
International Standard



6972

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Welded steel type cranked link mill chains and chain wheels

Chaînes à maillons coudés en acier, de type soudé, et roues dentées pour chaînes

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Descriptors : chains, welded link chains, sprockets, dimensions, dimensional tolerances, nomenclature, designation, measuring loads, breaking loads.

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.

International Standard ISO 6972 was developed by Technical Committee ISO/TC 100, *Chains and chain wheels for power transmission and conveyors*, and was circulated to the member bodies in September 1981.

It has been approved by the member bodies of the following countries:

Austria	India	South Africa, Rep. of
Belgium	Ireland	Spain
Czechoslovakia	Korea, Rep. of	United Kingdom
Egypt, Arab Rep. of	Netherlands	USA
France	Romania	USSR

The member body of the following country expressed disapproval of the document on technical grounds :

Poland

Welded steel type cranked link mill chains and chain wheels

1 Scope and field of application

This International Standard lays down dimensions, tolerances, measuring loads and minimum breaking loads, together with the tooth gap forms and rim profiles of the associated chain wheels, for welded cranked link¹⁾ mill chains suitable for the mechanical transmission of power and conveying applications under a variety of conditions.

Dimensions for fourteen types of attachment are also laid down.

The chain dimensions laid down ensure complete interchangeability of any given size and provide interchangeability of individual links of chain for repair purposes.

2 References

ISO 286/1, *ISO system of limits and fits — Part 1: General, tolerances and deviations.*²⁾

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

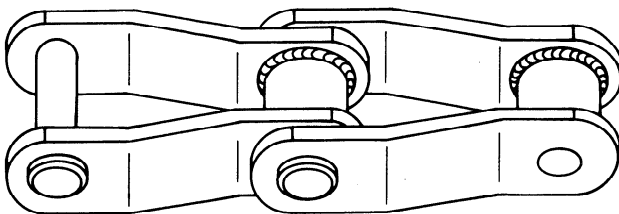


Figure 1 — Cranked link chain assembly

3 Chains

3.1 Nomenclature

The nomenclature of the chains is indicated in figures 1, 2 and 3, and in tables 1 and 1M.

The illustrations do not necessarily define the actual form of the cranked plates.

3.2 Designation

Welded steel type cranked link mill chains are designated by the prefix "W", to indicate that they are of welded design, followed by a number which is the same as the cast pintle or steel engineering type of chains which they replace.

3.3 Construction

A chain is constructed from a series of cranked link assemblies (see figures 1 and 2) which are joined by connecting pins passing through each pitch hole. The connecting pins are a press fit in the cranked plate and/or mechanically locked, for example flats, to prevent their rotation.

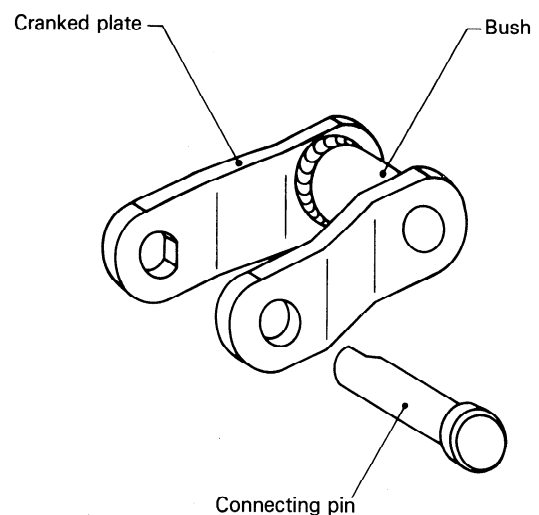


Figure 2 — Typical cranked link components

1) In the USA, the term "offset sidebar" is used in place of "cranked link".

2) At present at the stage of draft. (Revision of ISO/R 286-1962.)

3.4 Dimensions

Chains shall conform to the dimensions given in tables 1 and 1M. 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 that should be used in manufacture.

