BHARAT HEAVY ELECTRICALS LIMITED

CENTRAL FOUNDRY FORGE PLANT

SPECIFICATION FOR 3 PLATE SLIDE GATE SYSTEM

Specification no. : SMS/SP/29 Rev 01

1. General:

This specification covers the requirements of 3 plate slide gate system to be to be placed at the bottom of pony ladle and will be used during vacuum teeming of liquid steel for manufacturing of Ingot in Vacuum degassing tank at Pit side of Steel Melting Shop.

The sliding gate system should ensure:

a) Nozzle opening under vacuum for teeming of liquid steel.

b) Full control on flow of liquid steel from pony ladle to Ingot mould in Vacuum pit.

c) Stationary collector nozzle & it's Heat shield

d) Leak proof environment in vacuum to avoid any air aspiration.

e) No erosion in sliding gate refractories while operation.

3-Plate slide gate system should be a complete unit in itself with all attachments needed for vacuum Teeming of Ingots.

2. Scope of supply:

a) Scope of supply is Design, Engineering, Manufacture, Erection and Commissioning of 3 plate slide gate system. It shall be simple, robust and reliable equipment, designed for ease in operation and easy for maintenance. It should operate trouble free in during vacuum teeming of Ingots.

b) The supplier should furnish full technical information of the equipment along with general arrangement drawings, list of spare and tools.

c) The equipment shall be dispatched in suitable packing with proper identification, to avoid any damage during handling, transit and storage.

d) Offer should be clear in all respects and accompanied by technical details, description of working of equipment etc.

Prepared by		Checked by		Approved by
8/12/16	8/12/16		8/12/16	
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3. Drawing Document & Manual:

Following documents (in English) as below shall be suupliedt:-

I) **At the time of technical offer**

a. General arrangement drawing of position of slide gate system and location of nozzle on pony ladle (as per drawing attached) is to be submitted along with the technical offer for acceptance of technical suitability.

b. Assembly drawings/diagrams showing the placement of components/parts along with make, ratings and specification.

c. Complete list of spares required for the smooth operation of equipment.

d. Drawing and data sheet of Refractories as per clause 6.6 of this specification.

II) **After placement of Purchase Order**

a. General arrangement drawing has to be approved before start of manufacturing.

III) **Along with equipment**

a. Operation and maintenance manual.

4. Vendor's Qualification criteria

- Vendor should be a Manufacturer/ Manufacturer's Authorized Agent of the product.

  Authorization letter (for Indian manufacturers)/ Agency agreement (for foreign manufacturers) has to be provided by the manufacturer's authorized agents. Purchase order will be placed to the manufacturing company.

- Vendor should have supplied at least one 3-Plate slide gate system supplied to a steel industry within last ten years.
- Vendor has to provide PO/Invoice copy in support of point (1).
- Vendor has to provide at least one performance certificate from their customers for their past supplies of 3-Plate slide gate system.
- Offer should include the names and addresses of customers to whom same system have been

  Supplied by the supplier

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5. Operational parameters

Sl No	Category	Parameters
a	Steel Melting Process	Primary Melting: EAF Secondary Refining: VAD/VOD
b	Route of Liquid Steel	Liquid steel from VAD/VOD Ladle transferred to Pony Ladle then transferred to Ingot Mould in Vacuum Pit.
c	Liquid steel temperature at Pony Ladle	1500 to1600 °C
d	Pony Ladle Capacity	35 MT and 45 MT
e	Nozzle bore diameter	55 mm
f	Cylinder stroke length	180 mm
g	Cylinder Operating pressure	180 bar min.
h	Teeming Time/Casting time	7 minutes to 25 minutes depending on the size of Ingot
h	Liquid Steel grade	Alloy steel (Rotor grade Steel), Stainless steel, Supercritical grade steel
i	Pony ladle drawing	attached at Annexure-I

6. Technical parameters

6.1 For Slide Gate System:

a) Location of 3 plate slide gate system: At the bottom of Pony Ladle

b) Nozzle bore diameter required : 55 mm

c) Maximum Bore Diameter possible in the slide gate : Supplier to specify

d) Cylinder stroke length : 180 mm

e) Cylinder Operating pressure: 180 bar min.

f) Middle plate shall have porous plug arrangement in closed nozzle position so that argon flow in closed nozzle condition restricts metal solidification in nozzle and ensures nozzle opening without any failure.

g) Porous plug of middle plate shall be such that:

   i. Argon purging doesn't fail during holding of Liquid metal in closed nozzle position.

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iii. Metal leakage doesn't occur during holding of liquid metal in closed nozzle position through porous plug.

h) 3-Plate slide gate system is to be used under vacuum so setup should be such that no leakage should be there due to slide gate system.

6.2 Spares for Erection and Commissioning:

a) Complete set of spares to be provided by the vendor for Erection & Commissioning.

b) Vendor has to provide list of spares for Erection & Commissioning along with the offer.

6.3 Tools for Maintenance of the slide Gate:

a) Complete set of tools to be provided by the vendor for maintenance of Slide gate system.

b) Vendor has to provide list of tools for Maintenance of Slide gate system along with the offer.

