INTERPLANT STANDARD — STEEL INDUSTRY

IP SS	DESIGN PARAMETERS FOR SLAG LADLES AND SLAG LADLE CARS	IPSS : 2-01-003-81
	CORRESPONDING INDIAN STANDARD NOT AVAILABLE	

0. Foreword

0.1 Interplant standardization activity in steel industry is being pursued under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). This Interplant Standard, prepared by the Working Group on Steel Plant Ladles and Rolling Stock, IPSS 2 : 1, with the active participation of the representatives of the steel plants, established manufacturers of ladles and reputed consulting organizations, was adopted by the Approval Committee on Design Parameters, IPSS 2, on 19 December 1981.

0.2 Interplant Standards on design parameters primarily aim at achieving rationalization and unification of parts and assemblies of process and auxiliary equipment used in steel plants and these are intended to provide guidance to the steel plant engineers, consultants and manufacturers in their design activities.

0.3 This standard attempts at prescribing uniform overall dimensions and other parameters for design of slag ladles and slag ladle cars so that the related complementary equipment could be designed in harmony. Broad guidance in material selection has also been given in this standard. However, for the details of manufacturing practices, including heat treatment and testing, good manufacturing practices and/or the relevant Indian Standards are applicable.

0.4 This standard is essentially futuristic in nature and as such the developments in technology have been incorporated in it, to the extent possible. Hence for new steel plants and in the expansion programmes of the existing steel plants, deviations from the stipulations of this standard are not desirable. However, if the present situation in any existing steel plants so demands, the designer may deviate from the stipulations of this standard with respect to the size and other details.

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1. Scope — This Interplant Standard covers the requirements of slag ladles and slag ladle cars intended for transporting hot slag from the blast furnace, steel making furnaces and converters, to the dumping yard or other suitable locations within the plant.

2. Capacity — The capacity of slag ladles shall be as follows:

Type A — 16 m^3, and

Type B — 11 m^3.

3. Dimensions — The main feature and basic dimensions of the ladle and the car shall be as given in Table 1 read with Fig. 1 and 2. For deciding tolerances on linear dimensions, the 'coarse' class of deviation as stipulated in 'IS : 2102 (Part I)-1980 General tolerances for dimensions and form and position: Part I General tolerances for linear and angular dimensions (*second revision*)', shall apply.

Amendments Issued (*to be filled up by the user department*) :

No.	Date of Issue	No.	Date of Issue
1		3	
2		4	

UDC 621·746·33 : 669·18

TABLE 1 DIMENSIONS OF SLAG LADLE AND SLAG LADLE CARS

(*Clause* 3)

(All dimensions are in millimetres)

Sl No.	Component Part	Type A	Type B
i)	Outside diameter of ladle shell at the top (*B* in Fig. 2)	3 510	3 200
ii)	Height of ladle shell	3 300	2 860
iii)	Thickness of ladle shell at the bottom (*Min*) (t_B in Fig. 2)	100	100
iv)	Thickness of ladle shell near the top (*Min*) (t_{REST} in Fig. 2)	55	55
v)	Track gauge	1 676	1 676
vi)	Height of auto-coupler over the rails (see Fig. 1)	1 050	1 050
vii)	Overall height up to the top of ladle (over the rail)	3 870	3 600
viii)	Width of car in normal position (*Max*) (see Fig. 1)	3 600	3 200
ix)	Distance between centres of auto-couplers (see Fig. 1)	7 850	7 850
x)	Distance between bogies (*Min*)	4 250	4 000
xi)	Diameter of wheel (*Min*)	840	800
xii)	Clearance of the underframe bottom over top of the rail (*Min*)	120	120
xiii)	Angle of tilt	118°±2°	118°±2°

4. Design and Construction

4.1 The slag ladle car shall comprise a robust chasis mounted on two bogies and designed to carry the slag ladle and its tilting mechanism. The car shall be fitted with autocouplers of AAR Type E used by the Indian Railways or any other type of coupler as mutually agreed between the purchaser and the manufacturer. It shall be hauled by a locomotive at speeds not exceeding 16 kmph. The car shall be able to negotiate bends and shall be provided with pneumatic or mechanical brakes. The maximum permissible axle load with Type A and Type B ladles shall be 38 and 22·5 tonnes, respectively.

4.2 The tilting mechanism shall be electric or hydraulic or pneumatic. In case of electric drive, the motor shall conform to ' IS : 325-1978 Specification for three-phase induction motors (*fourth revision*) ' derated for 65°C ambient temperature.

4.3 All important joints shall be subjected to ultrasonic tests/radiographic examination.

5. Materials of Construction — The materials of construction of different parts of the ladle and the car shall be as mentioned in Table 2.