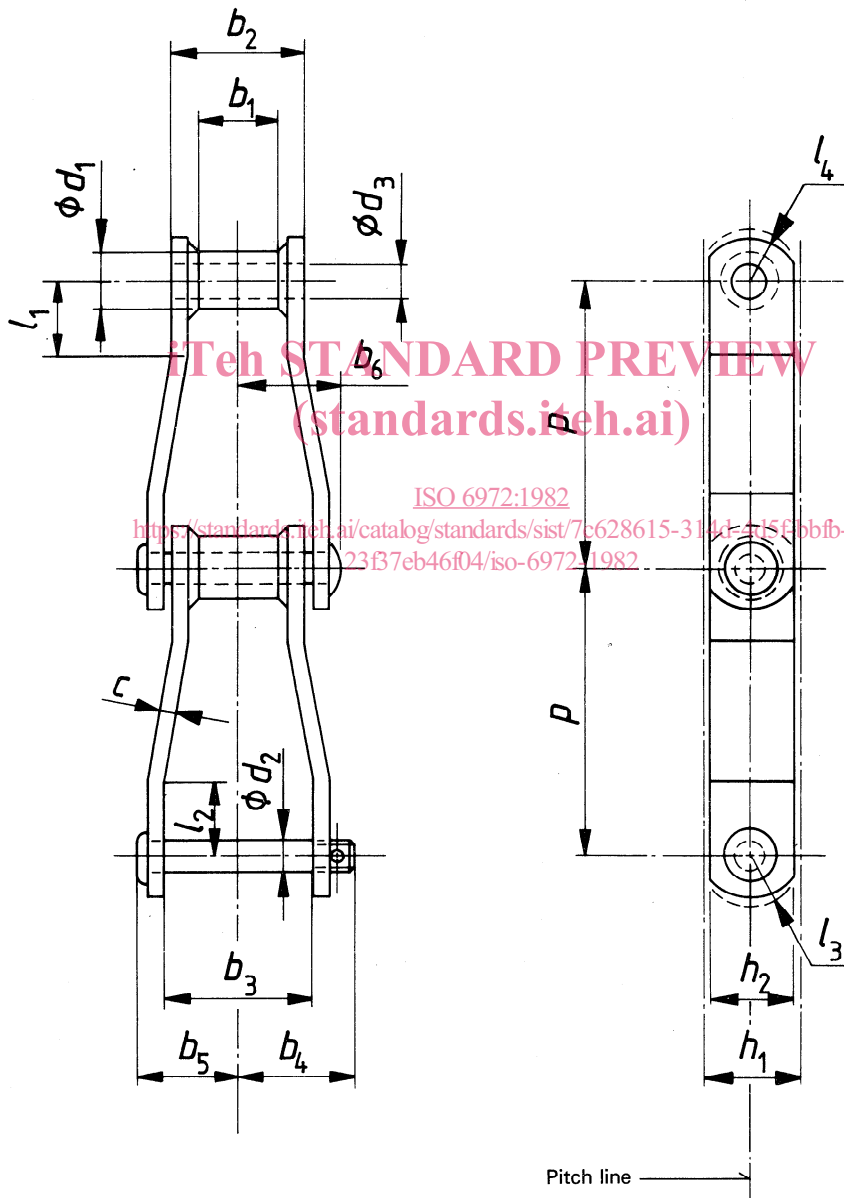
Pitch p is a theoretical reference dimension used in calculating strand lengths and chain wheel dimensions; it is not intended for inspection of individual links.

3.5 Breaking loads

The test length shall have a minimum of three free pitches. The ends shall be attached to the testing machine shackles by a pin through the plate holes or the bushes. 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.



NOTES

- 1 The overall width of connecting links are :
 - $b_5 + b_6$, when riveted;
 - $b_4 + b_5$, with fastener at one side;
 - $2 \times b_4$, with fastener at both sides.
- 2 The form of the line of cranking, or offset, between l_1 and l_2 is straight.

