

JIS

JAPANESE INDUSTRIAL STANDARD

Shackles

JIS B 2801—1996

Translated and Published

by

Japanese Standards Association

**In the event of any doubt arising,
the original Standard in Japanese is to be final authority**

Errata for JIS (English edition) are printed in *Standardization Journal*, published monthly by the Japanese Standards Association.

Errata will be provided upon request, please contact:

**Business Department,
Japanese Standards Association**
4-1-24, Akasaka, Minato-ku,
Tokyo, JAPAN 107
TEL. 03-3583-8002
FAX. 03-3583-0462

Errata are also provided to subscribers of JIS (English edition) in *Monthly Information*.

JAPANESE INDUSTRIAL STANDARD

J I S

Shackles

B 2801-1996

1. Scope This Japanese Industrial Standard specifies shackles to be used for wire rope and the like.

Remarks 1. Shackles specified in ISO 2415 shall comply with the requirements laid down in this Annex.

2. The Standards cited in this Standard are given in the following :

JIS B 0148 Glossary of terms for hoists

JIS B 0205 Metric coarse screw threads

JIS B 0207 Metric fine screw threads

JIS B 0209 Limits of sizes and tolerances for metric coarse screw threads

JIS B 0211 Limits of sizes and tolerances for metric fine screw threads

JIS B 0251 Limit gauges for metric coarse screw threads

JIS B 0252 Limit gauges for metric fine screw threads

JIS B 1181 Hexagon nuts and hexagon thin nuts

JIS B 1351 Split pins

JIS G 3101 Rolled steels for general structure

JIS G 3505 Low carbon steel wire rods

JIS G 4051 Carbon steels for machine structural use

JIS G 4105 Chromium molybdenum steels

JIS G 4303 Stainless steel bars

JIS H 0401 Methods of test for hot dip galvanized coatings

JIS Z 2243 Method of Brinell hardness test

JIS Z 2245 Method of Rockwell and Rockwell superficial hardness test

JIS Z 8601 Preferred numbers

3. The corresponding International Standard to this Standard is given in the following :

ISO 2415 : 1987 Forged shackles for general lifting purposes—Dee shackles and bow shackles

2. Definitions For the purpose of this Standard, main terms and definitions shall follow those laid down in JIS B 0148.

3. Type, form and grade

(1) Type The shackle shall be classified into the bow shackle and straight shackle according to the shape of the body.

2

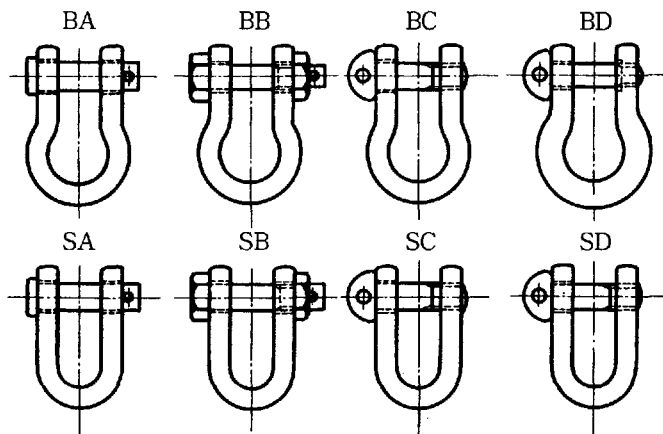
B 2801-1996

- (2) Forms The forms of the shackle shall be discriminated as given in Table 1 according to the combination of the shackle body with shackle bolt or shackle pin (see Fig. 1).

Table 1. Type and form

Type	Symbol of shackle body	Bolt or pin		Form symbol	Fastening method of bolt or pin
		Shape	Symbol		
Bow shackle	B	Flat head pin	A	BA	Round plug (with split cotter pin)
		Bolt with hexagon head	B	BB	Nut (with split cotter pin)
		Eyebolt	C	BC	Screw in
		Eyebolt	D	BD	Screw in
Straight shackle	S	Flat head pin	A	SA	Round plug (with split cotter pin)
		Bolt with hexagon head	B	SB	Nut (with split cotter pin)
		Eyebolt	C	SC	Screw in
		Eyebolt	D	SD	Screw in

Fig. 1. Form



- (3) Grade The shackle shall be classified into grades M, S, T and V.

4. Performance

- (1) Working load limit of the shackle shall be as given in Table 2.

