

REAFFIRMED

2010

IS 15560 : 2005

(Superseding IS 3815 : 1969, IS 6294 : 1971
and IS 8610 : 1977)

(Reaffirmed 2015)

भारतीय मानक

160 टन तक के शैकयुक्त प्वाईट हुक — विशिष्टि

(Reaffirmed 2020)

Indian Standard

**POINT HOOKS WITH SHANK UP TO 160 TONNE —
SPECIFICATION**

ICS 53.020.30

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 2005

Price Group 3

AMENDMENT NO. 1 MARCH 2007
TO
IS 15560 : 2005 POINT HOOKS WITH SHANKS UP TO 160 TONNE —
SPECIFICATION

(Foreword, second para, sixth line) — Delete the sentence 'This standard does not considered 0.063 tonne to 0.5 tonne capacity.'

(Page 1, clause 1.1.1, last line) — Substitute '0.063' for '0.63'.

(Page 4 Table 1) — Substitute the following table for the existing:

Table 1 Dimensional Characteristics of Shank Hooks

(Clause 6.1)

All dimensions in millimetres.

Lifting Capacity 'C _p ' in Tonnes for Grade				Throat Opening 2.9 d _n Min	Throat Opening 2.7 d _n Min	Seat Dia Min	Section			Shank Dia Max	Max
							Depth Max	Width Max	Height Max		
L	M	S	T	G	G ₁	D	H _m	L _m	L	E	B ₁
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
0.063	0.08	0.125	0.16	18.00	17.50	18.00	15.50	10.00	53	14.00	28
0.125	0.16	0.25	0.32	21.20	20.50	20.00	20.00	12.11	70	17.00	34
0.25	0.32	0.50	0.63	25.00	24.00	22.00	25.70	16.00	84	20.00	41
0.50	0.63	1.00	1.25	30.00	29.00	25.00	30.70	18.00	102	22.4	47
0.63	0.80	1.25	1.60	20.60	19.20	27.00	32.00	20.60	122	25.00	49
0.80	1.00	1.60	2.00	23.20	21.60	30.40	36.50	23.20	130	26.50	54
1.00	1.25	2.00	2.50	26.10	24.30	34.20	40.00	26.10	139	28.00	57
1.25	1.60	2.50	3.20	29.00	27.00	38.00	43.00	29.00	149	30.00	60
1.60	2.00	3.20	4.00	31.90	29.70	41.80	47.50	31.90	158	31.50	64
2.00	2.50	4.00	5.00	34.80	32.40	45.60	51.60	34.80	170	33.50	68
2.50	3.20	5.00	6.30	40.60	37.80	53.20	60.20	40.60	188	37.50	72
3.20	4.00	6.30	8.00	46.40	43.20	60.80	68.80	46.40	209	42.50	76
4.00	5.00	8.00	10.00	52.20	48.60	68.40	77.40	52.20	235	47.50	80
5.00	6.30	10.00	12.50	58.00	54.00	76.00	86.00	58.00	263	53.00	90
6.30	8.00	12.50	16.00	65.00	59.40	83.60	94.60	63.80	296	60.00	101
8.00	10.00	16.00	20.00	72.20	67.50	95.00	107.50	72.50	335	67.00	113
10.00	12.50	20.00	25.00	81.20	75.60	106.4	120.40	81.20	375	75.00	127
12.50	16.00	25.00	32.00	92.80	86.40	121.6	137.60	92.80	402	85.00	143
16.00	20.00	32.00	40.00	104.40	97.20	136.8	154.80	104.40	469	95.00	160
20.00	25.00	40.00	50.00	127.0	117.0	169.0	157.0	101.0	485	110.0	180
25.00	32.00	50.00	63.00	142.0	131.5	189.0	176.0	113.0	520	120.0	202
32.00	40.00	63.00	80.00	155.0	143.5	207.0	193.0	124.0	569	130.0	225
40.00	50.00	80.00	100.0	168.0	156.0	224.0	208.0	134.0	616	140.0	252
50.00	63.00	100.0	125.0	187.0	173.0	247.0	229.0	148.0	680	150.0	285
63.00	80.00	125.0	160.0	200.0	185.0	250.0	280.0	224.0	906	170.0	320
80.00	100.0	160.0	-	224.0	207.0	280.0	315.0	250.0	1020	190.0	358
100.0	125.0	-	-	250.0	231.0	315.0	355.0	300.0	1115	212.0	402
125.0	160.0	-	-	280.0	259.0	355.0	400.0	315.0	1250	236.0	450
160.0	-	-	-	315.0	292.0	400.0	450.0	355.0	1485	260.0	505

(ME 14)

Cranes, Lifting Chains and Its Related Equipment Sectional Committee, ME 14

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Cranes Lifting Chains and Its Related Equipment Sectional Committee had been approved by the Mechanical Engineering Division Council.