6.4 Tools for Slide Gate Preparation:

a) Hydraulic Unit & Hydraulic hoses will be provided by BHEL.

b) Complete set of tools except above items is to be provided by the vendor for Preparation of Slide gate system.

c) Vendor has to provide list of tools for Slide gate preparation along with the offer.

6.5 Tools for Casting :

a) Hydraulic Unit , Hydraulic hoses and Argon hoses will be provided by BHEL.

b) Complete set of tools required in Casting area except above items is to be provided by the vendor.

c) Vendor has to provide list of tools for Casting area along with the offer.

6.6 Refractory Required in Slide Gate System for successful erection and commissioning:

a) Well Block : 3 nos.

b) Inner nozzle :3 nos.

c) Top plate Assembly :20 nos.

d) Middle plate Assembly :20 nos.

e) Bottom plate Assembly :20 nos.

f) Supplier should mention the approximate life of above refractories with respect to number of heats.

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7. Utilities to be Provided by BHEL

a) Hydraulic unit & Control system – 180 bar pressure min.

b) Hydraulic & Argon hose

c) Auxilary Hydraulic unit

d) Ramming mass & other castables.

e) Fabrication work in pony ladle (if required any under supervision of vendor's representative)

8. ERECTION AND COMMISSIONING

a) Supplier shall take full responsibility for carrying out the erection, testing and commissioning of equipment.

b) Erection & Commissioning spares and tools, required for commissioning of the equipment, shall be brought by the Supplier.

c) Lump sum Charges, duration, terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer. No extra payment will be made by BHEL to the vendor above the lump sum amount.

9. Performance guarantee / warranty:

The supplier shall provide full and complete guarantee for trouble free performance for at least one year from the date of commissioning. If instrument remains out of order during this period, guarantee period will stand extended for the corresponding period. If any manufacturing defect is noticed during guarantee period, it will be rectified free of cost even after completion of guarantee period.

10. Site visit at CFFP, BHEL:

Supplier may visit the site before submitting the offer.

11. Confirmation on spares & services

a) Vendor has to confirm the availability period in years for the service/ maintenance & spares of equipment for smooth running of equipment.

b) The availability period must not be less than 12 years.

c) The supplier must have a service center in India.

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12. Training

The supplier shall train CFFP staff & engineers for operation, calibration and maintenance of the system at CFFP.

13. **Price bid:**

In the price bid following category has to be quoted separately:

S.No.	Category	Quantity	Price
1.1	3-Plate Slide Gate System (Main Equipment)	3	
1.2	**Tools for Maintenance of the slide Gate:**		
1.3	**Tools for Slide Gate Preparation**		
1.4	**Tools for Casting :**		
2.0	**Spares for Erection and Commissioning**		
3.0	**Refractory set charge:**		
	Well Block	3	
	Inner nozzle	3	
	Top plate Assembly	20	
	Middle plate Assembly	20	
	Bottom plate Assembly	20	
4.0	Engineering, Documentation, Technical Assistance including Erection & Commissioning (Lump sum amount to be quoted)		
5.0	Packing & delivery charges (lump sum amount to be quoted)		

Note:

a) Taxes extra

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REVISION RECORD SHEET

SN	Revision No.	Revision date	Nature of Changes
01	Rev 01	08.12.2016	Clause 4 modified as follows: Supply of least one number of 3-Plate Slide gate system to a steel industry within last ten years instead of three numbers of 3-Plate slide gate system in last seven years.

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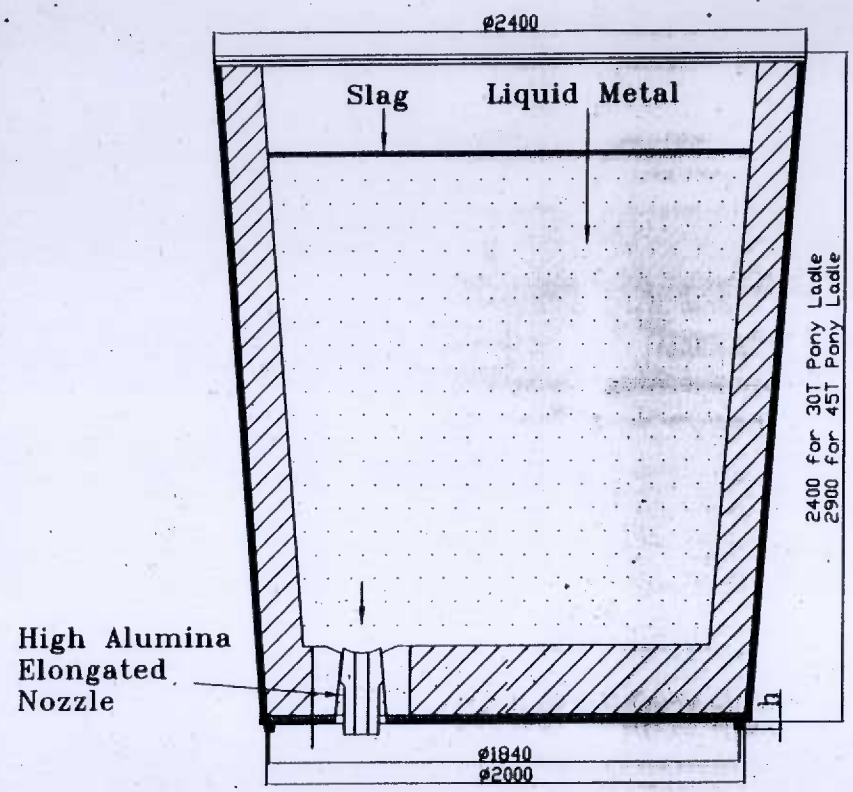
FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN M.M.)

