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*Indian Standard*  
**SPECIFICATION FOR  
HIGHER TENSILE STEEL POINT HOOKS  
FOR USE WITH WIRE ROPE THIMBLES**

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

**Gr 3**

**July 1969**

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# *Indian Standard*

## SPECIFICATION FOR HIGHER TENSILE STEEL POINT HOOKS FOR USE WITH WIRE ROPE THIMBLES

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**SPECIFICATION FOR  
HIGHER TENSILE STEEL POINT HOOKS  
FOR USE WITH WIRE ROPE THIMBLES**

**0. F O R E W O R D**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 7 March 1969, after the draft finalized by the Lifting Chains and Associated Fittings and Components Sectional Committee had been approved by the Mechanical Engineering Division Council.

**0.2** Hooks form an important part of lifting gears extensively used for construction, erection, and operation in industrial establishments and for material handling.

**0.2.1** Eye hooks are generally used for low loads and the eyes may be designed for use with chain, shackle or with wire rope thimble. The hook may be of circular cross-section or of trapezoidal section. The trapezoidal section specified here is the closest approximation to the theoretical optimum triangular section and is preferred to the circular section hooks.

**0.3** On account of the need for reliability, it is recommended that supplies should be obtained from manufacturers possessing adequate facilities for heat treatment and testing equipment and employing competent staff for inspection.

**0.4** Users are warned that the hook shall not be taken as complying with this standard unless the specified tests have been made and the test requirements obtained in the presence of a person representing or approved by the purchaser.

**0.5** For normal conditions of use, the maximum permissible load ( safe working load ) shall not exceed the value given in Table 1. When the conditions of working are extremely hazardous or severe, the permissible working load should be substantially less.

**0.6** The information to be supplied with enquiry and order is given in Appendix A.

**0.7** In the preparation of this standard assistance has been derived from B.S. 2903 : 1957 ' Higher tensile steel hooks for chains, slings, blocks and general engineering purposes ' issued by the British Standards Institution.

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**0.8** For the purpose of deciding whether a particular requirement 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 : 2-1260\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### **1. SCOPE**

**1.1** This standard covers the requirements of higher tensile steel point hooks with eye for use with wire rope thimbles conforming to IS : 2315-1963†.

### **2. TERMINOLOGY**

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Rating** — The maximum safe working load which the hook shall withstand.

**2.2 Proof Load** — The load to which the hook shall be subjected in the finished condition ( *see* 9.2 ).

**2.3 Processing** — Any treatment of the hook subsequent to forging, such as heat treatment, polishing, etc.

**2.4 Competent Person** — A person who is approved and declared as such under the relevant statutory provisions.

### **3. TYPE**

**3.1** The hooks shall be of trapezoidal cross-section ( *see* figure in Table I ).

### **4. MATERIAL**

**4.1** Higher tensile steel point hooks with eye shall be made of material conforming to Grade 3 of IS : 1875-1966‡ or from material with equivalent mechanical properties.

**4.2** If required by the purchaser at the time of placing the order, the manufacturer shall supply a copy of steel maker's cast analysis.

### **5. FORM AND DIMENSIONS**

**5.1** The form and dimensions of hooks shall be in accordance with Table 1.

\*Rules for rounding off numerical values ( *revised* ).

†Specification for thimbles for wire ropes.

‡Specification for carbon steel billets, blooms and slabs for forgings.

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## **5.2 Tolerances on Dimensions**

**5.2.1 Tolerances on Drop-Forged Hooks** — The tolerances on drop-forged hooks shall be as given in IS : 3469-1966\*.

**5.2.2 Tolerances on Hand-Forged Hooks** — Forged dimensions shall not be less than the values given in Table 1 and shall not exceed these by more than the following amounts:

30 percent on the radius, dimensions  $Z$ ; and

8 percent on all other dimensions.

*C* being a critical dimension it is recommended that it is as nearly as possible to size.

## **6. RATING**

**6.1** The hooks shall be rated according to safe working load given in Table 1.

## **7. WORKMANSHIP AND FINISH**

**7.1** The hooks shall be free from defects and shall be cleanly forged in such a manner that the microscopic flow lines follow the body outline of the hook. The finished hook shall be clean and free from coating of any description unless otherwise specified by the purchaser. The hook shall be free from any welding.

## **8. HEAT TREATMENT**

**8.1** All hooks shall, before proof testing, be subjected to one of the following heat treatments as agreed to between the purchaser and the manufacturer:

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

**8.2** Details of the heat treatment which has been given to the hooks during manufacture shall be endorsed on the maker's test certificate.