Table 2. Working load limit

Unit : t

Nominal size	Grade M								Grade S		Grade T		Grade V	
	Bow shackle				Straight shackle				Bow shackle	Straight shackle	Bow shackle	Straight shackle	Bow shackle	Straight shackle
	BA	BB	BC	BD	SA	SB	SC	SD	BB	SB	BB	SB	BB	SB
6	—	—	0.2	0.15	—	—	0.2	—	—	—	—	—	—	—
8	—	—	0.315	0.315	—	—	0.315	—	—	—	—	—	—	—
10	—	—	(0.6)	0.5	—	—	(0.6)	0.4	0.8	0.8	1	1	1.25	1.25
12	—	—	1	(0.7)	—	—	1	0.63	1.6	1.6	2	2	2.5	2.5
14	—	—	1.25	(0.9)	—	—	1.25	0.8	2	2	2.5	2.5	3.15	3.15
16	—	—	1.6	(1.2)	—	—	1.6	1	2.5	2.5	3.15	3.15	4	4
18	—	—	2	(1.3)	—	—	2	—	3.15	3.15	4	4	5	5
20	—	2.5	2.5	1.8	—	2.5	2.5	1.6	4	4	5	5	6.3	6.3
22	—	3.15	3.15	—	—	3.15	3.15	2	5	5	6.3	6.3	—	—
24	—	(3.6)	(3.6)	—	—	(3.6)	(3.6)	2.5	6.3	6.3	—	—	8	8
26	—	4	4	—	—	4	4	3.15	—	—	8	8	10	10
28	—	(4.8)	(4.8)	—	—	(4.8)	(4.8)	(3.5)	8	8	10	10	12.5	12.5
30	—	5	5	—	—	5	5	4	—	—	—	—	—	—
32	—	6.3	6.3	—	—	6.3	6.3	—	10	10	12.5	12.5	16	16
34	(7)	(7)	(7)	—	(7)	(7)	(7)	5	—	—	—	—	—	—
36	8	8	8	—	8	8	8	—	12.5	12.5	16	16	20	20
38	(9)	(9)	(9)	—	(9)	(9)	(9)	6.3	—	—	—	—	—	—
40	10	10	10	—	10	10	10	(7)	16	16	20	20	25	25
42	(11)	(11)	—	—	(11)	(11)	—	8	—	—	—	—	—	—
44	12.5	12.5	—	—	12.5	12.5	—	—	20	20	25	25	31.5	31.5
46	(13)	(13)	—	—	(13)	(13)	—	—	—	—	—	—	—	—
48	14	14	—	—	14	14	—	10	—	—	—	—	—	—
50	16	16	—	—	16	16	—	—	25	25	31.5	31.5	40	40
52	—	—	—	—	—	—	—	12.5	—	—	—	—	—	—
55	18	18	—	—	18	18	—	—	—	—	—	—	—	—
58	—	—	—	—	—	—	—	16	—	—	—	—	—	—
60	20	20	—	—	20	20	—	—	31.5	31.5	40	40	50	50
65	25	25	—	—	25	25	—	—	40	40	50	50	63	63
70	31.5	31.5	—	—	31.5	31.5	—	—	50	50	63	63	80	80
75	(35)	(35)	—	—	(35)	(35)	—	—	—	—	—	—	—	—
80	40	40	—	—	40	40	—	—	63	63	80	80	100	100
85	45	45	—	—	45	45	—	—	—	—	—	—	—	—
90	50	50	—	—	50	50	—	—	80	80	100	100	125	125

Remarks: The numerical values without parentheses are given in accordance with the preferred numbers specified in JIS Z 8601.

- (2) Proof force The shackle shall be free from abnormality when a proof force that is twice the working load limit given in Table 2 is applied. The shackle body, shackle pin, shackle bolt, etc. shall be free from permanent deformation when they are applied a proof force and then loosened.
- (3) Static strength The shackle shall withstand the tensile load equivalent to 5 or more times the working load limit specified in Table 2.

5. Shape and dimensions The shape and dimensions shall be as given in the following :

- (1) The shape and dimensions of the shackle body, shackle pin, bolt and nut shall conform to Figs. 2 to 9. The dimensional tolerances on d , d_1 , t , d_3 , B , L and L_1 , however, shall conform to Table 3.