DRAWING NUMBER

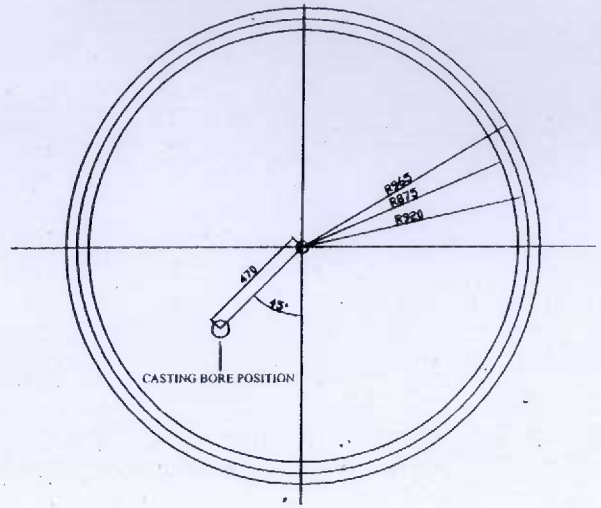
ANNEXURE-I
Pg 1 of 2

PONY LADLE (SCHEMATIC)



Here "h", height of pony of the ladle can be increased to accommodate 3 Plate Slide Gate System

SCHEMATIC DRAWING OF CASTING BORE POSITION AND LADLE BOTTOM



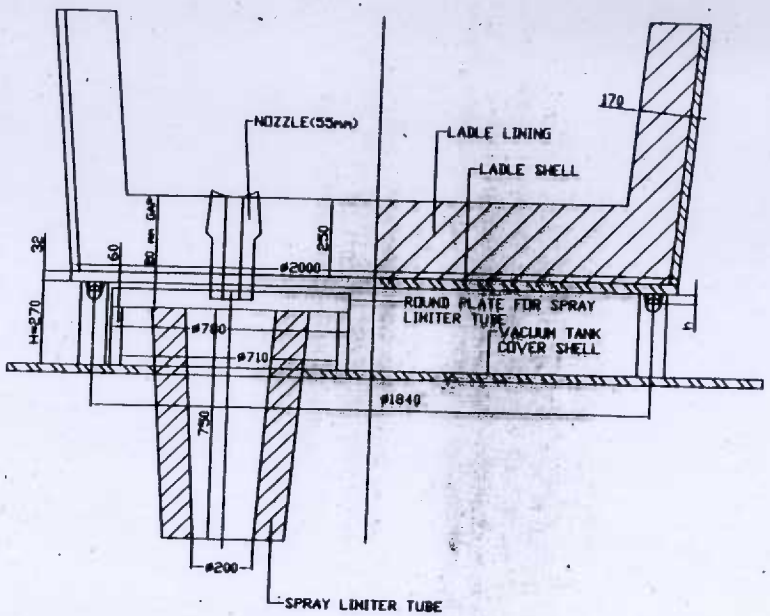
BHARAT HEAVY ELECTRICALS. LTD. CENTRAL FOUNDRY FORGE PLANT RANIPUR HARDWAR					
DEPTT. SMS	SCALE N.T.S.	WEIGHT	NAME	SIGN	DATE
TITLE SCHEMATIC DRG OF PONY LADLE		DRN	SUNIL KUMAR		
		CKD			
		APD	P.K.ROY		
DEPARTMENT SMS	DRG NO.				
	SHEET NO.- 2		NO. OF SHEETS-2		

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN M.M.)

DRAWING NUMBER

SCHEMATIC DRAWING OF LADLE SETUP WITH VACUUM TANK COVER

ANNEXURE-I
Pg 2 of 2



H=270 IS FIXED AND IT IS PART OF VACUUM TANK COVER.
h= PONY AT THE BOTTOM OF LADLE THAT SITS INTO GROOVE OF VACUUM TANK COVER MAY BE INCREASED TO ACCOMMODATE 3 PLATE SLIDE GATE SYSTEM.
CASTING BORE POSITION IS FIXED.

BHARAT HEAVY ELECTRICALS. LTD.
CENTRAL FOUNDRY FORGE PLANT
RANIPUR HARDWAR

DEPTT.	SCALE	WEIGHT		NAME	SIGN	DATE
SMS	N.T.S.		DRN	SUNIL KUMAR		
TITLE: SCHEMATIC DRG OF PONY LADLE			CKD			
			APD	P.K.ROY		

DEPARTMENT: SMS
DRG NO.
SHEET NO.- 2
NO. OF SHEETS-2