Figure 3 — Symbols related 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		
									Bush diameter	Width between plates for wheel contact at inner end								Width over link at inner end	Width between plates at outer end	Width over pin fastening to centre line
ISO chain No.	p	d_1	b_1	d_2	d_3	h_1	h_2	l_1	l_2	l_3	l_4	h_2	b_3	b_4	b_5	b_6	c	lbf	lbf	
W78	2.609	0.90	1.12	0.503	0.508	1.12	1.12	0.67	0.66	0.66	0.66	2.01	2.03	1.78	1.56	1.68	0.25	200	21 000	24 000
W82	3.075	1.24	1.25	0.565	0.570	1.32	1.25	0.78	0.82	0.77	0.82	2.26	2.28	1.90	1.64	1.78	0.25	300	22 500	29 500
W106	6.000	1.46	1.62	0.753	0.758	1.56	1.50	1.05	1.06	1.04	1.06	2.82	2.84	2.45	2.22	2.34	0.38	400	38 000	50 500
W110	6.000	1.26	1.84	0.753	0.758	1.56	1.50	1.05	1.06	1.04	1.06	3.01	3.03	2.45	2.16	2.34	0.38	300	38 000	50 500
W111	4.760	1.46	2.25	0.753	0.758	1.56	1.50	1.05	1.06	1.04	1.06	3.38	3.40	2.75	2.50	2.53	0.38	400	38 000	50 500
W124	4.000	1.46	1.62	0.753	0.758	1.56	1.50	1.05	1.06	1.04	1.06	2.82	2.84	2.44	2.22	2.34	0.38	400	38 000	50 500
W124H	4.063	1.64	1.62	0.878	0.883	2.06	2.00	1.11	1.20	1.10	1.19	3.01	3.03	2.78	2.46	2.59	0.50	700	62 000	80 000
W132	6.050	1.76	3.00	1.003	1.008	2.06	2.00	1.19	1.20	1.18	1.19	4.40	4.42	3.47	3.12	3.28	0.50	700	62 000	85 000

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

1	2	3	4	5	6	7	8	9	10		11	12	13	14	15	16	17	18		
									Bush diameter	Width between plates for wheel contact at inner end								Width over link at inner end	Width between plates at outer end	Width over pin fastening to centre line
ISO chain No.	p	d_1	b_1	d_2	d_3	h_1	h_2	l_1	l_2	l_3	l_4	b_2	b_3	b_4	b_5	b_6	c	daN	daN	
W78	66,27	22,9	28,4	12,78	12,90	30,0	28,4	17,0	16,8	16,8	16,8	51,0	51,6	45,2	39,6	42,7	6,4	90	9 340	10 680
W82	78,10	31,5	31,8	14,35	14,48	33,5	31,8	19,8	20,8	19,6	20,8	57,4	57,9	48,3	41,7	45,2	6,4	130	10 010	13 120
W106	152,40	37,1	41,2	19,13	19,25	39,6	38,1	26,7	26,4	26,9	26,9	71,6	72,1	62,2	56,4	59,4	9,7	180	16 900	22 460
W110	152,40	32,0	46,7	19,13	19,25	39,6	38,1	26,7	26,4	26,9	26,9	76,5	77,0	62,2	54,9	59,4	9,7	130	16 900	22 460
W111	120,90	37,1	57,2	19,13	19,25	39,6	38,1	26,7	26,4	26,9	26,9	85,9	86,4	69,8	63,5	64,3	9,7	180	16 900	22 460
W124	101,60	37,1	41,2	19,13	19,25	39,6	38,1	26,7	26,4	26,9	26,9	71,6	72,1	62,0	56,4	59,4	9,7	180	16 900	22 460
W124H	103,20	41,7	41,2	22,30	22,43	52,3	50,8	28,2	27,9	30,0	30,2	76,5	77,0	70,6	62,5	65,8	12,7	310	27 580	35 590
W132	153,67	44,7	76,2	25,48	25,60	52,3	50,8	30,2	30,0	30,2	30,2	111,8	112,3	88,1	79,2	83,3	12,7	310	27 580	37 810

3.6 Length accuracy

Finished chains shall be measured either dry or after only light lubricating.

The standard nominal length for measurement shall be that nearest to 3 048 mm (120 in).

The chain shall be supported throughout its entire length and the measuring load given in tables 1 and 1M applied. To comply with this International Standard, the length shall be the nominal length subject to the limits of tolerance of $^{+0,32}_0$ %.

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 chain shall be marked with :

- a) the manufacturer's name or trade mark;
- b) the ISO chain number (see 3.2).

4 Attachments

4.1 General

Unless otherwise stated, the dimensions and test details for the chain with attachments shall conform to clause 3.