## **9. PROOF TESTING**

**9.1** The testing machine shall conform to the requirements given in Appendix B.

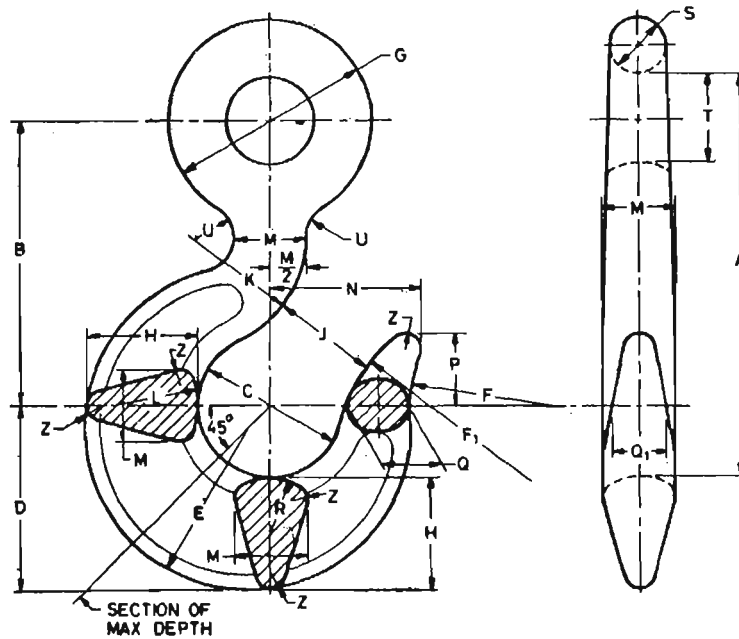
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\*Specification for tolerances for steel drop forgings, press forgings and forged bars.

**TABLE 1 DIMENSIONS FOR HIGHER TENSILE STEEL TRAPEZOIDAL SECTION EYE HOOKS FOR USE WITH WIRE ROPE THIMBLES**

( Clauses 0.5, 3.1, 5.1, 5.2.2, 6.1 and 9.2 )

All dimensions in millimetres.



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SAFE WORKING LOAD, W TONNES	A (2.79 C)	B (1.98 C)	C (40.07 $\sqrt{W}$ )	D (1.29 C)	E (1.13 C)	F (1.00 C)	F <sub>1</sub> (1.61 C)	G (1.41 C)	H (0.78 C)	J (0.75 C)	K (0.80 C)	L (0.58 C)	M (0.51 C)	N (1.05 C)	P (0.50 C)	Q (0.42 C)	Q <sub>1</sub> (0.36 C)	R (0.39 C)	S (0.40 C)	T (0.61 C)	U (0.25 C)	Z (0.10 C)
0.5	78	55	28	36	32	28	45	39	22	21	22	16	14	29	14	12	10	11	11	17	7	3
1.0	112	79	40	52	45	40	64	56	31	30	32	23	20	42	20	17	14	16	16	24	10	4
2.0	159	113	57	74	64	57	92	80	44	43	46	33	29	60	28	24	21	22	23	35	14	6
3.2	201	143	72	93	79	72	113	102	55	54	58	41	36	76	36	30	25	28	29	44	18	7
5.0	251	178	90	116	102	90	145	123	70	68	72	52	46	94	45	38	32	35	36	55	22	9
8.0	315	224	113	146	128	113	182	159	88	85	90	66	58	119	56	47	41	44	45	69	28	11
10.0	354	251	127	164	144	127	204	179	99	95	102	74	65	133	64	53	46	50	51	77	32	13
12.5	396	281	142	183	160	142	229	200	111	106	114	82	72	149	71	60	51	55	57	87	36	14
16.0	446	317	160	206	181	160	258	226	125	120	128	93	82	168	80	67	58	62	64	98	40	16
20.0	499	354	179	231	202	179	288	252	140	134	143	104	91	188	90	75	64	70	72	109	45	18

7



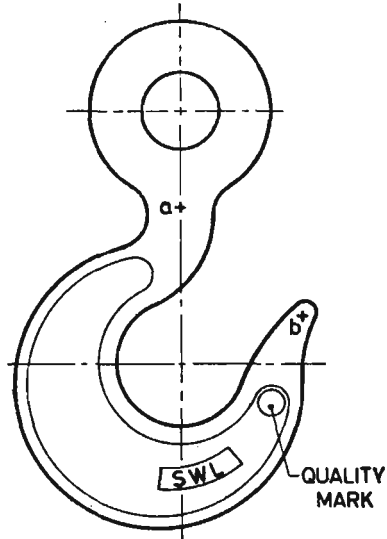
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**9.2** After heat treatment, the finished hooks shall be subjected to a proof load of twice the safe working load given in Table 1. Prior to the application of the proof load each hook shall bear two centre punch marks at positions *a* and *b*, as shown in Fig. 1. The change in distance between *a* and *b* before applying proof load and after removal of proof load is the amount of permanent set and shall not exceed 0.25 percent of the initial distance. 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 this standard only if found free from flaw or defects.

**9.3** In case proof load testing facilities are not available at the manufacturer's works, the manufacturer shall carry out such proof test at a recognized or approved test house at his cost.