Table 3. Dimensional tolerances

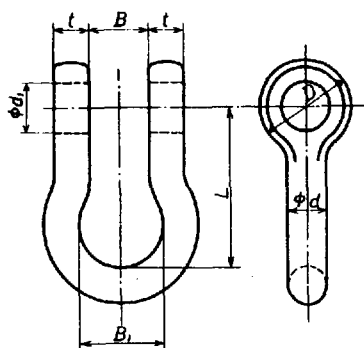
Unit : mm		
Dimension	Discrimination of dimension	Dimensional tolerance
d	6 to 10	+ 1 - 0.5
	12 to 18	+ 1 - 1
	20 to 50	+ 2 - 1
	51 and over	+ 3 - 2
d_1, t	25 or less	+ 1 - 0.5
	26 and over, up to and incl. 38	+ 2 - 0.5
	40 and over	+ 2.5 - 1
d_3	15 or less	± 0.2
	17 and over, up to and incl. 62	± 0.3
	65 and over	± 0.5
L, L_1	16 or less (in nominal)	$\pm 4.5 \%$
	18 and over (in nominal)	$\pm 4 \%$
B	11 to 135	+ 5 % (5 max.) 0

- (2) The split cotter pins used for forms BA, BB, SA and SB shall conform to the requirements specified in JIS B 1351.
- (3) The screw threads shall conform to the requirements specified in JIS B 0205 or JIS B 0207, and their fitting quality shall be Quality 3 of JIS B 0209 or Quality 3 of JIS B 0211.

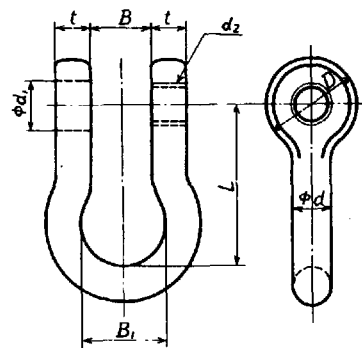
Remarks: The dimension, d , shall be measured at underneath the head.

Fig. 2. Shape and dimensions of bow shackle body

Shackle body, forms BA and BB



Shackle body, form BC



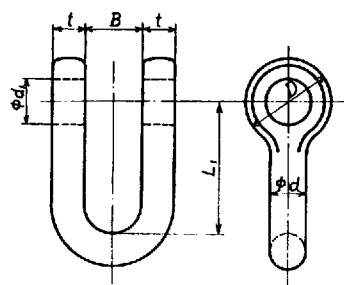
Unit : mm

Nominal size	t	d	B	B ₁	D	d ₁	Designation of screw thread (d ₂)	L	(Informative reference) Theoretical mass (kg)		
									BA	BB	BC
6	6	8	11	20	17	9	M8	36	—	—	0.07
8	8	10	14	25	21	11	M10	45	—	—	0.15
10	10	12	17	30	25	13	M12	54	—	0.31	0.31
12	12	14	20	35	32	16	M14	63	—	0.48	0.48
14	14	16	24	40	36	18	M16	72	—	0.67	0.67
16	16	18	26	45	40	20	M18	80	—	0.93	0.93
18	18	21	29	53	45	22	M20	95	—	1.35	1.35
20	20	23	31	58	50	25	M24	104	—	1.93	2.15
22	22	26	34	65	55	27	M24	117	—	2.81	2.98
24	24	28	39	70	62	31	M30	126	—	3.64	3.77
26	26	30	41	75	66	33	M30	135	—	4.33	4.45
28	28	32	43	80	70	35	M33	144	—	5.33	5.36
30	30	34	45	85	75	37	M36	153	—	6.44	6.10
32	32	37	48	93	80	39	M36	167	—	8.17	7.56
34	34	39	50	98	85	41	M39	176	8.88	10.0	9.05
36	36	42	54	105	90	43	M42	190	10.49	11.85	10.32
38	38	44	57	110	95	47	M45	198	11.74	13.50	11.70
40	40	47	60	118	100	49	M48	212	13.16	15.23	13.13
42	42	49	63	123	105	53	M48	220	15.25	17.65	—
44	44	51	66	128	110	56	M48	230	18.24	20.45	—
46	46	53	68	133	115	58	M48	240	20.74	23.08	—
48	48	55	72	138	120	60	M56	248	23.21	25.60	—
50	50	57	75	143	125	62	M56	257	24.85	27.38	—
55	55	62	83	155	138	67	M64	280	38.60	43.50	—
60	60	69	90	178	150	72	M64	310	54.47	59.25	—
65	65	75	98	188	164	79	M72×6	338	64.68	70.63	—
70	70	81	105	202	178	85	M80×6	360	77.95	85.04	—
75	75	87	112	218	192	92	M80×6	387	98.49	107.74	—
80	80	93	120	232	206	98	M90×6	414	119.37	130.87	—
85	85	99	128	248	220	104	M90×6	440	144.44	159.5	—
90	90	104	135	260	232	110	M100×6	473	171.50	190.13	—

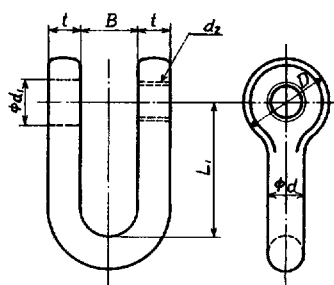
Remarks: The theoretical mass includes the mass of pin or bolt and nut, and is given for reference only.

