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STANDARD

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(JSIM/JSA)

Hooks

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Society of Industrial Machinery Manufacturers (JSIM)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 2803**:1996 is replaced with this Standard.

This revision has been made based on **ISO 7597**:1987 *Forged steel lifting hooks with point and eye for use with steel chains of grade T(8)* for the purpose of making consistent with International Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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the original JIS is to be the final authority.

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Contents

	Page
Introduction.....	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification	2
5 Performance	3
5.1 Working load	3
5.2 Proof load	3
5.3 Static strength	3
5.4 Fatigue strength.....	3
6 Shape and main dimensions	4
6.1 Shape	4
6.2 Main dimensions	7
7 Appearance.....	8
8 Material	8
9 Method of production.....	8
10 Testing	9
10.1 Proof load test.....	9
10.2 Static strength test	10
10.3 Fatigue strength test	10
11 Inspection	10
11.1 Shape, main dimensions and appearance	10
11.2 Proof load and static strength.....	11
11.3 Fatigue strength.....	11

12	Designation of products	11
13	Marking	12
Annex 1 (normative)	Working load and proof load of hooks with working loads of 10 t or greater	13
Annex 2 (normative)	Eye hooks specified in ISO 7597	14
Annex 3 (normative)	Locking hooks	21
Annex 4 (informative)	Standard usage of hooks	27
Annex 5 (informative)	Standard check of hooks	29
Annex 6 (informative)	Comparison table between JIS and corresponding International Standard	31

Hooks

Introduction This Japanese Industrial Standard specifies the shank hooks, eye hooks and locking hooks.

Annex 2 of this Standard, specifying eye hooks, has been prepared based on the first edition of **ISO 7597** *Forged steel lifting hooks with point and eye for use with steel chains of grade T(8)* published in 1987 without modifying the technical contents.

The portions with continuous sidelines or dotted underlines are the matters not included in the original International Standard. A proposal of addition of requirements concerning shank hooks and locking hooks based on the revised Japanese Industrial Standard, which are not included in the original International Standard, is being prepared to be submitted to **ISO** with the goal of achieving the future conformity between the two standards.

1 Scope This Standard specifies the shank hooks, eye hooks and locking hooks of the single-hook type for use in hoists, cranes, lifting slings, etc. (hereafter referred to as “hooks”).

The requirements of eye hooks derived from the corresponding International Standard **ISO 7597** are given in Annex 2.

NOTE : The International Standard corresponding to this Standard is as follows.

In addition, the symbols which denote the degree of correspondence between **JIS** and the relevant International Standard are IDT (identical), MOD (modified) and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 7597:1987 *Forged steel lifting hooks with point and eye for use with steel chains of grade T(8)* (MOD)

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0148 *Lifting equipment—Terminology*

JIS G 0565 *Method for magnetic particle testing of ferromagnetic materials and classification of magnetic particle indication*

JIS Z 2343-1 *Non-destructive testing—Penetrant testing—Part 1: General principles—Method for liquid penetrant testing and classification of the penetrant indication*

3 Terms and definitions For the purpose of this Standard the terms and definitions in **JIS B 0148** shall apply.

4 Classification Hooks shall be classified as follows:

- a) Hooks shall be classified into shank hooks (S) and eye hooks (E) by their shape.
- b) Hooks shall be classified as shown in table 1 depending upon their hook shape, hook number, and grade.
- c) Locking hooks of Grade 8 shall be as specified in Annex 3.

Table 1 Classification of hooks

Hook number	Grade				
	4	5	6	8	10
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	○	○	○	○	○
26	○	○	○	○	—
27	○	○	○	—	—
28	○	○	—	—	—
29	○	—	—	—	—

NOTE : Shank hooks shall be limited to within the range enclosed by the bold lines in the above table, and eye hooks to within the range enclosed by the dotted line and the lower bold lines.

5 Performance

5.1 Working load The working load shall be as shown in table 2 or Annex 1⁽¹⁾.

Note ⁽¹⁾ Where hooks are used frequently, subjected to impacts, or used under special conditions such as low temperature, high temperature or corrosive atmosphere, they shall be used under a load decided by considering safety.

NOTE : For hooks whose working load is 10 t or more, the working load and proof loads stated in Annex 1 table 1 may be used instead of those stated in table 2.