4.2 Designation

Fourteen types of attachments are given having the following designations and distinguishing features :

- A1, A2 and A22 : a mounting plate, with mounting holes, attached parallel to pitch line on one cranked link;
- F2 and F4 : an angle section, with mounting hole, attached to the edge of each cranked plate;
- H1 and H2 : a U-section attached to, and spanning, each cranked link;
- K1 and K2 : mounting plates, with mounting holes, attached parallel to pitch line on both cranked plates;
- R1, RR1, R2 and RR2 : a triangular spur attached to one or both cranked plates;
- W1 : an angle section attached to the outer face of each cranked plate.

4.3 Dimensions

The attachments shall conform to the dimensions given in tables 2 to 13M respectively.

4.4 Manufacture

The actual form of the attachments is left to the discretion of the manufacturer whilst maintaining the dimensions specified in 4.3.

4.5 Marking

The marking of the chain required by 3.7 shall not be obscured by an attachment.

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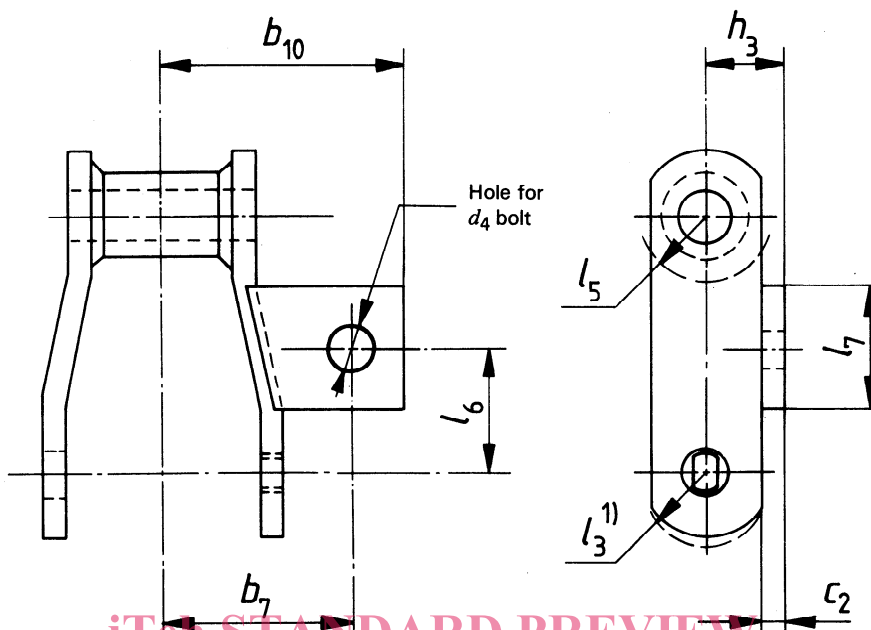


Figure 4 – A1 attachment

ISO 6972:1982

Table 2 – Dimensions of A1 attachments (in inches)

ISO chain No.	b_7	l_6	l_7 max.	h_3 max.	b_{10} max.	c_2	l_5	Bolt diameter $d_4^{2)}$
W78	2.00	1.25	1.44	0.88	2.56	0.25	0.67	0.38
W82	2.10	1.50	1.81	0.94	2.81	0.25	0.80	0.38

Table 2M – Dimensions of A1 attachment (in millimetres)

ISO chain No.	b_7	l_6	l_7 max.	h_3 max.	b_{10} max.	c_2	l_5	Bolt diameter $d_4^{2)}$
W78	50,8	31,8	36,6	22,4	65,0	6,4	17,0	9,7
W82	53,3	38,1	46,0	23,9	71,4	6,4	20,3	9,7

1) See tables 1 and 1M for l_3 dimension.

2) Actual hole diameter to provide adequate clearance for the specified bolt diameter, d_4 .