Point hooks with shank for general engineering purposes was covered in IS 3815 : 1969 point hooks with shank for capacities 63 to 160 tonne, and point hooks with shank capacity up to 25 tonne — trapezoidal section were covered in IS 6294 : 1971 and IS 8610 : 1977 respectively. Since various tests given in these standards are identical in nature, therefore in order to make them more users friendly; these standards have been amalgamated into a single standard. Accordingly this standard shall supersede IS 3815, IS 6294 and IS 8610 once it is published. This standard does not considered 0.063 tonne to 0.5 tonne capacity. The length above the neck which is called shank is left open to manufacturers to take into account the requirements for machining, threading and other parts holding the hooks.

The construction details and the typical dimensional details of the hooks are left to the choice of the manufacturers and the dimensional tolerances eliminated completely.

Assistance has been drawn from ISO 2374 : 1983 'Lifting appliances — Range of maximum capacities for basic models'.

The composition of the Committee responsible for formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirements of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

POINT HOOKS WITH SHANK UP TO 160 TONNE — SPECIFICATION

1 SCOPE

1.1 This standard covers basic requirements, materials and dimensions of mild steel, high tensile steel and alloy steel eye hooks for use, with Grade L(3), Grade M(4), Grade S(6) and Grade T(8) chains, respectively.

1.1.1 This standard applies to the drop-forged and open-die forged eye hooks up to a safe working load from 0.63 to 160 tonne.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
1500 : 1983	Method for Brinell hardness test for metallic materials (<i>second revision</i>)
1875 : 1992	Carbon steel billets, blooms, slabs and bars for forging (<i>fifth revision</i>)
4367 : 1991	Alloy steel forgings for general industrial use (<i>first revision</i>)
4748 : 1988	Methods for estimating average grain size of metal (<i>first revision</i>)
7847 : 1975	General characteristics of lifting hooks

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 7847 shall apply.

4 RATING

The hooks shall be rated according to the safe working load for a particular grade given in Table 1.

5 MATERIAL

5.1 The steel shall be produced by the open hearth or electric process or by any oxygen top blown process.

5.2 In its finished state, as supplied to the hook manufacturer, the steel shall be fully killed and shall meet the maximum sulphur and phosphorus content limits as under:

	Cast Analysis (Percent), Max	Check Analysis (Percent), Max
a) For Grade L and M hooks		
Sulphur	0.045	0.050
Phosphorus	0.040	0.045
b) For Grade S and T hooks		
Sulphur	0.035	0.040
Phosphorus	0.035	0.040

5.3 The steel shall be made in conformity with a suitable de-oxidation practice to obtain an austenitic grain size of 5 or finer when tested in accordance with IS 4748.

5.3.1 This could be accomplished, for example, by ensuring that it contains sufficient aluminium, or an equivalent element to enable the manufacture of hooks stabilized against strain and age-embrittlement during service, a minimum of 0.02 percent of metallic aluminium is quoted for guidance.

5.4 Within the above limitations it is the responsibility of the hook manufacturers to select steel, so that the finished hook, suitably heat-treated, meets the mechanical properties required by this specification. Class 1A and class 3 steels of IS 1875 may be used for Grade L and Grade M hooks respectively. Alloy steel conforming to IS 4367 may be used for Grade S and Grade T hooks. Any other material having equivalent mechanical properties may also be used.

6 SHAPE AND DIMENSIONS

The shape and dimensions of hook shall be within the maximum and minimum limits specified in Table 1 and generally according to Fig. 1.