Fig. 3. Shape and dimensions of straight shackle body

Shackle body, forms SA and SB



Shackle body, form SC

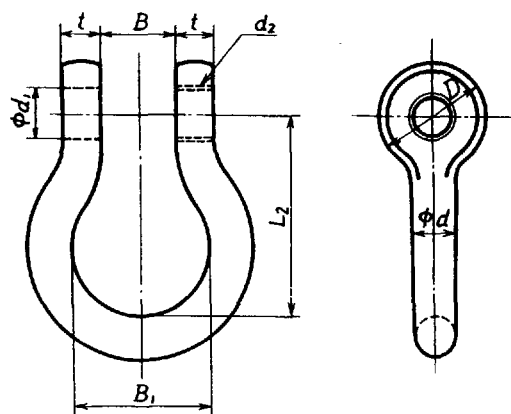


Unit : mm

Nominal size	t	d	B	D	d_1	Designation of screw thread (d_2)	L_1	(Informative reference) Theoretical mass (kg)		
								SA	SB	SC
6	6	6	11	17	9	M8	24	—	—	0.04
8	8	8	14	21	11	M10	32	—	—	0.09
10	10	10	17	25	13	M12	40	—	0.15	0.15
12	12	12	20	32	16	M14	48	—	0.31	0.31
14	14	14	24	36	18	M16	56	—	0.49	0.49
16	16	16	26	40	20	M18	64	—	0.74	0.74
18	18	18	29	45	22	M20	72	—	1.23	1.13
20	20	20	31	50	25	M24	80	—	1.33	1.55
22	22	22	34	55	27	M24	88	—	1.53	1.70
24	24	24	39	62	31	M30	96	—	1.74	1.87
26	26	26	41	66	33	M30	104	—	2.48	2.55
28	28	28	43	70	35	M33	112	—	3.49	3.52
30	30	30	45	75	37	M36	120	—	4.60	4.26
32	32	32	48	80	39	M36	128	—	6.18	5.57
34	34	34	50	85	41	M39	136	6.49	7.61	6.66
36	36	36	54	90	43	M42	144	7.99	9.35	7.82
38	38	38	57	95	47	M45	152	9.22	10.98	9.98
40	40	40	60	100	49	M48	160	10.08	12.15	10.05
42	42	42	63	105	53	M48	168	12.17	14.27	—
44	44	44	66	110	56	M48	176	13.90	16.11	—
46	46	46	68	115	58	M48	184	15.85	18.19	—
48	48	48	72	120	60	M56	192	17.75	20.14	—
50	50	50	75	125	62	M56	200	19.35	21.88	—
55	55	55	83	138	67	M64	220	24.60	29.50	—
60	60	60	90	150	72	M64	240	36.46	41.24	—
65	65	65	98	164	79	M72×6	260	44.80	50.75	—
70	70	70	105	178	85	M80×6	280	53.32	60.41	—
75	75	75	112	192	92	M80×6	300	57.51	76.76	—
80	80	80	120	206	98	M90×6	320	81.69	93.19	—
85	85	85	128	220	104	M90×6	340	97.42	112.48	—
90	90	90	135	232	110	M100×6	360	113.10	131.73	—

Remarks: The theoretical mass includes the mass of pin or bolt and nut, and is given for reference only.