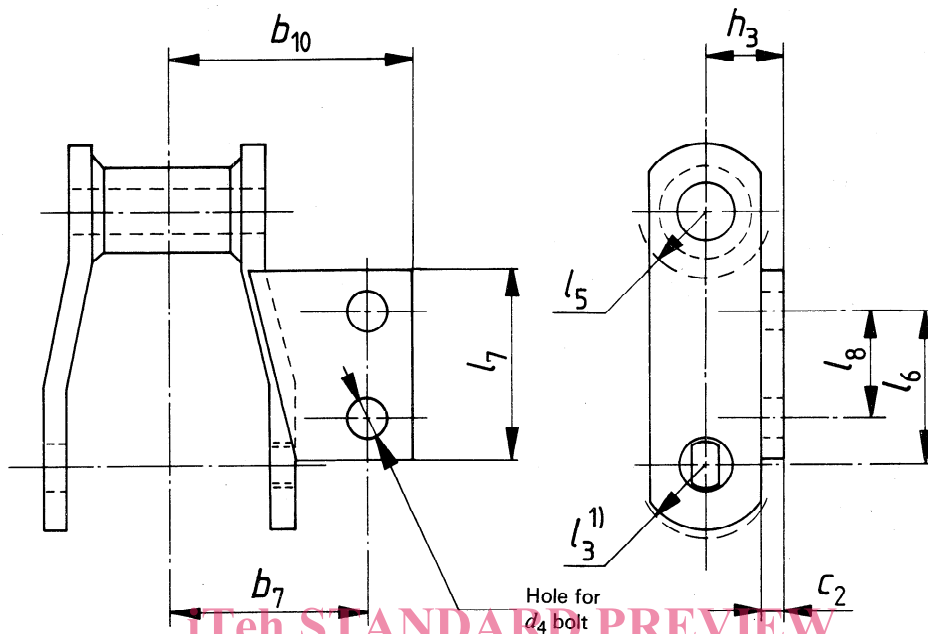


Figure 5 — A2 attachment
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Table 3 — Dimensions of A2 attachments (in inches)
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ISO chain No.	b_7	l_6	l_7 max.	l_8	h_3 max.	b_{10} max.	c_2	l_5	Bolt diameter $d_4^{2)}$
W78	2.00	1.53	2.06	1.12	0.88	2.56	0.25	0.67	0.38
W82	2.13	2.06	2.44	1.31	0.94	2.81	0.25	0.80	0.38
W110	2.66	3.88	3.31	1.75	1.18	3.31	0.38	0.91	0.38
W111	3.13	3.54	3.56	2.31	1.18	3.81	0.38	0.91	0.50
W124	2.63	2.81	3.06	1.94	1.18	3.56	0.38	0.91	0.38
W124H	2.63	2.88	3.18	1.94	1.56	3.26	0.50	1.12	0.50
W132	3.75	4.38	4.18	2.75	1.56	4.62	0.50	1.19	0.50

Table 3M — Dimensions of A2 attachments (in millimetres)

ISO chain No.	b_7	l_6	l_7 max.	l_8	h_3 max.	b_{10} max.	c_2	l_5	Bolt diameter $d_4^{2)}$
W78	50,8	38,9	52,3	28,4	22,4	65,0	6,4	17,0	9,7
W82	54,1	52,3	62,0	33,3	23,9	71,4	6,4	20,3	9,7
W110	67,6	98,6	84,1	44,4	30,0	84,1	9,7	23,1	9,7
W111	79,5	89,9	90,4	58,7	30,0	96,8	9,7	23,1	12,7
W124	66,8	71,4	77,7	49,3	30,0	90,4	9,7	23,1	9,7
W124H	66,8	73,2	80,8	49,3	39,6	82,8	12,7	28,4	12,7
W132	95,2	111,3	106,2	69,8	39,6	117,3	12,7	30,2	12,7

1) See tables 1 and 1M for l_3 dimension.

2) Actual hole diameter to provide adequate clearance for the specified bolt diameter, d_4 .