In addition, the following requirements shall be met:

- a) *Diameter of the shank* — There shall be positive tolerance when made by forging for the shank to allow for machining the diameter of the shank and the diameter at the top of the screw thread. In all cases a fillet or radius shall be machined at the junction of the shank and the forged diameter adjacent to the shank.
- b) *Threaded length* — The length of the screwed portion of the shank shall not be less than the nominal thread diameter. If the shank and the nut which secures it are drilled to take a fixing

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or retaining pin or for any other purposes, these shall remain a continuous length to the shank engaged by the nut on the load side at least equal to the diameter of the shank.

- c) The actual throat opening 'G' shall not exceed 95 percent of the actual seat diameter 'D' of the same hook.
- d) If any safety latch is fitted, it shall be capable of closing over the maximum diameter of the bar which can be admitted through the actual opening 'G₁' as indicated by the dotted lines in the Fig. 1.

7 WORKMANSHIP AND FINISH

The hooks shall be free from defects and shall be cleanly forged in one piece in such a manner that the macro etched flaw lines follow the body of the hook except at the eye. The finished hook shall be clean and free from coating of any description, unless otherwise specified by the purchaser.

8 HEAT TREATMENT

8.1 All hooks shall, before proof testing, be subjected to one of the following heat treatments:

- a) Normalizing by heating to a temperature within 50°C above the upper critical point of the steel used, followed by cooling in still air; or
- b) Hardening by heating to a temperature within 50°C above the upper critical point of the steel used, followed by quenching in oil or water and tempering.

8.1.1 Normalizing treatment shall be permitted for Grade L and Grade M hooks only. Grade S and Grade T hooks shall be hardened and tempered necessarily.

8.1.2 The minimum hardness of hooks after heat treatment, when tested according to the method given in IS 1500, shall be minimum 250 HB and minimum 350 HB for Grade S and Grade T respectively. This test shall be carried out on the hooks selected for destructive testing.

8.2 Details of heat treatment given to the hooks during manufacture shall be endorsed on the manufacturer's test certificate.

9 ULTRASONIC TEST

If required by the purchaser, the hooks shall be subjected to ultrasonic test for detection of crack, etc.

10 PROOF TESTING

After heat treatment and other processing, the finished hooks shall be subjected to carry out test for following proof load test according to lifting capacity (C_p):

- a) For lifting capacity up to 32 tonne proof load shall be two times the lifting capacity,

- b) For lifting capacity 40 tonne and 50 tonne proof load shall be 1.7 times the lifting capacity, and
- c) For lifting capacity 63 tonne to 160 tonne proof load shall be 1.25 times the lifting capacity.

Prior to the application of the proof load, each hook shall bear two centre punch marks at positions 'a' and 'b' as shown in Fig. 1. The change in distance between 'a' and 'b' before applying proof load and after removal of the proof load will be the amount of permanent deformation up to 0.5 percent of the actual throat or the dimension between 'a' and 'b' or 0.2 mm whichever is higher. After removal of the proof load and determination of the permanent set, each hook shall be thoroughly examined by a competent person and shall be accepted as complying with the standard, if no permanent deformation or visible defects are observed on the hook.

11 DESTRUCTION TEST

11.1 A sample hook shall be selected out of a lot of every 50 hooks or less and tested to four times the safe working load specified for the appropriate grade hook in Table 1. The load shall be applied as specified in 7.3 of IS 7847. The hook shall withstand any load less than four times the safe working load, neither fracture nor so distort as to be incapable of retaining the load.

NOTES

1 It is not necessary to test the hook up to its actual ultimate strength for mechanical properties to be demonstrated. It is sufficient that the minimum ultimate strength specified is exceeded and the hook deforms significantly at the maximum force of the test.

2 Lower capacity up to 25 tonne shank hooks, the destruction test shall be of 5 times the safe working load.

11.2 Micro-structure Test

After destruction test, a portion of the hook, which has not undergone deformation, shall be taken and micro-structure test shall be carried out to ensure that hooks have been given proper heat treatment.

11.3 Hardness Testing

Hook of Grade S and Grade T selected for destructive testing shall be tested for hardness value as given in 8.1.2. The hardness shall be checked at least 10 mm away from the edge and 1 mm below the surface.

