INTERPLANT STANDARD – STEEL INDUSTRY		
	SPECIFICATION FOR FORGED RAMSHORN HOOKS	**IPSS:1-08-008-18** (*First Revision*)
	Based on IS 5749:1970	Formerly: IPSS:1-08-008-83

0. FOREWORD

0.1 This Interplant Standard has been prepared by the Standards Committee on Lifting and Hoisting Equipment, IPSS 1:8 with the active participation of the representatives of all the steel plants, established manufacturers of crane hooks and leading consultants and adopted in 1983.

0.2 The Standard discussed again in presence of experts from SAIL, RINL, TATA STEEL, ESSAR, JSPL and Consultants of MECON, HEC & DASTURCO and revised with first revision in **August, 2018**.

0.2 Interplant Standards for steel industry primarily aim at achieving rationalization and unification of parts and assemblies used in steel plant equipment and provide guidance in indenting stores for existing equipment (or while placing orders for additional requirements) by individual steel plants. For exercising effective control on inventories, it is advisable to select a fewer number of sizes/types from those mentioned in this standard. These limited sizes/types can be adopted as Plant Standards for an individual steel plant. It is not desirable to make deviations in technical requirements.

1. SCOPE

1.1 This Interplant Standard covers the requirements of forged ramshorn hooks used in steel industry and is generally based on IS 5749:1970 regarding terminology, workmanship, testing and examination and marking shall remain essentially the same for this Interplant Standard.

1.2 Other technical aspects, required for meeting the specific needs of the steel industry, are given in this Interplant Standard.

2. MATERIAL – The material used in manufacturing the crane hooks shall be steel of designation 20C15 as given in Table 1 of IS:4367-1991 `Specification for alloy and tool steel forgings for general industrial use'. If agreed by the purchaser, material Class 2 according to IS: 1875-1992 `Specification for Carbon steel billets, blooms, slabs and bars for forgings (fourth revision)' may also be used.

2.1 The chemical composition of the steel shall be as follows:

Constituent	20C15 (IS: 4367-1991) Percent	Material Class 2 IS: 1875-1992 Percent
Carbon	0.16 to 0.24	0.15 to 0.25
Manganese	1.30 to 1.70	0.60 to 0.90
Silicon	0.10 to 0.35	0.15 to 0.35
Sulphur, Max	0.050	0.050
Phosphorus, Max	0.050	0.050

2.2 The steel shall be silicon killed aluminum treated (fine grain) and resistant to strain ageing effect in service.

2.2.1 The steel shall not have grain size index less than 5 when tested according to IS: 2853-1964 `Method of determining austenitic grain size of steel'.

2.3 The steel (20C15) shall have mechanical properties as specified in Table-3 of (IS: 4367-1991) :

2.4 On request, the manufacturer shall supply the chemical composition of cast or heat of the material.

3. FORM AND DIMENSIONS

3.1 The hook shall be of trapezoidal section. The dimensions shall be as given in Table-1 and Fig.1. The tolerances on dimensions shall be in accordance with the relevant clauses of IS: 5749-1970.

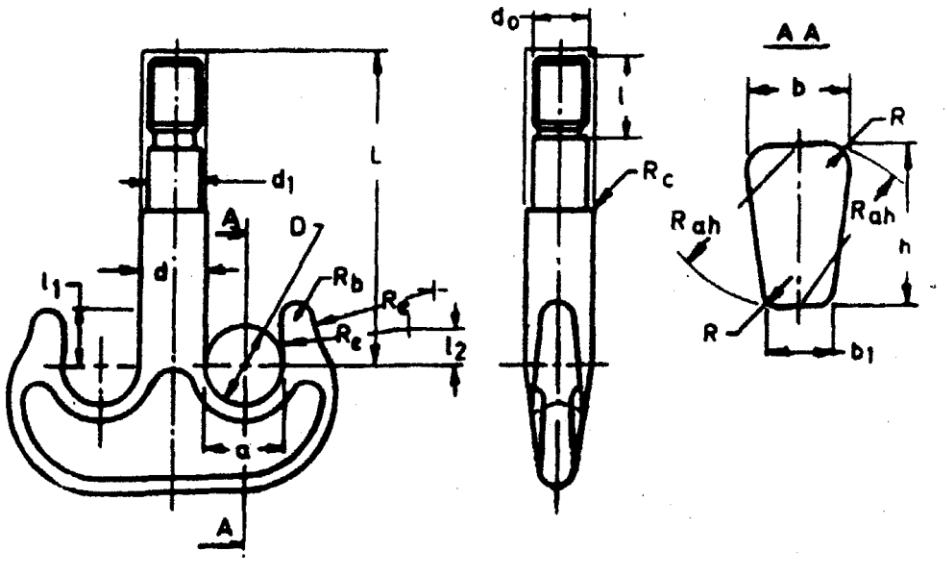


FIG. 1 DIMENSIONS OF FORGED RAMSHORN HOOK

3.2 To check the hook metal for mechanical properties, the hook shall be manufactured with an allowance provided in the shank portion for making the test samples.