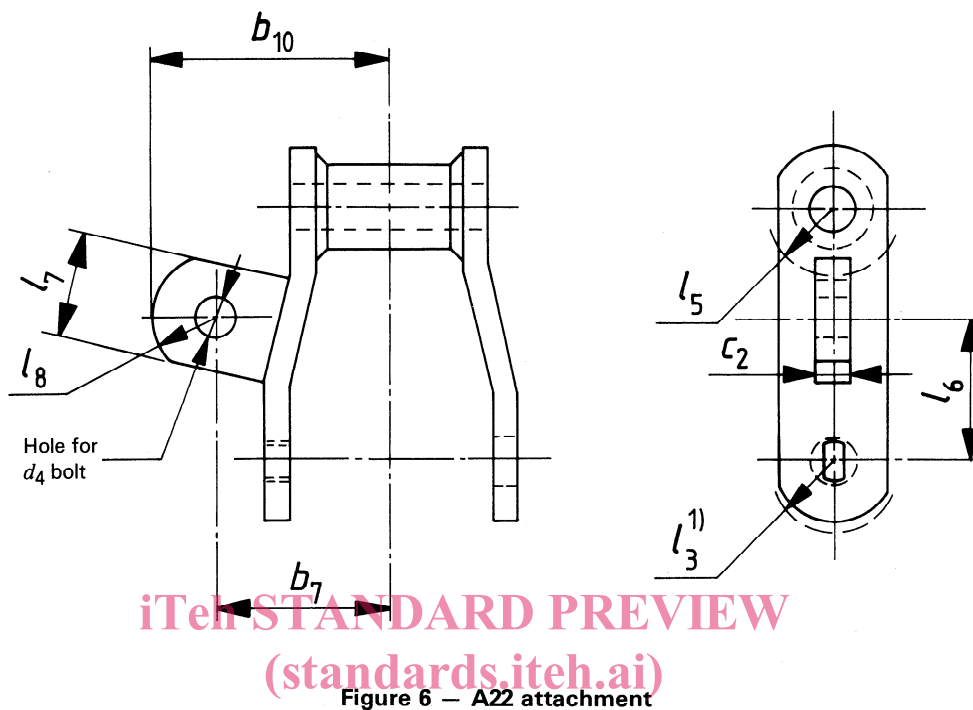


Figure 6 – A22 attachment

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Table 4 – Dimensions of A22 attachments (in inches)

ISO chain No.	b_7	l_6	l_7 max.	b_{10} max.	c_2	l_8 max.	l_5	Bolt diameter $d_4^{2)}$
W78	1.88	1.31	1.18	2.56	0.38	0.72	0.67	0.38

Table 4M – Dimensions of A22 attachments (in millimetres)

ISO chain No.	b_7	l_6	l_7 max.	b_{10} max.	c_2	l_8 max.	l_5	Bolt diameter $d_4^{2)}$
W78	47,8	33,3	30,0	65,0	9,7	18,3	17,0	9,7

1) See tables 1 and 1M for l_3 dimension.2) Actual hole diameter to provide adequate clearance for the specified bolt diameter, d_4 .