12 INSPECTION, CERTIFICATE OF TEST AND EXAMINATION

12.1 The representative of the purchaser shall have access to the works of the manufacturer at all reasonable times for the purpose of witnessing the specified tests and inspecting the machine and method of examination. The manufacturer shall give the inspector, copies of the reports of the tests made in his presence.

12.2 The manufacturer shall supply a certificate of test and examination in accordance with 8.2 and 8.3 of IS 7847.

13 MARKING

13.1 Provided that the hook passes the proof test, each hook shall be legibly and indelibly marked on parts not highly stressed. This marking shall include at least the following information:

- a) Grade letter,
- b) Safe working load, and

c) Manufacturer's identification mark.

13.2 BIS Certification Marking

The hook may also be marked with the Standard Mark.

13.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

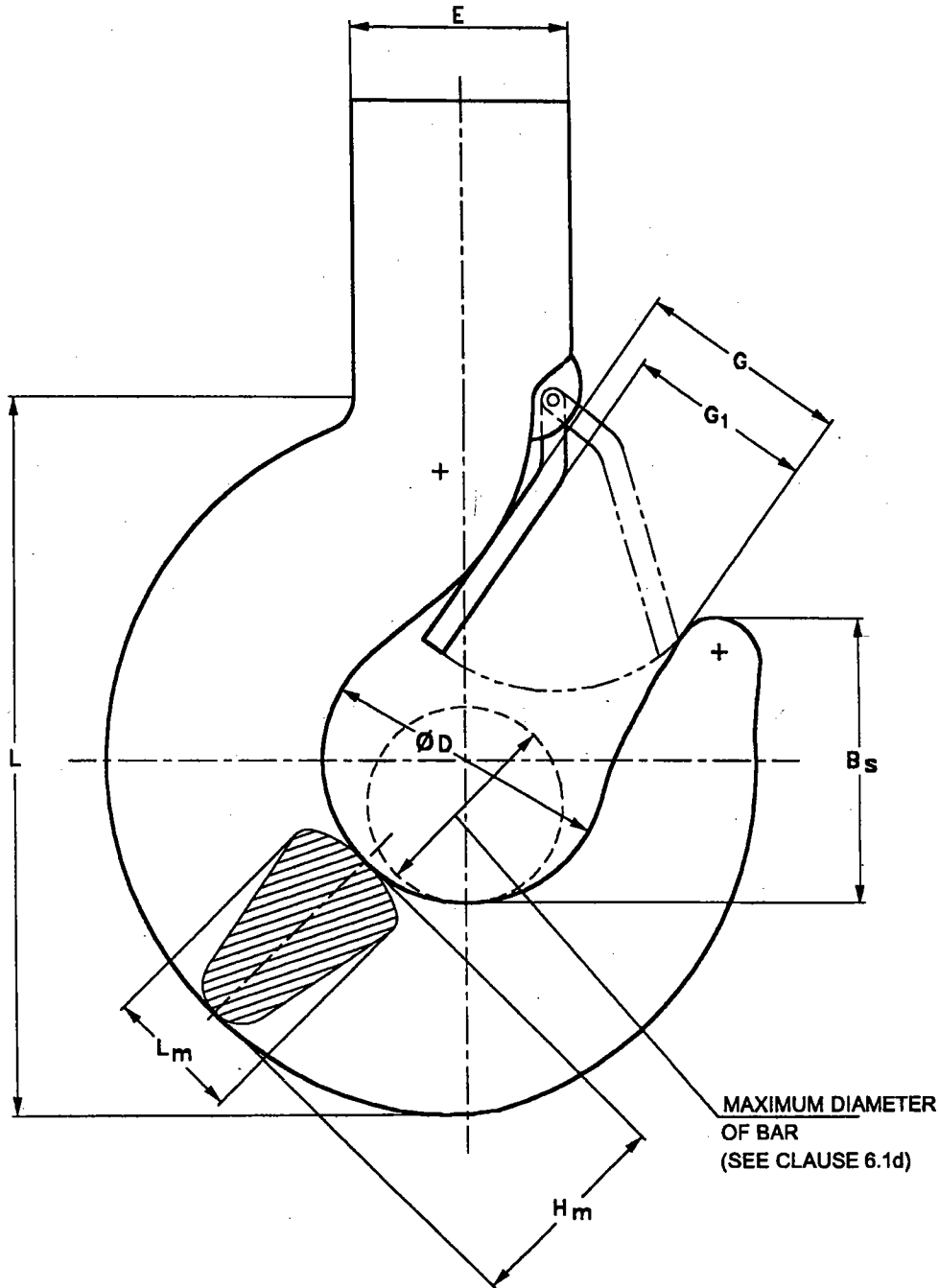


FIG. 1 DIMENSIONS OF HOOK

IS 15560 : 2005

Table 1 Dimensional Characteristics of Shank Hooks

(Clause 6.1)

All dimensions in millimetres.