5.2 Proof load Hooks shall not produce abnormalities when the proof load specified in table 2 or Annex 1 is applied. The permanent deformation of the opening gap of hook after application of the proof load shall be within 0.25 % and there shall not occur cracks or permanent deformation in any parts when they are tested according to the method specified in **10.1**.

5.3 Static strength When tested according to **10.2**, hooks shall withstand a tensile load of two times or more of the proof load shown in table 2.

5.4 Fatigue strength When tested according to **10.3**, hooks shall withstand the repetitive force of 20 000 cycles.

NOTE : The fatigue strength is applicable to hooks of working load not exceeding 10 t.

Table 2 Working loads and proof loads of hooks

Hook number	Working load (t)					Proof load (kN)				
	Grade 4	Grade 5	Grade 6	Grade 8	Grade 10	Grade 4	Grade 5	Grade 6	Grade 8	Grade 10
1	0.1 max.	0.13 max.	0.16 max.	0.2 max.	0.25 max.	2.0	2.6	3.2	4.0	5.0
2	0.13 max.	0.16 max.	0.2 max.	0.25 max.	0.32 max.	2.6	3.2	4.0	5.0	6.3
3	0.16 max.	0.2 max.	0.25 max.	0.32 max.	0.4 max.	3.2	4.0	5.0	6.3	8.0
4	0.2 max.	0.25 max.	0.32 max.	0.4 max.	0.5 max.	4.0	5.0	6.3	8.0	10
5	0.25 max.	0.32 max.	0.4 max.	0.5 max.	0.63 max.	5.0	6.3	8.0	10	12.5
6	0.32 max.	0.4 max.	0.5 max.	0.63 max.	0.8 max.	6.3	8.0	10	12.5	16
7	0.4 max.	0.5 max.	0.63 max.	0.8 max.	1 max.	8.0	10	12.5	16	20
8	0.5 max.	0.63 max.	0.8 max.	1 max.	1.25 max.	10	12.5	16	20	25
9	0.63 max.	0.8 max.	1 max.	1.25 max.	1.6 max.	12.5	16	20	25	31.5
10	0.8 max.	1 max.	1.25 max.	1.6 max.	2 max.	16	20	25	31.5	40
11	1 max.	1.25 max.	1.6 max.	2 max.	2.5 max.	20	25	31.5	40	50
12	1.25 max.	1.6 max.	2 max.	2.5 max.	3.2 max.	25	31.5	40	50	63
13	1.6 max.	2 max.	2.5 max.	3.2 max.	4 max.	31.5	40	50	63	80
14	2 max.	2.5 max.	3.2 max.	4 max.	5 max.	40	50	63	80	100
15	2.5 max.	3.2 max.	4 max.	5 max.	6.3 max.	50	63	80	100	125
16	3.2 max.	4 max.	5 max.	6.3 max.	8 max.	63	80	100	125	160
17	4 max.	5 max.	6.3 max.	8 max.	10 max.	80	100	125	160	200
18	5 max.	6.3 max.	8 max.	10 max.	12.5 max.	100	125	160	200	250
19	6.3 max.	8 max.	10 max.	12.5 max.	16 max.	125	160	200	250	315
20	8 max.	10 max.	12.5 max.	16 max.	20 max.	160	200	250	315	400
21	10 max.	12.5 max.	16 max.	20 max.	25 max.	200	250	315	400	500
22	12.5 max.	16 max.	20 max.	25 max.	31.5 max.	250	315	400	500	630
23	16 max.	20 max.	25 max.	31.5 max.	40 max.	315	400	500	630	800
24	20 max.	25 max.	31.5 max.	40 max.	50 max.	400	500	630	800	1 000
25	25 max.	31.5 max.	40 max.	50 max.	63 max.	500	630	800	1 000	1 250
26	31.5 max.	40 max.	50 max.	63 max.	—	630	800	1 000	1 250	—
27	40 max.	50 max.	63 max.	—	—	800	1 000	1 250	—	—
28	50 max.	63 max.	—	—	—	1 000	1 250	—	—	—
29	63 max.	—	—	—	—	1 250	—	—	—	—

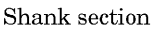
6 Shape and main dimensions

6.1 Shape The shape of hooks shall be as follows:

- A hook shall consist of the body and the shank section or eye section, as shown in figure 1⁽²⁾ and figure 2⁽²⁾.
- The shape of the main cross section of hooks shall be as shown in figure 3.

Note ⁽²⁾ The shapes in figures 1 to 3 show one example, and the shape of a hook shall satisfy the function and performance of the hook.

