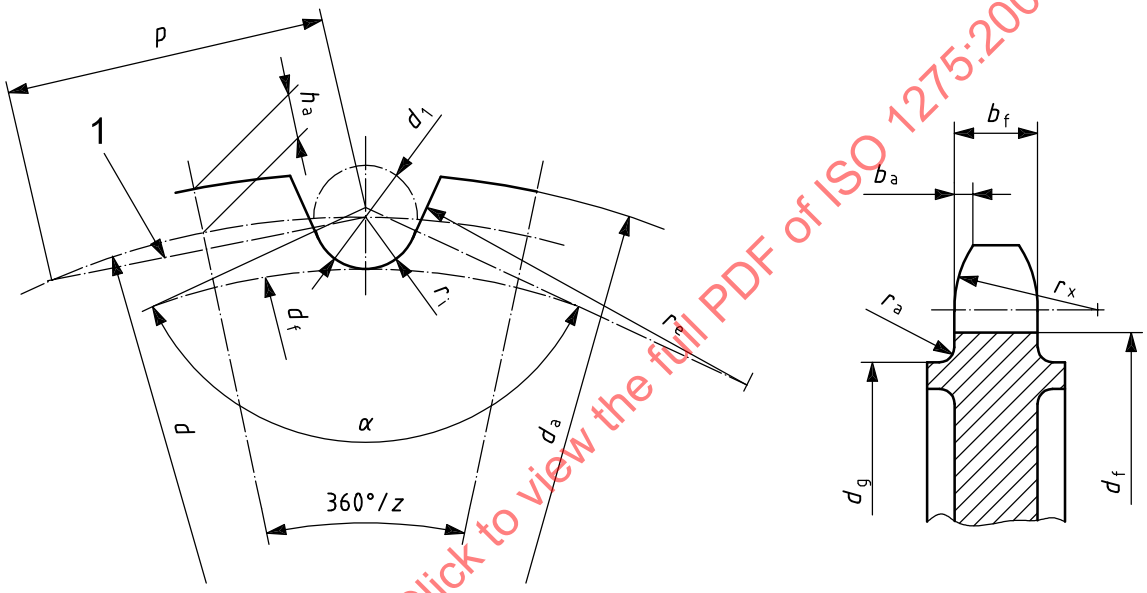
5.1 Nomenclature

The nomenclature for basic chain dimensions on which all sprocket data are based is shown in Figure 3 and given in Tables 1 and 2.

5.2 Diametral dimensions and tooth shape

5.2.1 Nomenclature

Nomenclature for diametral dimensions and tooth shape is shown in Figure 10.



Key

1	pitch polygon	p	chordal pitch (equal to chain pitch)
b_a	tooth side relief	r_a	shroud fillet radius
b_f	tooth width	r_e	tooth flank radius
d	pitch circle diameter	r_i	roller seating radius
d_a	tip diameter	r_x	tooth side radius
d_f	root diameter	z	number of teeth corresponding to number of links that can be wrapped around the sprocket
d_g	absolute maximum shroud diameter		
d_1	maximum roller diameter	z_1	number of teeth for double-cut sprockets (equal to $2z$)
h_a	height of tooth above pitch polygon	α	roller seating angle
h_2	maximum plate depth		

Figure 10 — Diametral dimensions and tooth shape

5.2.2 Diametral dimensions

5.2.2.1 Pitch circle diameter, d

The chain sprocket pitch circle diameter d is given by

$$d = \frac{p}{\sin\frac{180°}{z}}$$

Annex A gives the pitch circle diameter for unit pitch as a function of the number of teeth.

5.2.2.2 Measuring pin diameter, d_R

The chain sprocket measuring pin diameter, d_R, is given by

$$d_R = d_1 {}^{+0,01}_{0} \quad \text{(see Figure 11)}$$

5.2.2.3 Root diameter, d_f

The chain sprocket root diameter d_f is given by

$$d_f = d - d_1$$

and is subject to the tolerance limits given in Table 7.

Table 7 — Chain sprocket root diameter tolerance limits

Dimensions in millimetres

Root diameter d_f	Upper deviation	Lower deviation
$d_f \leqslant 127$	0	0,25
$127 < d_f \leqslant 250$	0	0,3
$d_f > 250$	h11 [a]	

[a] See ISO 286-2.

5.2.2.4 Measurement over pins (see Figure 11)

For an even number of teeth, the measurement over pins is given by

$$M_{R,\,min} = d + d_R$$

For an odd number of teeth and single-cut sprockets, the measurement over pins is given by

$$M_{R,\,min} = d\cos\frac{90°}{z} + d_R$$