Indent No.20092883
Date:13-07-09

Broad Specification
Optical Emission Spectrometer

1. Qualifying Conditions

A. The spectrometer shall be arc type, PMT based or a combination of PMT & CCD. Dedicated CCD based systems or GDS systems are not acceptable
B. Only those vendors who have supplied and commissioned at least 3 Optical Emission Spectrometers, analyzing both ferrous & non-ferrous alloys, in the past 10 years in India, and, referred machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of tender) should quote. However, if referred machine(s) has been supplied to BHEL then the m/c should be presently working satisfactorily for more than 6 months after commissioning & acceptance (on the date of opening of tender) in BHEL can also quote.
C. The following information should be submitted by the vendor about companies were similar equipment have been supplied. This is required from all vendors for qualification of their offer:

I. Name of customers/ companies where referred machine is installed
II. Complete postal address of the customers, name & designation of the contact persons of customers with their phone/FAX and e-mail address
III. Month and year of commissioning
IV. Type of products tested by the customer
V. Parameters of the m/c's supplied,.
VI. Performance certificate from the customers regarding satisfactory performance of the m/c supplied to them (original certificate) or through e-mail directly from the customer of the vendor.
VII. BHEL reserves the right to verify the information submitted by the vendor. In case the information is found to be false or incorrect the offer shall be rejected.

2. Technical Parameters

The Optical Emission Spectrometer shall be used for the chemical analysis of solid metallic samples which may be ferrous or non-ferrous.

A. The detailed analytical matrix comprising of different bases, the elements to be determined in each base and the concentration ranges of each element in a base is attached in Annexure-I. For each matrix-alloying element combination, supplier to provide guaranteed accuracy results which shall be verified at the time of commissioning. Offers without this complete data will not be considered.
B. The system shall be capable of analyzing nitrogen in steels & oxygen in copper alloys.
C. The system shall be capable of analyzing cast iron samples in the as cast condition and samples containing cracks voids etc. Supplier to confirm.
D. The equipment shall have high precision and accuracy (better than ±1% over our total range). The values of precision & accuracy should meet the requirements of Cl.14, Tables 2 & 3 of ASTM E 1086,and, Cl.10, Tables 1&2 of ASTM E 1009. Vendor to provide the actual precision and accuracy results as per the above standards with the offer. Offers without this complete data will not be considered.

E. The spectrometer shall have a Paschen-Runge vacuum polychromator with a focal length of minimum 550 mm.
F. The holographic master grating should have at least 2400 grooves / mm. Other gratings selectable by the analytical task to be provided. Details to be given with the offer.
G. Effective wavelength range to be at least 120-600 nm.
H. The optics shall be under temperature controlled environment to minimize ambient temperature effects. Details required .
I. The system shall be capable of automatic profiling.
J. The spark stand is to be argon flushed using Grade-I argon gas. Ultra purity argon should not be necessary. If the stand is water cooled, the cooling system should be of the closed loop type with no necessity of external water supply. Details to be provided along with offer.
K. The excitation system shall consist of a fully digitized plasma generator with digital discharge definition and digital pulse generation. Details required.
L. The spectrometer control shall be fully digitized with status measuring card, A/D converters and attenuators for each channel.
M. The computer system shall have a branded PC (3 Ghz, 120 GB HDD, CD/DVD R&W) with Windows operating system, 17" TFT monitor & 132 col. dot matrix printer.
N. The instrument shall be factory calibrated to cover our total analytical range for all matrices. A complete set (new, with detailed compositional certificate) of all the Certified Reference Materials used for calibration is to be supplied with the spectrometer.
O. Along with the equipment the supplier shall provide the original analytical software and also a back up copy.
P. The excitation system and control system should be enclosed in a totally dust proof environment and provided with high capacity cooling fans.

3. General Requirements

A. The instrument shall work off 220 V± 10%, 50 Hz, AC supply.
B. The ambient temperature in the laboratory is expected to vary from 4-40ºC.
C. Along with the main equipment the supplier shall quote for spares e.g. electrodes, electronic components, pump oil etc. needed for trouble free functioning for at least 10 years. This is a must.
D. Along with the main equipment the supplier shall quote for a compatible argon purifying furnace and oxygen/ moisture removal furnace along with magnesium turnings/ dessciants needed for each type of furnace for 5 yrs. trouble free operation.
E. The supplier shall provide a branded UPS having at least 30 minutes of standby time. The capacity of the UPS should be such as to cater to the complete system requirement including the vacuum pump.
F. The supplier shall install & commission the system in our laboratory and demonstrate complete compliance of the total system to our specification.
G. The supplier shall train our laboratory staff in the complete operation & maintenance of the system. This training shall be for at least 3 days.
H. Along with the equipment the supplier shall provide a hard copy of the complete operation & maintenance manual and a soft copy on CD. The maintenance manual should have the total circuit diagrams of the main equipment and all its accessories.
I. The total system shall be guaranteed for satisfactory performance for 24 mnths. from the date of commissioning. Any spares needed during this period shall be provided by the supplier free of cost.
J. Along with the offer, the supplier shall provide complete details of his service network in north India with details of the technical staff.
K. Along with the offer the supplier shall provide a list of users with details of the contact person where such equipment have been supplied in India.
L. The offer should be accompanied with brochure & detailed technical offer where each of the above points are addressed in totality.

