INTERPLANT STANDARD – STEEL INDUSTRY		
	SPECIFICATION FOR LAMINATED LADLE HOOKS	**IPSS:1-08-009-18 (***First Revision***)**
	Corresponding IS does not exist	Formerly: IPSS:1-08-009-83

0. FOREWORD

0.1 Interplant Standardization activity in Steel Industry is being pursued by IPSS Secretariat which functions under Centre for Engineering & Technology (CET), the in-house consultancy organization of SAIL.

0.2 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 crane manufacturers and leading consultants and was adopted in June, 1983.

0.3 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**.

0.4 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 or equipment 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.

0.5 This revision incorporates the changes based on the experience gained in usage since 1983. The change in Indian Standards due to their revision in the last 20 years have also be included.

1. SCOPE – This specification covers the laminated hooks of rectangular cross section used for lifting molten metal ladles in steel plants.

2. MATERIAL – The material used for the fabrication of laminated ladle hooks shall be as follows:

a) Plates – Rolled steel plates of Fe 410 WB conforming to IS: 2062:1999 `Steel for general structural purposes - specification (fifth revision)'. For plates below 20 mm thickness, steel Fe 410 WA conforming to IS:2062 may also be used.

b) Rivets – Rivets shall conform to IS: 1929:1982 `Specification for hot forged steel rivets for hot closing (12 to 36 mm diameter) (first revision)'.

c) Supporting Bush – Steel 50C8 conforming to IS: 2004:1991 `Carbon steel forgings for general engineering purposes (third revision)'.

d) Trunnion Seat Wearing Plate – Fe 410 WB or Fe 410 S conforming to IS:2062. Cast steel liners grade 230-450 N conforming to IS 1030:1998 `Specification for carbon steel castings for general engineering purposes (fifth revision)' may also be used.

e) Wrapper Plate – Steel Fe 410 WB conforming to IS:2062.

2.1 All plates used in ladle hooks shall be straight, flat and free of flows and defects. Straightening or flattening by the application of heat shall not be permitted.

2.2 All plates in ladle hooks shall be ultrasonically tested.

3. FABRICATION

3.1 The thickness of each plate shall not be less than 16 mm and not more than 32 mm. The length of the plates shall be in the direction of rolling.

3.2 Individual plates in each pack shall be dressed smooth by grinding. The edges of the plates shall be chamfered 10 mm x 50^{o} near supporting bush and tip of the hook for welding after rivetting. Individual plates shall be painted before assembling.

3.3 The holes for rivets shall be drilled with the plates held together in a packet and reemed to size. Rivets used shall be either counter-sunk or button head.

3.4 Gap between laminations shall not exceed 0.1 mm for a distance of 2 times the rivet dia from the edge of a rivet hole. Gap in other areas shall not exceed 0.25 mm.

3.5 Any projection of counter-sunk rivets on first row under wearing plates and near supporting bush shall be ground off.

3.6 The distance between any rivet to the inside surface of the wearing plate, shall not be less than one-third the thickness of the laminated hook.

3.7 The rivet centers other than these at the vertical section in the height shall not be less than 60 mm from the edge of the hook. Rivets shall not be located on a common radial centerline, on the common horizontal centerline and common

vertical (and passing through the centers of pin and trunnion) centerline of the hook.

3.8 In the eye portion of the hook, rivets shall be located at a distance of 1.5 times the dia of the supporting pin and bushing hole below the centerline of the pin. The plates in this section shall be fully welded over an angle of 90^{o} at the top and 45^{o} each on the sides as shown in Fig.1 and hand ground. Welding shall be done using EB 2856HBJ as per IS 814:1991 `Covered electrodes for manual metal arc welding of carbon and carbon manganese steel (fifth revision)' having properties equivalent to material of the plates. Transverse welding is not permitted.

3.9 Riveting work on the hook shall be completed before the hooks are continuous edge welded.

3.10 The surface of the plates where lip plate, trunnion seat wearing plate liner wrapper plate and supporting bush are fixed, shall be machined after riveting of the hook.

4. WEARING PLATES

4.1 The inner surface of the hook that comes in contact with the ladle trunnion and the outside tip of the hook shall be protected by a steel wearing plate not less than 16 mm thick. The trunnion seat wearing plate shall be made of materials as specified in clause 2, machined to fit the laminations and secured in place by welding. The outside edges of the wear plate and wrapper plate shall be beveled and joined to the hook plates by continuous welds. Wearing plates in the height shall be continuous throughout and no transverse weld shall be used.

5. SUPPORTING BUSHING

5.1 The eye end of the laminated hooks shall be provided with a steel bushing. The bushing shall be press fit and suitably locked. It shall have a minimum thickness of 12 mm and heat treated to 280-300 HB. Suitable groove shall be provided in the bush for greasing.

6. FORM AND DIMENSIONS – The hook shall have the form and dimensions as given in Table 1 and Fig.1 and tolerances on these dimensions shall be according to IS:2102 (Part I & Part II):1993 `General tolerances without individual tolerance indications (third revision)'.