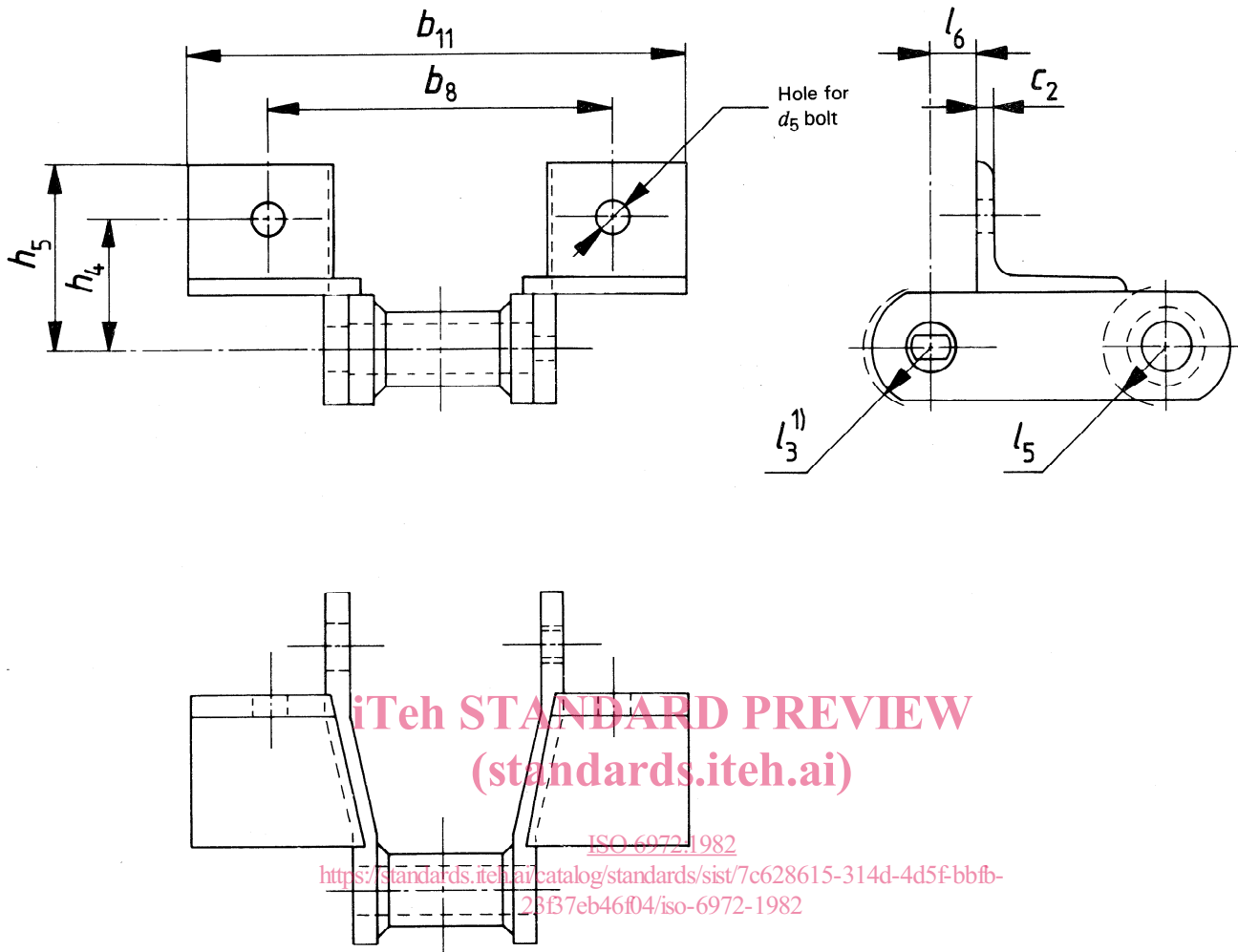


Figure 7 — F2 attachment

Table 5 — Dimensions of F2 attachments (in inches)

ISO chain No.	b_8	l_6 max.	h_4	h_5 max.	b_{11} max.	c_2	l_5	Bolt diameter $d_5^{2)}$
W78	3.76	0.62	1.44	2.38	5.44	0.25	0.67	0.38

Table 5M — Dimensions of F2 attachments (in millimetres)

ISO chain No.	b_8	l_6 max.	h_4	h_5 max.	b_{11} max.	c_2	l_5	Bolt diameter $d_5^{2)}$
W78	95,5	15,7	36,6	60,5	138,2	6,4	17,0	9,7

1) See tables 1 and 1M for l_3 dimension.

2) Actual hole diameter to provide adequate clearance for the specified bolt diameter, d_5 .