The value of R is not specified.

Dislocation
stopper⁽³⁾

- Body

Figure 1 Shape of hook (shank hook)

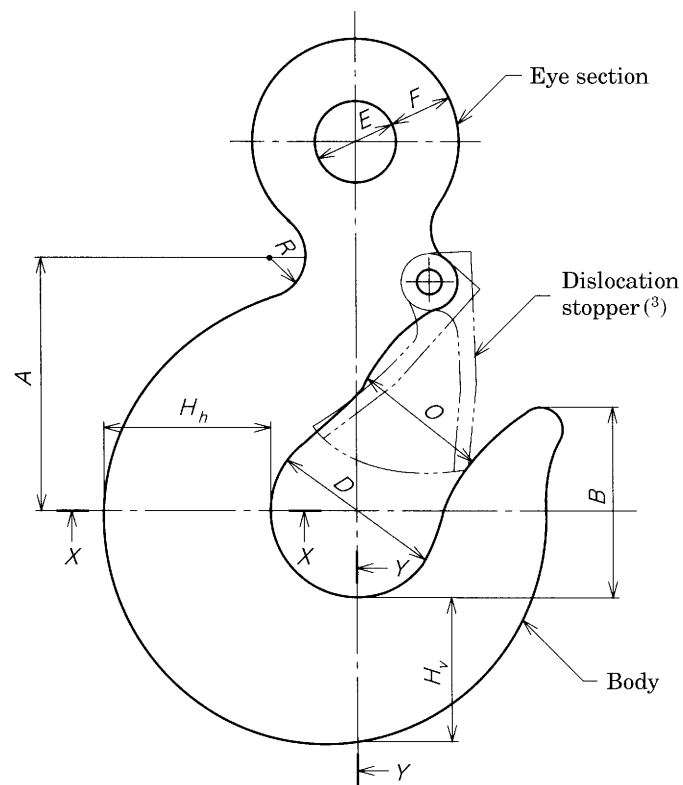


Figure 2 Shape of hook (eye hook)

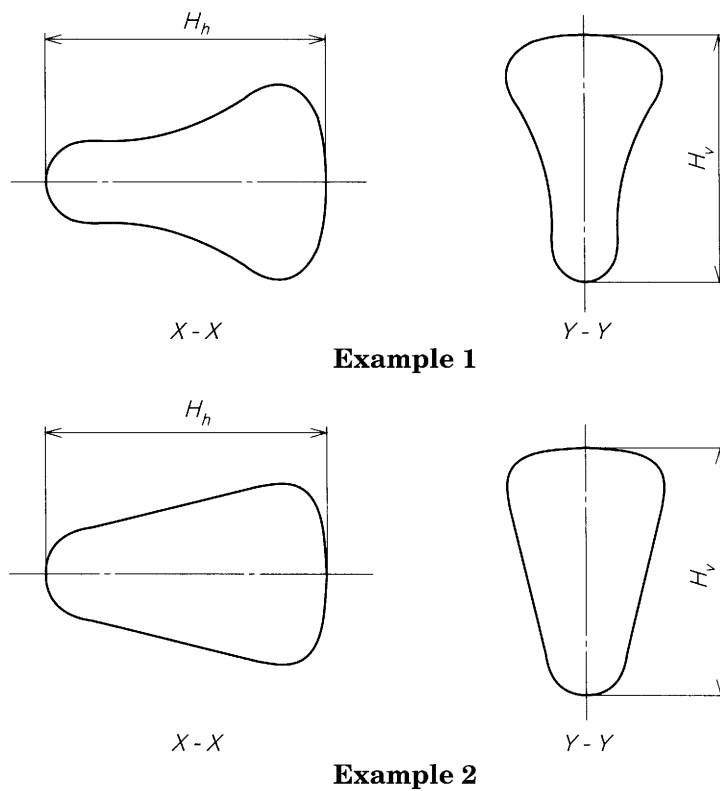


Figure 3 Shape of main cross section of hook

6.2 Main dimensions The main dimensions of hooks shall be as shown in table 3 and table 4, and shall satisfy the performances of hooks.

