



BHARAT HEAVY ELECTRICALS LIMITED
CENTRAL FOUNDRY FORGE PLANT
SPECIFICATION FOR HYDROGEN MEASURING INSTRUMENT

Specification no: SMS/SP/27 Rev 01

1. General:

This specification covers the requirements of hydrogen measuring equipment for in-situ measurement of hydrogen content in Liquid steel in ladle at VAD station of Steel Melting Shop.

Hydrogen measuring equipment should be a complete unit in itself with all attachments and spares needed for measuring hydrogen content in liquid steel.

2. Scope of supply:

- Scope of supply will cover Design, Engineering, Manufacture, Erection commissioning and supply of Hydrogen measuring equipment in VAD unit of steel melting shop. It should operate trouble free in presence of dust and vibrations in steel plant. The supplier should furnish technical information of the equipment along with general arrangement drawings, list of spare and tools.
- The supplier has to provide spares as per clause 6 of Specification.
- The supplier shall calibrate the Equipment.
- The equipment shall be dispatched in packing with identification, to avoid any damage to the equipment.
- Offer should be clear in all respects and accompanied by technical details, data processing, description of working of equipment etc.

3. Vendor's Qualification criteria:

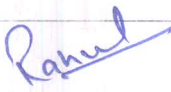
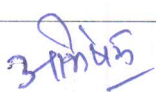
3.1 Vendor should be a Manufacturer/ Manufacturer's Authorized Agent of the product.

Authorization letter (for Indian manufacturers)/ Agency agreement (for Indian agent of foreign manufacturers) has to be provided by the manufacturer's authorized agents.

3.2 Vendor should have supplied at least one in situ Hydrogen measuring equipment to a steel industry within last seven years.

3.3 Vendor has to provide PO/Invoice copy in support of point 3.2.

3.4 Offer should include the names, addresses, official e-mail id & contact nos. of customers to whom same system have been supplied by the supplier.

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4 Operational parameters:

Measurement location	At VAD station in ladle containing liquid steel
Temperature	1500-1700 °C
Type of steel grade	a) Plain Carbon steel & 1.5% Mn steel b) Alloy steel c) Stainless steel d) Supercritical grade steel
Hydrogen level after end of refining	Less than 1 ppm

5. Technical parameters

5.1 For Equipment:

a	Hydrogen measuring range	Lower Limit: Less than 0.8 ppm Upper Limit: 10ppm or more
b	Accuracy of measurement	± 0.1 ppm
c	Operating distance	Up to 75 meters (min)
d	Display type	Digital/LED display
e	Testing time	180 sec (max)
f	Lance Length	4 to 4.5 meters

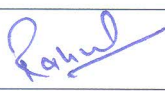
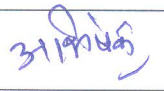
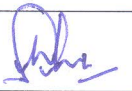
5.2 Probe Parameters:

Type of probe and length of probe shall be suitable to measure Hydrogen level for steel grade as mentioned in operation parameters at clause 4 and Technical parameters at clause 5.1 of the specification.

6: Spares

List of spares to be supplied along with the equipment:

- Hydrogen measuring probes: 24 Nos suitable for grade of steel at clause 4.
- Measuring Lance – 1 no.
- Minimum 5 set of Lance auxiliaries. (Probe holder, contact block etc.)
- Additional spares (if any) suitable for successful running of Equipment.

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7 Utilities to be provided by BHEL

Power Supply: 220V±10%, single phase and 415V±10%, three phase.

8 Performance guarantee / warranty:

The supplier shall provide guarantee for trouble free performance for at least one year from the date of commissioning. If any manufacturing defect is noticed during guarantee period, it will be rectified/replaced free of cost.

9 Drawing Document & Manual:

Three sets of documents (in English) along with a soft copy as below shall be supplied along with the equipment:-

- Operation and maintenance manual.
- Electrical circuit diagram.
- Assembly drawings/diagrams showing the placement of components/parts along with make, ratings and specification.
- Complete list of spares required for the smooth operation of equipment.
- Calibration Procedure of the Equipment.

10 Site visit at CFFP, BHEL:

Supplier may visit the site before submitting the offer.

11 Erection and Commissioning:

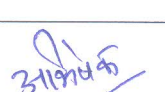
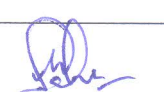
- Supplier shall take responsibility for carrying out the erection, calibration, testing and commissioning of equipment.
- Tools and spares, over & above the quantity which are mentioned at clause 6, for Erection, Calibration, testing and commissioning of the equipment shall be brought by the Supplier.
- Charges, duration, terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.

12 Confirmation on availability Spares & Services

- Vendor has to confirm the availability period in years for the service & spares of equipment for smooth running of equipment.
- The availability period must not be less than 12 years.

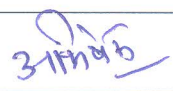
13 Training

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

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REVISION RECORD SHEET

SN	Revision No.	Revision date	Nature of Changes
01	Rev 01	10.10.2017	Requirement of Performance Certificate is removed from Vendor Qualification Criteria as per clause 3 of specification. Hydrogen measuring range modified as per clause 5.1. of specification.

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