Fig. 4. Shape and dimensions of shackle body, form BD

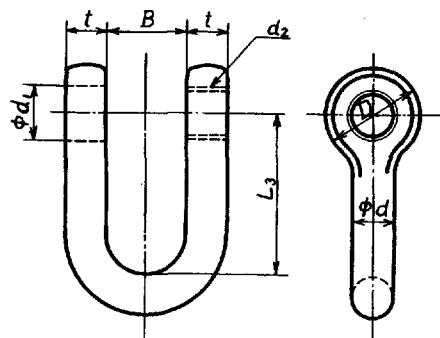


Unit : mm

Nominal size	t	d	B	B_1	D	d_1	Designation of screw thread (d_2)	L_2	(Informative reference) Theoretical mass (kg)
6	6	8	12	24	17	9	M8	36	0.06
8	8	10	16	30	24	11	M10	45	0.15
10	10	12	20	36	28	13	M12	54	0.28
12	12	14	24	42	32	16	M14	63	0.43
14	14	16	28	48	35	18	M16	72	0.62
16	16	18	32	54	40	21	M20	80	1.03
18	18	20	36	60	45	22	M20	100	1.60
20	20	22	40	66	50	25	M24	112	2.17

Remarks: The theoretical mass includes the mass of pin or bolt and nut, and is given for reference only.

Fig. 5. Shape and dimensions of shackle body, form SD

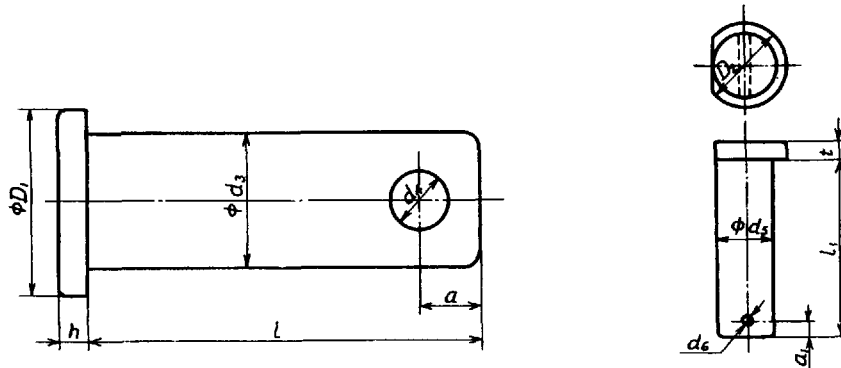


Unit : mm

Nominal size	t	d	B	D	d_1	Designation of screw thread (d_2)	L_3	(Informative reference) Theoretical mass (kg)
10	10	10	20	23	13	M12	40	0.57
12	12	12	24	28	16	M14	48	0.66
14	14	14	28	32	18	M16	56	0.75
16	16	16	32	36	21	M20	64	1.0
20	20	20	40	44	25	M24	80	1.58
22	22	22	44	50	28	M27	88	1.74
24	24	24	48	56	30	M27	96	1.89
26	26	26	52	62	33	M30	104	2.37
28	28	28	56	65	35	M33	112	3.13
30	30	30	60	70	37	M36	120	4.19
34	34	34	68	80	43	M42	136	6.30
38	38	38	76	85	46	M45	152	8.44
40	40	40	80	92	49	M48	160	9.65
42	42	42	84	100	53	M48	168	11.26
48	48	48	96	110	60	M56	192	16.69
52	52	52	104	120	64	M56	208	20.15
58	58	58	116	132	70	M64	232	25.27

Remarks: The theoretical mass includes the mass of pin or bolt and nut, and is given for reference only.

Fig. 6. Shape and dimensions of shackle pin,
forms BA and SA, and of round plug



Unit : mm

Nominal size	d_3	D_1	l	a	h	d_4	d_5	Split pin hole dia. d_6	D_2	t	a_1	l_1
34	40	55	147	17	8	17	16	4	24	5	5.5	52
36	42	58	155	17	9	17	16	4	24	5	5.5	54
38	46	62	165	19	10	19	18	4	26	5	5.5	58
40	48	64	172	19	10	19	18	4	26	5	5.5	60
42	51	68	181	20	10	20	19	4	28	5	5.5	63
44	54	72	188	20	11	20	19	4	28	5	5.5	66
46	56	74	195	21	11	21	20	4	30	6	5.5	68
48	58	77	204	21	11	21	20	4	30	6	5.5	70
50	60	79	211	21	12	21	20	4	30	6	5.5	72
55	65	87	235	25	12	25	24	5	38	8	7	79
60	70	95	252	25	13	25	24	5	38	8	7	84
65	77	104	275	28	14	28	27	5	40	8	7	91
70	83	112	296	31	15	31	30	6	44	9	8	99
75	90	120	317	33	16	33	32	6	48	9	8	106
80	96	128	335	33	18	33	32	6	48	9	8	112
85	102	136	359	37	20	37	36	6	52	10	8	118
90	108	144	379	39	22	39	38	6	56	12	8	124