Fig.1 FORM OF LAMINATED LADLE HOOK

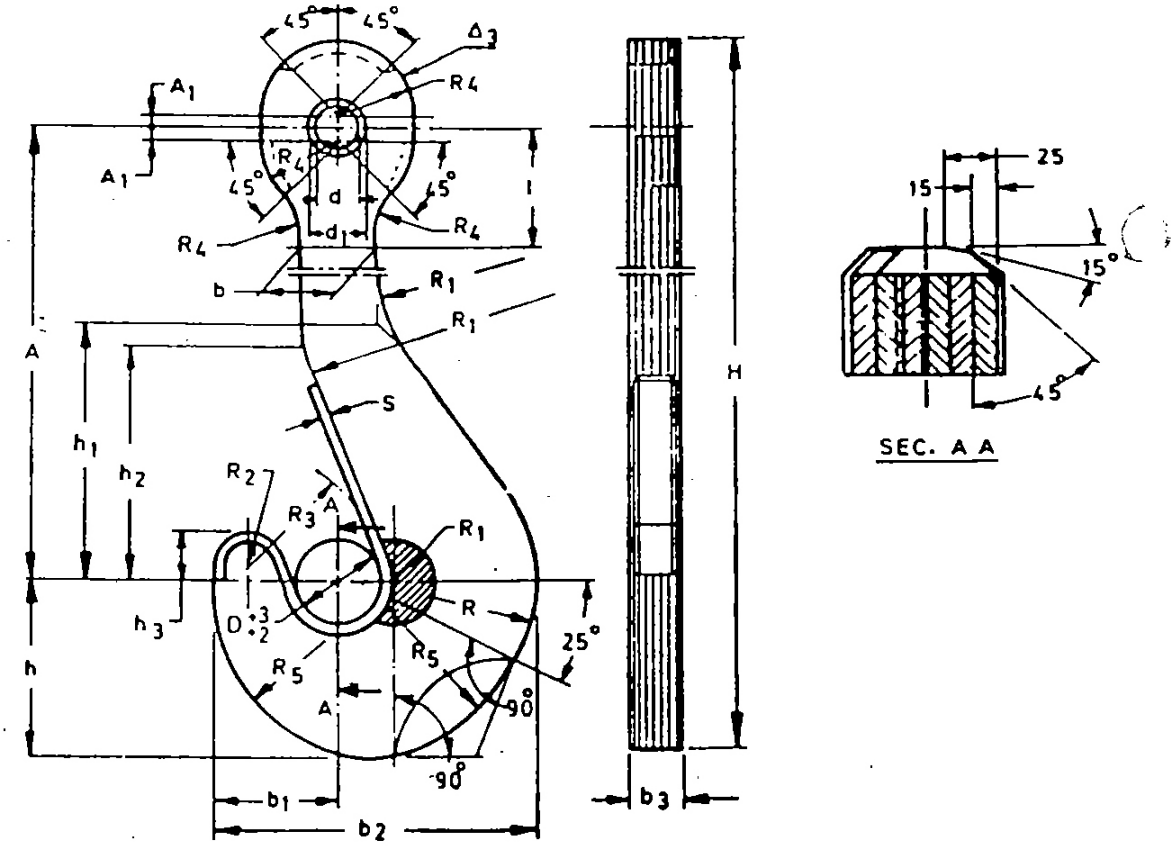

FIG. 1 FORM OF LAMINATED LADLE HOOK

TABLE-1

DIMENSIONS OF LAMINATED LADLE HOOKS

(Clause 6)

Sl. No.	Capacity In Tonnes Crane	Hook	D	d	d1	A1	R	R1	R2	R3	R4	R5	A	H	h	h1	h2	h3	b	b1	b2	b3	Mass in Kg
i)	80	40	250	125	150	30	450	800	85	365	180	120	1750	2400	440	800	730	125	180	345	850	140	950
ii)	140	70	350	160	190	40	650	1000	120	500	260	150	2200	3115	615	1000	900	175	280	460	1200	160	1970
iii)	180	90	390	190	230	50	800	1100	120	600	300	150	2300	3360	710	1250	1100	190	300	515	1360	180	2800
iv)	225	115	420	200	240	50	875	1200	140	630	320	150	2600	3745	775	1400	1200	200	320	560	1500	200	4020
v)	280	140	430	220	260	60	1050	1300	150	670	350	150	2800	4135	925	1500	1300	210	400	600	1700	200	4960
vi)	320	160	450	240	280	60	1120	1360	180	700	400	150	3000	4435	975	1600	1400	225	450	670	1880	200	6100
vii)	360	180	470	250	300	70	1150	1400	200	730	400	150	3150	4620	1000	1650	1450	230	450	700	1900	240	7470
viii)	400	200	470	260	310	75	1220	1500	220	730	440	150	3350	4935	1070	1750	1550	235	475	750	2060	240	8700
ix)	450	225	500	280	340	80	1280	1550	250	750	470	150	3500	5200	1150	1850	1650	250	520	800	2180	250	10220
x)	500	250	530	300	360	85	1400	1700	250	775	530	150	3650	5485	1220	1950	1750	270	560	860	2370	250	11900
xi)	560	280	560	320	380	90	1450	1800	270	825	545	150	3750	5685	1300	2060	1900	280	580	925	2500	275	14300
xii)	630	315	700	350	420	100	1550	1900	300	900	580	150	4000	6080	1400	2120	1950	360	630	1060	2720	300	17700

NOTE- Hooks with capacity above 16T and below 40T may be considered DIN 15407.