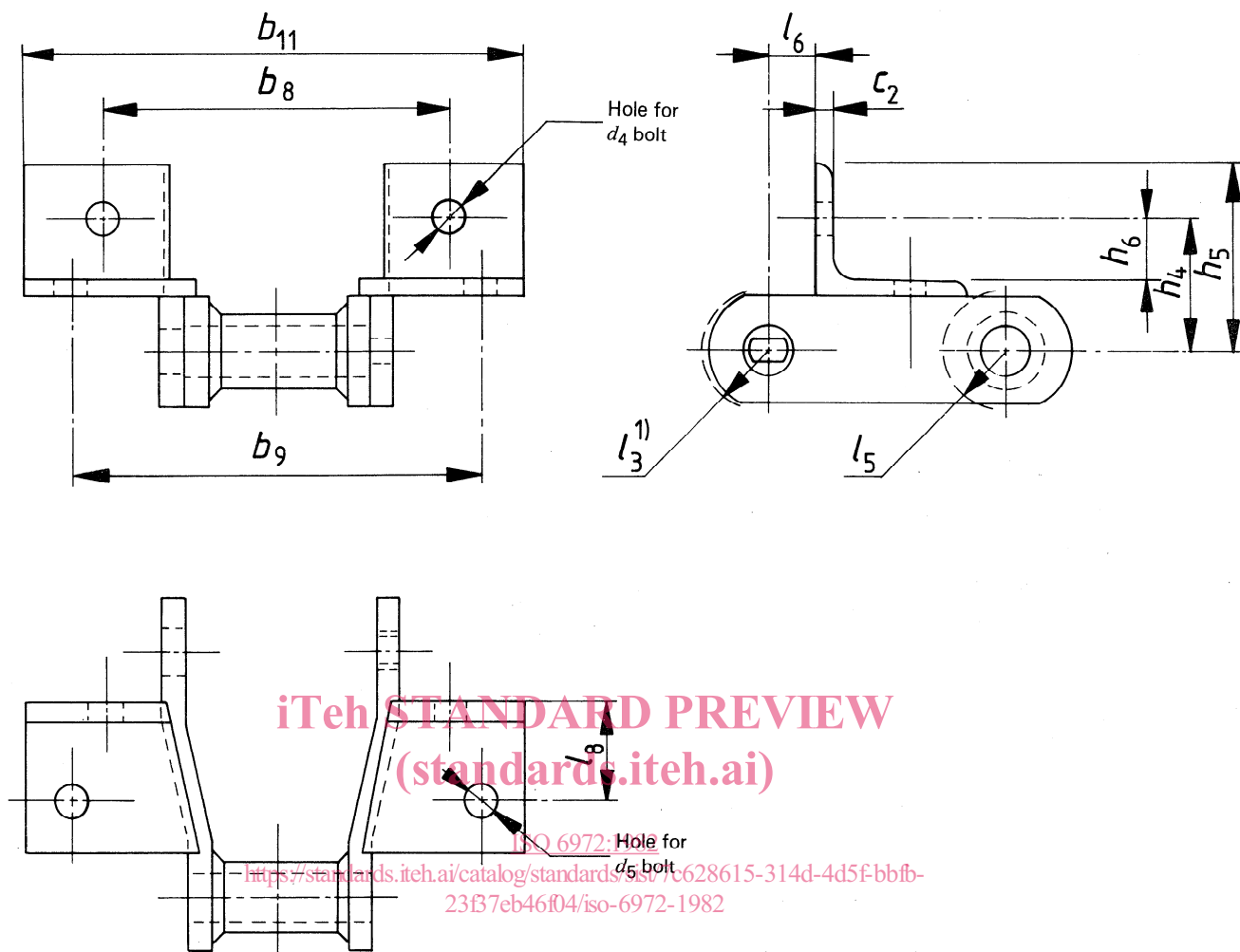


Figure 8 — F4 attachment

Table 6 — Dimensions of F4 attachments (in inches)

ISO chain No.	b_9	l_6	l_8	h_4	h_6	h_5 max.	b_8	b_{11} max.	c_2	l_5	Bolt diameter $d_4^{(2)}$	Bolt diameter $d_5^{(2)}$
W78	4.50	0.68	1.25	1.75	0.94	2.38	3.75	5.56	0.25	0.67	0.38	0.38
W82	5.00	0.81	1.12	1.82	0.94	2.44	4.12	5.94	0.25	0.80	0.38	0.38
W124	5.26	0.88	1.44	2.06	0.93	2.88	4.38	6.18	0.38	0.91	0.38	0.38

Table 6M — Dimensions of F4 attachments (in millimetres)

ISO chain No.	b_9	l_6	l_8	h_4	h_6	h_5 max.	b_8	b_{11} max.	c_2	l_5	Bolt diameter $d_4^{(2)}$	Bolt diameter $d_5^{(2)}$
W78	114,3	17,3	31,8	44,4	23,8	60,5	95,2	141,2	6,4	17,0	9,7	9,7
W82	127,0	20,6	28,4	46,2	23,8	62,0	104,6	150,9	6,4	20,3	9,7	9,7
W124	133,6	22,4	36,6	52,3	23,6	73,2	111,3	157,0	9,7	23,1	9,7	9,7

1) See tables 1 and 1M for l_3 dimension.

2) Actual hole diameter to provide adequate clearance for the specified bolt diameter, d_4 or d_5 .