4. RATING

4.1 The hook shall be rated for medium duty (M) and heavy duty (H) according to Table-1. Hooks of medium duty shall be used in classification No. 1 & 2 and hooks of heavy duty shall be used in cranes of classification No. 3 & 4 according to IS:807-2006 `Code of practice for design, manufacture, erection and testing (structural portion) of cranes and hoists (first revision).

5. SHANK

5.1 **Length** - The length of the shank portion shall depend upon the type of hook block. The hook shall be short shank (Type A) or long shank (Type B) as given in Table-1.

5.2 **Threads** – The threads shall be trapezoidal as shown in Fig.2 read with Table-2.

5.2.1 The threaded portion of the shank shall be clean and free of burrs, stripped threads, cuts and dents.

6. HOOK NUT

6.1 Each hook shall be supplied in assembled condition with the nut and its locking arrangement. The nut shall be locked to prevent its unscrewing by any suitable arrangement as specified by the purchaser.

6.2 If the shank and nut which secures it are drilled to take a fixing or retaining pin or for any other purpose, there shall remain a continuous length of the shank engaged by the nut on the load side at least equal to the diameter of the shank.

6.3 The hook nut shall be made of steel 45 C8 according to IS 1570 (Part 2) – 1979 `Schedules for wrought steels: Part 2 Carbon steels (unalloyed steels) (first revision)'.

6.4 The dimensions of the hook nut shall be specified by the purchaser at the time of placing the order.

7. WORKMANSHIP AND FINISH

7.1 The hook shall have a total minimum reduction in area of 80 percent if forged out of ingots or a total minimum reduction in area of 50 percent if forged out of blooms and shall be clearly forged in such a manner that the macroscopic flow lines of the hook follow the body outline.

7.2 The hook shall be free from defects. Elimination of defects by welding or any other method shall not be allowed.

8. HEAT TREATMENT

8.1 After completion of the forging operation, the hook shall be normalized by heating to a temperature of 50ºC above the upper critical temperature of steel used followed by cooling in still air. The hardness attached after normalizing shall be 140-180 BHN.

9. TESTING

9.1 In addition to all the tests specified in IS: 5749-1970, the following tests and examinations shall also be conducted for each hook.

a) Visual inspection
b) Checking the dimensions of the machined portion of the hook and its shank
c) Determination of the mechanical properties of the book metal, and
d) Test for hardness

9.1.1 Certificates for tests and examinations conducted in accordance with 9.1 shall be supplied along with the proof load test certificate.

9.2 The manufacturer shall, if so specified by the purchaser, ensure that all forgings are free from lamination and other internal and external defects by

subjecting each hook to radiographic /ultrasonic examination and supply the documents of such examinations with proper means of identification of the hook.

10. **MARKING** - Each hook shall have its quality marking identifications, SWL, etc. stamped in addition to details as given in IS: 5749-1970.

11. **PACKING –** After inspection and testing, each hook shall be painted with corrosion preventive paint. The machined portion of the shank shall be coated with an anti-corrosive grease / paint. While transporting the hook, the machined portion of shank shall be properly packed to protect it from any external damage.

TABLE 1 DIMENSIONS OF FORGED RAMSHORN HOOK

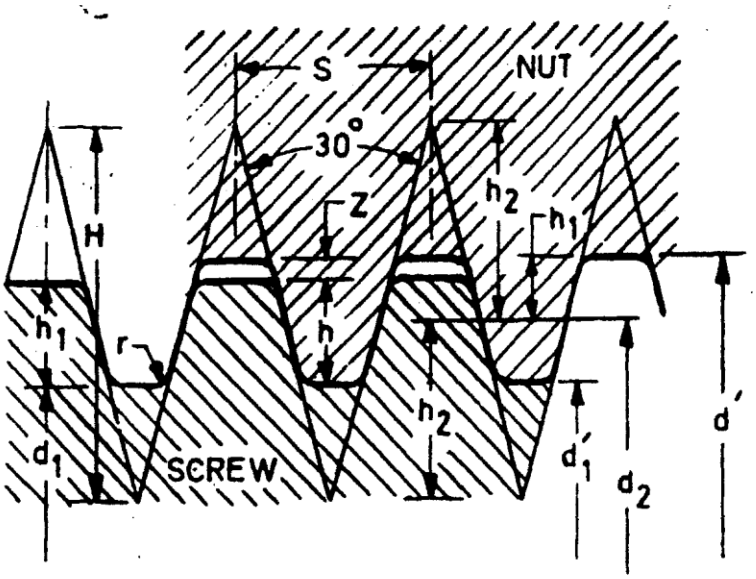
(*Clauses* 3.1, 4 *and* 5.1)

All dimensions in millimetres.