Lifting Capacity 'C _p ' in Tonnes for Grade				Throat Opening 2.9 d _n Max	Throat Opening 2.7 d _n Min	Seat Dia Min	Section			Shank Dia Max	B _s
							Depth Max	Width Max	Height Min		
L	M	S	T	G	G ₁	D	H _m	L _m	L	E	B _s
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
0.63	0.80	1.25	1.60	20.60	19.20	27.00	30.50	20.60	122	25.00	49
0.80	1.00	1.60	2.00	23.20	21.60	30.40	34.40	23.20	130	26.50	54
1.00	1.25	2.00	2.50	26.10	24.30	34.20	38.70	26.10	139	28.00	57
1.25	1.60	2.50	3.20	29.00	27.00	38.00	43.00	29.00	149	30.00	60
1.60	2.00	3.20	4.00	31.90	29.70	41.80	43.70	31.90	158	31.50	64
2.00	2.50	4.00	5.00	34.80	32.40	45.60	51.60	34.80	170	33.50	68
2.50	3.20	5.00	6.30	40.60	37.80	53.20	60.20	40.60	188	37.50	72
3.20	4.00	6.30	8.00	46.40	43.20	60.80	68.80	46.40	209	42.50	76
4.00	5.00	8.00	10.00	52.20	48.60	68.40	77.40	52.20	235	47.50	80
5.00	6.30	10.00	12.50	58.00	54.00	76.00	86.00	58.00	263	53.00	90
6.30	8.00	12.50	16.00	65.00	59.40	83.60	94.60	63.80	296	60.00	101
8.00	10.00	16.00	20.00	72.20	67.50	95.00	107.50	72.50	335	67.00	113
10.00	12.50	20.00	25.00	81.20	75.60	106.4	120.40	81.20	375	75.00	127
12.50	16.00	25.00	32.00	92.80	86.40	121.6	137.60	92.80	402	85.00	143
16.00	20.00	32.00	40.00	104.40	97.20	136.8	154.80	104.40	469	95.00	160
20.00	25.00	40.00	50.00	127.0	117.0	169.0	157.0	101.0	485	110.0	180
25.00	32.00	50.00	63.00	142.0	131.5	189.0	176.0	113.0	520	120.0	202
32.00	40.00	63.00	80.00	155.0	143.5	207.0	193.0	124.0	569	130.0	225
40.00	50.00	80.00	100.0	168.0	156.0	224.0	208.0	134.0	616	140.0	252
50.00	63.00	100.0	125.0	187.0	173.0	247.0	229.0	148.0	680	150.0	285
63.00	80.00	125.0	160.0	200.0	185.0	250.0	280.0	224.0	906	170.0	320
80.00	100.0	160.0	—	224.0	207.0	280.0	315.0	250.0	1 020	190.0	358
100.0	125.0	—	—	250.0	231.0	315.0	355.0	380.0	1 115	212.0	402
125.0	160.0	—	—	280.0	259.0	355.0	400.0	315.0	1 250	236.0	450
160.0	—	—	—	315.0	292.0	400.0	450.0	355.0	1 485	260.0	505

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Cranes, Lifting Chains and Its Related Equipment Sectional Committee, ME 14

<i>Organization</i>	<i>Representative(s)</i>
Bharat Heavy Electricals Ltd, Tiruchirappalli Armsel MHE Pvt Ltd, Bangalore	SHRI K. MANICKAM (<i>Chairman</i>) SHRI A. C. HERI SHRI N. VASUDEVA (<i>Alternate</i>)
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Member Secretary
SHRI S. B. ROY
Director (MED), BIS

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Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

website : www.bis.org.in

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