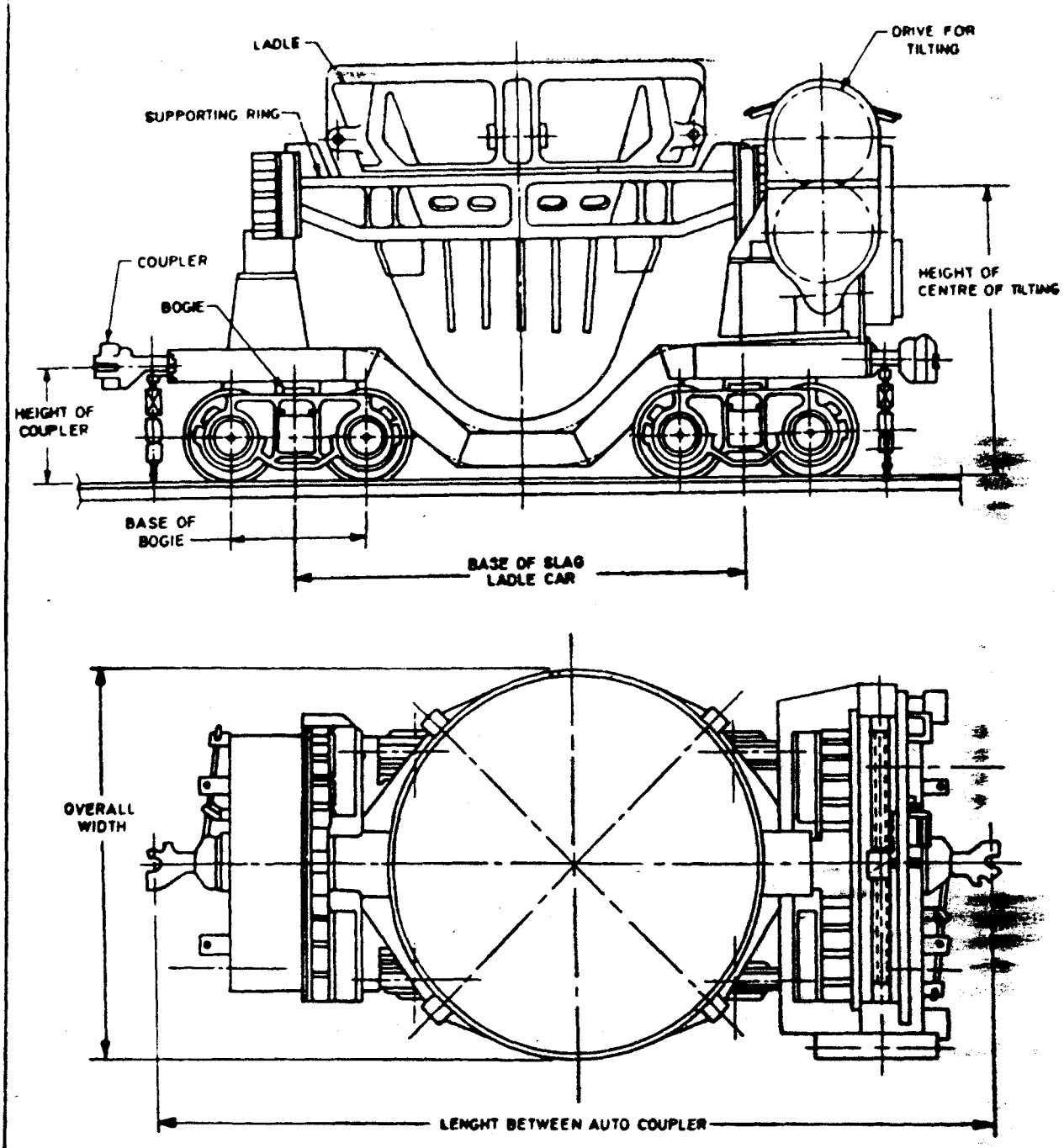

FIG. 1 TYPICAL FEATURES OF SLAG LADLE AND SLAG LADLE CARS

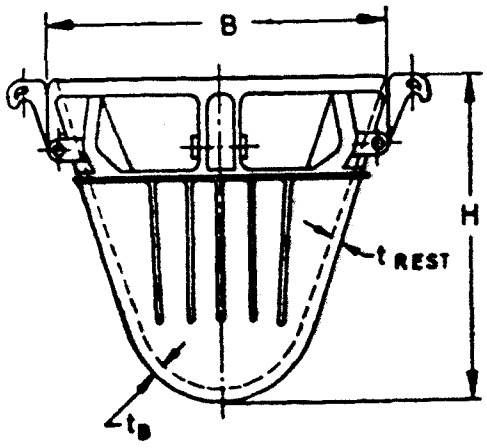

FIG. 2 DETAILS OF SLAG LADLE

TABLE 2 MATERIALS OF CONSTRUCTION OF PARTS OF SLAG LADLE AND SLAG LADLE CARS

(*Clause* 5)

Sl No.	Component Part	Material of Construction	Relevant Indian Standard Specification
i)	Ladle shell	Cast steel, C23-45 or suitable grade of cast iron	IS : 1030-1974 Specification for carbon steel castings for general engineering purposes (*second revision*)
ii)	Supporting ring	Cast steel, C26-52 or	IS : 1030-1974
		Structural steel St 42-W, fabricated construction	IS : 2062-1980 Specification for structural steel (fusion welding quality) (*second revision*)
iii)	Car frame	Cast steel, C26-52 or fabricated steel St 42-W construction	IS : 1030-1974 IS : 2062-1980
iv)	Wheels	Steel, tensile strength 45 kg/mm² (*Min*)	—
v)	Axle	Medium carbon steel	—
vi)	Bogie frame	Cast steel or structual steel fabricated construction, tensile strength 37 kg/mm² (*Min*)	—
vii)	Bogie springs	Silicon manganese spring steel	—
viii)	Drive gear and pinion	Medium carbon or low alloy steel suitable for duty conditions	—
ix)	Drive shaft		

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