Sl No.	SWL of Hook (in Tonnes)		Proof Load in Tonnes	D	b	b_1	h	d	d_1	d_2	Shank Length (L)		l	l_1	l_2	R	R_1	R_2	R_3	R_4	Thrust Bearing Details	
	Med Duty	Heavy Duty									Type A	Type B								Brg. Designation IS : 2398-1967*	Brg. Dimension IS : 5934-1970† Bore × O D × Height × Chamfers
i)	20	16	40	115±4	65$^{+3}_{0}$	32$^{+1}_{0}$	110$^{+11}_{0}$	95±5	85	Trap 80 × 10	420	760	100	85±3	40	15	20	5	125	165	85TA13	85 × 150 × 49 × 2·5
ii)	25	20	50	125±4	75$^{+3}_{0}$	38$^{+4}_{0}$	120$^{+12}_{0}$	110±5	100	Trap 90 × 12	470	820	115	95±3	45	18	22	5	135	180	100TA13	100 × 170 × 55 × 2·5
iii)	32	25	64	145±4	85$^{+3}_{0}$	42$^{+4}_{0}$	140$^{+14}_{0}$	125±6	110	Trap 100 × 12	525	875	130	115±3	50	20	25	5	160	200	110TA13	110 × 190 × 63 × 3·0
iv)	40	32	70	160±5	95$^{+10}_{0}$	48$^{+5}_{0}$	150$^{+15}_{0}$	135±7	120	Trap 110 × 20	590	940	140	130±3	55	22	26	5	175	230	120TA13	120 × 210 × 70 × 3·5
v)	50	40	85	180±5	105$^{+11}_{0}$	52$^{+5}_{0}$	170$^{+17}_{0}$	160±8	140	Trap 120 × 16	660	1 000	150	140±4	65	22	30	6	200	260	140TA13	140 × 240 × 80 × 3·5
vi)	63	50	105	200±6	115$^{+12}_{0}$	58$^{+6}_{0}$	180$^{+18}_{0}$	170±9	150	Trap 140 × 16	725	1 050	175	165±5	70	25	30	6	220	280	150TA13	150 × 250 × 80 × 3·5
vii)	80	63	135	220±7	130$^{+14}_{0}$	65$^{+6}_{0}$	210$^{+21}_{0}$	190±10	170	Trap 160 × 16	800	1 100	190	180±5	80	25	35	8	240	310	170TA13	170 × 280 × 87 × 4·0
viii)	100	80	170	250±8	150$^{+16}_{0}$	75$^{+8}_{0}$	235$^{+24}_{0}$	200±10	180	Trap 170 × 16	860	1 175	205	200±6	95	30	35	8	265	330	180TA13	180 × 300 × 95 × 4·0
ix)	125	100	190	280±9	165$^{+18}_{0}$	85$^{+9}_{0}$	270$^{+27}_{0}$	220±11	200	Trap 180 × 20	900	1 200	230	210±6	100	35	40	10	300	360	200TA13	200 × 340 × 110 × 5·0
x)	160	125	215	300±9	180$^{+20}_{0}$	90$^{+9}_{0}$	290$^{+29}_{0}$	250±12	220	Trap 200 × 20	960	1 275	255	220±7	105	40	45	10	340	380	220TA13	220 × 360 × 112 × 5·0
xi)	200	160	266	330±10	195$^{+20}_{0}$	100$^{+10}_{0}$	320$^{+32}_{0}$	280±14	240	Trap 220 × 20	1 025	1 330	270	230±8	110	45	50	12	380	420	240TA13	240 × 380 × 112 × 5·0
xii)	250	200	333	370±12	220$^{+22}_{0}$	110$^{+11}_{0}$	350$^{+35}_{0}$	310±16	280	Trap 240 × 20	1 090	1 400	290	240±8	125	45	55	12	420	460	280TA13	280 × 440 × 130 × 6·0

*Identification code for rolling bearings.

†Chamfers and fillet radii for rolling bearings.



$H = 1{\cdot}866\ S$
$h_1 = 0{\cdot}5\ S + Z$
$h = 0{\cdot}5\ S$

$d_2 = d - 0{\cdot}5\ S$
$d_1 = d - 2\ h_1$
$d' = d + 2\ Z$
$d'_1 = d - S$

FIG. 2 FORM OF TRAPEZOIDAL THREAD

TABLE 2 DIMENSIONS OF TRAPEZOIDAL THREAD

(*Clause* 5.2)

All dimensions in millimetres.

Sl No.	Thread Pitch S	Thread Depth h_1	Thread Height h	Clearance Z	Radius r
i)	10	5·5	5	0·5	0·25
ii)	12	6·5	6	0·5	0·25
iii)	16	9	8	1	0·5
iv)	20	11	10		
v)	24	13	12		