BHARAT HEAVY ELECTRICALS LIMITED
CENTRAL FOUNDRY FORGE PLANT

SPECIFICATION FOR ACTIVE OXYGEN MEASURING INSTRUMENT

Specification no. : SMS/SP/28 Rev 00

1. **General:**

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

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

2. **Scope of supply:**
   a. Scope of supply is Design, Engineering, Manufacture, Erection & commissioning of Active oxygen measuring equipment in VAD units of steel melting shop. It shall be simple, robust and reliable equipment designed for minimizing and easy for maintenance. It should operate trouble free in presence of dust and vibrations in steel plant. The supplier should furnish full technical information of the equipment along with general arrangement drawings, list of spare and tools.
   b. The supplier shall calibrate the Equipment satisfactorily.
   c. The equipment shall be dispatched in 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, 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 foreign manufacturers) has to be provided by the manufacturer's authorized agents.*
   3.2 Vendor should have supplied at least three in situ Active oxygen measuring equipment to a steel industry within last five years.
   3.3 Vendor has to provide PO/Invoice copy in support of point 3.1.
   3.4 Vendor has to provide at least one performance certificate from their customers for their past supplies of Active oxygen measuring Instrument in Liquid steel.
   3.5 Offer should include the names and addresses of customers to whom same system have been supplied by the supplier.

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Material Code : FF4220216537

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
Dual station measurement capability	**For measurement of Active oxygen at both the units VAD 1 and VAD 2.**

5. Technical parameters

5.1 For Equipment:

a	Active oxygen measuring range	0-50 ppm
b	Accuracy of measurement	± 0.1 ppm
c	Operating distance	Up to 50 meters (min) (Wireless)
d	Connectivity between lance and equipment	Wireless
e	Display type	Digital/LED display
f	Testing time	10 sec (max)
g	Lance Length	4-4.5 meters
h	Dual station measurement capability	Single equipment must have capability of dual station measurement at both units VAD-1 & VAD-2

5.2 Probe Parameters:

Length and Type of probe shall be suitable to measure Active oxygen 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:

a. Active oxygen measuring probes: 50 Nos.
b. Measuring Lance – 2 no.
c. Minimum 5 set of Lance auxiliaries. (Contact block, compensating cable, probe holder etc.)
d. Additional spares suitable for successful running of the 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 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.

9 **Drawing Document & Manual:**

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

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

10 **Site visit at CFFP, BHEL:**

Supplier may visit the site before submitting the offer.

11 **Erection and Commissioning:**

a. Supplier shall take full responsibility for carrying out the erection, calibration, testing and commissioning of equipment.
b. 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.
c. Charges, duration, terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.

12 **Confirmation on availability Spares & Services**

a. Vendor has to confirm the availability period in years for the service & 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.

13 **Training**

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

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				26/5/16	
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