Table 3 Main dimensions of shank hooks

Unit: mm

Hook number	Minimum dimension							
	D	O	B	$A^{(4)}$	$H_h^{(4)}$	$H_v^{(4)}$	$d_1^{(4)}$	d_2
1	22	18	25	34	16	13	14	6
2	24	19	27	36	17	14	15	6.5
3	25	20	28	38	19	16	16	7
4	27	21	30	40	20	17	17	8
6	30	24	34	45	24	20	19	9
7	32	25	36	48	26	22	20	10
8	34	27	38	50	28	24	21	11
9	36	28	40	53	31	26	22	12
10	38	30	43	56	34	28	24	13
11	40	32	45	60	37	31	25	14
12	43	34	48	63	40	34	27	16
13	45	36	50	67	44	37	28	17
14	48	38	54	71	48	40	30	19
15	50	40	57	75	52	44	32	20
16	53	43	60	80	56	48	34	22
17	60	48	68	90	60	50	38	24
18	67	53	76	100	67	56	43	26
19	75	60	85	112	75	63	48	28
20	85	67	95	125	85	71	53	31
21	95	75	107	140	95	80	60	34
22	106	85	120	160	106	90	67	38
23	118	95	134	180	118	100	75	43
24	132	106	151	200	132	112	85	48
25	150	118	170	224	150	125	95	53
26	170	132	191	250	170	140	106	60
27	190	152	215	285	190	162	120	67
28	212	170	240	318	212	180	134	74
29	237	190	267	356	237	201	149	83

Note ⁽⁴⁾ Dimensions A , H_h , H_v and d_1 are informative reference values, and they shall satisfy the performance of the hook.

Table 4 Main dimensions of eye hooks

Unit: mm

Hook number	Minimum dimension							
	<i>D</i>	<i>O</i>	<i>B</i>	<i>A</i> ⁽⁴⁾	<i>H_h</i> ⁽⁴⁾	<i>H_v</i> ⁽⁴⁾	<i>E</i>	<i>F</i> (max.)
5	28	22	32	43	22	19	7	8
6	30	24	34	45	24	20	8	9
7	32	25	36	48	26	22	9	10
8	34	27	38	50	28	24	10	11
9	36	28	40	53	31	26	11	12
10	38	30	43	56	34	28	12	13
11	40	32	45	60	37	31	14	15
12	43	34	48	63	40	34	15	16
13	45	36	50	67	44	37	17	18
14	48	38	54	71	48	40	19	20
15	50	40	57	75	52	44	22	23
16	53	43	60	80	56	48	24	25
17	60	48	68	90	60	50	28	29
18	67	53	76	100	67	56	31	32
19	75	60	85	112	75	63	35	36
20	85	67	95	125	85	71	39	40
21	95	75	107	140	95	80	44	45
22	106	85	120	160	106	90	49	50
23	118	95	134	180	118	100	56	58
24	132	106	151	200	132	112	63	65
25	150	118	170	224	150	125	70	72
26	170	132	191	250	170	140	79	81
27	190	152	215	285	190	162	88	90
28	212	170	240	318	212	180	98	101
29	237	190	267	356	237	201	110	113

7 Appearance Hooks shall be free from detrimental defects such as cracks and noticeable rust.

8 Material The material of hooks shall be a killed steel containing phosphorus not exceeding 0.030 % and sulfur not exceeding 0.035 % and shall satisfy the performance requirements of hooks.

NOTE : The analysis method shall be the ladle analysis.

9 Method of production The method of producing hooks shall be as follows:

- Hooks shall be formed by forging.
- The shank section and eye section shall be formed by forging or be formed by machining or plastic working after forging.
- Hooks shall be subjected to a suitable heat treatment after forging.

10 Testing

10.1 Proof load test As shown in figure 4, attach gauge marks on the hook body and measure the initial gauge length, then fixing the hook on the grippers of the tensile testing machine, apply the proof load of table 2 and measure again the gauge length when the load is returned to zero, and obtain the permanent deformation of the hook opening gap according to the following formula:

$$E_h = (l_h' - l_h) / l_h \times 100 (\%)$$

where, E_h : permanent deformation of hook opening gap (%)

l_h : initial gauge length of hook opening (mm)

l_h' : gauge length of hook opening when proof load is applied and then returned to zero (mm)

In addition, examine for the presence of cracks and deformation in the respective parts of the hook after applying the proof load⁽⁵⁾.

Note ⁽⁵⁾ The crack test shall be made by visual observation, but as required, it shall be made according to **JIS G 0565** or **JIS Z 2343-1**.

For hooks having a dislocation stopper, examination shall be made for abnormalities in the dislocation stopper after the test.