**10. DESTRUCTION TEST**

**10.1** One sample hook shall be selected out of a lot every 50 hooks and tested destruction by the application of the test load. In the event of a purchaser desiring destruction tests to be carried out when the lot size is less than 50, he should specifically so state in his enquiry and order. The hook shall, at any load less than five times the safe working load, neither fracture nor so distort as to be incapable of retaining the load.



**FIG. 1 MARKING ON HOOK**

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## **11. INSPECTION, CERTIFICATE OF TEST AND EXAMINATION**

**11.1** The representative of the purchaser shall have access to the works of the manufacturer at all reasonable times for the purposes of inspecting works at any stage of manufacture and for the purpose of witnessing the specified tests and inspecting the machine and methods of examination.

**11.2** The manufacturer shall supply a certificate of test and examination in the form shown in Appendix C with every supply of hooks. The certificate shall give the results of all tests made.

For the purpose of this standard that certificate in Form V of the Indian Dock Labourers Regulation, 1948, is acceptable provided that it is endorsed in col 2 by the manufacturer or supplier that the hooks comply in all respects with this standard and that it states the material of which the hooks are made, the details of heat treatment to which they have been subjected and the destructive test results.

## **12. MARKING**

**12.1 Quality Marking** — Each hook shall be legibly marked as indicated in Fig. 1 as follows:

- a) Normalized hook with the mark 4.
- b) Quenched and tempered hook with the mark 04. The mark shall be enclosed in a circle.
- c) The stamps shall be of the following sizes:

<i>Safe Working Load of Hook</i>	<i>Size of Mark</i>
tonnes	mm
Up to and including 2	3·5
Over 2, up to and including 8	5
Over 8	6·5

The stamps used shall have a concave surface and the indentation shall be neither too sharp nor of excessive depths.

**12.2 Identification Marking** — Unless otherwise specified by the purchaser, each hook shall, after proof testing, be permanently and legibly stamped on a non-vital part (*see* Fig. 1), with the safe working load given in Table 1 and also with such individual marks or symbols as will allow identification with the manufacturer's certificate of test and examination.

**12.3 Inspection Marking** — The eye hooks may also be marked with the Standard Mark ,

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys

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the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**A P P E N D I X A**

( *Clause 0.6* )

**INFORMATION TO BE SUPPLIED WITH ENQUIRY AND ORDER**

The enquiry and order shall state the following:

- a) Safe working load ( *see* Table 1 ),
- b) Heat treatment required ( *see* 8 ), and
- c) Further tests or chemical analysis required.

**A P P E N D I X B**

( *Clause 9.1* )

**REQUIREMENTS OF TESTING MACHINES**

**B-1.** The machine shall be sufficiently accurate to take measurements within a tolerance of  $\pm 5$  percent of the proof load applied.

**B-2.** Machines measuring the load by levers and weights or by pendulum shall be verified and adjusted as necessary by a competent independent person at intervals not greater than one year. For machines measuring the load other than by levers and weights or by pendulum, the interval shall be not greater than three months. The testing machine shall be balanced in the presence of the representative of the purchaser before the tests are made.

**B-3.** A signed certificate of the last examination shall be prominently displayed adjacent to the machine.

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## **A P P E N D I X C**

*( Clause 11.2 )*

### **PRO FORMA FOR THE CERTIFICATE OF TEST AND EXAMINATION**

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<b>DISTINGUISHING MARK</b>	<b>DESCRIPTION OF HOOKS</b>	<b>MATERIAL</b>	<b>NUMBER TESTED</b>	<b>PROOF LOAD APPLIED</b>	<b>LOAD APPLIED IN THE DESTRUCTION TEST ON THE TEST SAMPLE</b>	<b>SAFE WORKING LOAD</b>
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				tonnes	tonnes	tonnes

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Particulars of heat treatment to which the hooks have been subjected, stating temperatures and methods of cooling, are as follows :

.....  
.....

We hereby certify that the hooks described above, comply in all respects with IS : 2759-1969 and that they were subjected to the proof load and subsequently examined and passed by a competent person.

Signature.....

Date .....

## BUREAU OF INDIAN STANDARDS

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41 29 16

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5-8-56C L. N. Gupta Marg, (Nampally Station Road),  
HYDERABAD 500001 22 10 83

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6 98 32

117/418B Sarvodaya Nagar, KANPUR 208005 { 21 68 76  
21 82 92

Patliputra Industrial Estate, PATNA 800013 6 23 05

Hantex Bldg ( 2nd Floor ), Rly Station Road,  
TRIVANDRUM 695001 52 27

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Institution of Engineers ( India ) Building, 1332 Shivaji Nagar, 5 24 35  
PUNE 410005

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\*Sales Office in Bombay is at Novelty Chambers, Grant Road, 89 65 28  
Bombay 400007

†Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep  
Street, Calcutta 700072 27 68 00

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