M. It is preferred that the quotation and any subsequent clarification be from the Original Equipment Manufacturer. In case these are from Indian representatives, then, a **current** letter of authorization is required to be furnished.

Annexure- I

Range of Elements to be analysed in Spectrometer						
Element	**Fe Base**	**Cu Base**	**Al Base**	**Sn Base**	**Co Base**	**Ni Base**
Ag	…….	0.001-0.5	…….	0.001-0.5	……..	……..
Ag	……..	0.5-16.0	……..	0.50-3.0	…….	…….
Al	……..	0.50-2.50	I.S	……..	…….	0.1-2.5
Al	0.001-1.5	……..	…….	0.001-0.005	0.01-1.5	…….
As	0.002-0.20	0.001-0.50	…….	0.001-0.5	…….	……..
As	…….	0.001-1.50	…….	…….	…….	……..
B	0.001-1.0		…….	……..	…….	0.001-1.0
Be	……..	0.001-0.1	0.005-0.10	……..	…….	……..
Bi	…….	0.001-1.0	…….	0.001-0.5	…….	……..
C	0.015-4.0	0.003-0.5	…….	……..	0.10-2.0	0.003-0.40
Cd	…….	0.1-2.0	…….	0.001-2.50	……..	…….
Co	0.001-1.0	……..	……..	0.001-0.005	……..	0.05-20.0
Co	1.0-12.0	…….	…….	……..	I.S.	……..
Cr	0.003-2.0	0.001-2.0	0.01-2.0	0.01-0.50	…….	…….
Cr	1.0-25.0	……..	…….	……..	1.0-30.0	1.0-25.0
Cu	0.50-1.0	I.S.	.1-7.0	1.0-10.0	……..	0.005-2.0
Cu	0.01-0.50	…….	…….	…….	0.05-1.0	
Cu	…….	I.S.	…….	…….	…….	……..
Fe	I.S.	0.10-3.0	…….	…….		
Fe	……..	……..	…….	……..	0.10-3.0	1.0-20.0
Fe	…….	0.001-1.0	0.001-3.0	0.001-0.5		0.10-1.0
Hg	……..	……..	……..	…….	…….	…….
Mg	…….	0.001-0.1	…….	…….	……..	……..
Mg	…….	……..	0.01-13.0	……..	…….	……..
Mn	……..	0.005-1.50	0.001-3.0	……..	0.10-2.0	0.01-2.0
Mn	0.20-20.0	0.10-2.50	…….	…….	……..	…….

Element	Fe Base	Cu Base	Al Base	Sn Base	Co Base	Ni Base
Mo	0.01-6.0	…….	…….	……..	1.0-5.0	0.001-30.0
Nb	.003-3.0	……..	0.003-0.5	…….	0.5-3.0	0.001-4.0
Ni	1.0-20.0	1.0-35.0	……..	…….	0.5-15.0	I.S.
Ni	0.005-1.50	0.002-1.50	0.001-3.0	0.001-3.0	…….	…….
Element	**Fe Base**	**Cu Base**	**Al Base**	**Sn Base**	**Co Base**	**Ni Base**
P	0.001-0.5	0.001-1.0	…….	……..	…….	0.001-0.02
Pb	… …….	0.10-7.0	……..	0.10-3.0	…….	…….
Pb	0.001-0.2	0.005-1.0	0.001-0.20	0.001-1.0	…….	……..
S	0.001-0.2	0.001-0.50	……..	0.001-0.10	……..	0.001-0.005
Sb	0.001-0.2	0.001-0.1	0.01-0.50	…….	…….	…….
Sb	…….	…….	…….	0.1-15.0	…….	…….
Se	……..	0.001-0.10	…….	…….	…….	…….
Si	1.0-5.0	…….	0.1-16.0	……..	0.10-3.50	0.01-2.0
Si	0.002-1.0	…….	…….	…….	…….	…….
Sn	0.002-0.50	0.001-0.50		……..	……..	…….
Sn	……..	…….	…….	I.S	…….	…….
Sn	…….	0.01-8.0	0.001-0.50	…….	…….	…….
Te	……..	0.001-0.10	……..	…….	…….	…….
Ti	0.002-2.0	0.002-1.0	0.01-0.50	0.01-0.05	0.10-2.0	0.1-3.0
V	0.01-3.0	…….	……..	……..	…….	0.001-0.05
W	0.05-20.0	…….	…….	……..	1.0-15.0	0.10-5.0
Zn	……..	……..	0.001-0.50	0.001-3.0	…….	…….
Zn	……..	1.0-40.0	…….	…….	……..	…….