

Corrigendum 07

Revisions to the specifications for the purchase of Optical Emission Spectrometer based on pre-bid meeting and discussion of internal committee meeting.

Tender Reference No.: NITK/CRF/OES/2019-2020/04; dated 09/07/2019 Tender ID: 2019_NITK_455573_1

Queries & Reply/Clarification

Sl. No.	Specification	Questions	Committee's Decision	Response
1	Annexure-H: Detector System Fully PMT based detectors only. Multiple detectors to cover the range as per specified metal alloy bases with superior resolution and signal to noise ratio	Suggestion: PMT or CCD/CMOS detectors. Multiple detectors to cover the range as per specified metal alloy bases with superior resolution and signal to noise ratio.	Fully PMT or Fully CCD can be permitted. Reasons for change: We understand that the reliability of PMTs is far superior but cannot cover a large range of metals owing to budgetary limitations. However, the CCDs can cover a large range of bases and still being very cost effective. However, since the detector system is at the heart of the OES, the specifications will be different for the two systems. Hence, Annexure H, H-I and H-II will now be renamed as Annexure H-PMT. H-PMT-I and H-PMT-II and an new section of the name Annexure H-CCD is added to the specification part.	Annexure H, H-I and H-II will now be renamed as Annexure H-PMT, H-PMT-I and H-PMT-II and a 1 new annexure, Annexure H-CCD is added to the Tender document. Fully PMT or Fully CCD can be permitted. Fully PMT based systems refer to Annexure H-PMT, H-PMT-I and H-PMT-II Fully CCD based systems refer to Annexure H-CCD

2	<p>Annexure-H: Optic System Line-2: Vacuum based optic system with focal length of 600mm or better</p>	<p>Suggestion: Vacuum based optics system is not required in case of CCD detectors. 500mm focal length is allowed only if grating is of 3,600 grooves/mm or better;</p>	<p>Refer to Committees decision on SI. No. 1 of this document</p>	<p>Fully CCD based systems refer to Annexure H-CCD</p>
3	<p>Annexure-H: Optic System Line-3: Machine should have facility to add PMT in future if required. The limit on the no of base and PMTs can be added should be 65 PMTs or better</p>	<p>Suggestion: Machine should have facility to add elements or bases at our site without any hardware modification.</p>	<p>Refer to Committees decision on SI. No. 1 of this document</p>	<p>Fully CCD based systems refer to Annexure H-CCD</p>

Annexure H-CCD

Sl. No	Technical Specification Description	Remarks
I	Qualifying Conditions	
1	The spectrometers shall be arc /spark type with high resolution advanced CCD / scientific grade photo diode array CCD detectors (at least 8 nos. or more) with high pixel resolution for detection of elements. Should have multi optical chamber with minimum 400mm focal length for better resolution. The optical system must be argon flushed for UV optic (without vacuum pump to avoid spluttering of pump oil in the optic chamber).	
2	The Manufacturer should be minimum 10 years or more in the relevant business and have facility to provide service.	
3	The same model OES should be supplied to at least 100 no's in India and the performance certificate of five reputed companies should be presented. Contacts details of 5 users (Permanent employees) in Government academic/research institutes should be provided for written verification	
4	Extended Service, Spares & Consumable support for a period of minimum 10 years from the date of installation, commissioning & acceptance of the machine.	
II	<u>Technical Parameters</u>	
	Analysis & Measurements	
1	Two separate systems to be provided one of which can work dedicatedly on low melting metals like Al, Mg, Zn, Pb, Sn and the other dedicated for high melting metals like Fe, Cu, Co, Ni, Ti. Each system should work independent of the other with individual PC, software and gas connections.	
2	The Optical Emission Spectrometer shall be used for the chemical analysis of solid metallic samples of ferrous and non-ferrous alloys. Shall be capable of analysing atleast 42 elements, i.e., C, Si, Mn, S, P, Cr, Mo, Ni, B, Al, Co, Cu, Fe, Nb, Ti, V, W, Pb, Sn, Mg, As, Zr, Bi, Ca, Ce, Cd, Sb, Se, Be, Ta, Zn, La, Au, Ag, Ga, Ge, Hg, In, Na, Pd, N2 & O2 (low nitrogen & Oxygen)	
3	Bases: Along with the 4 bases (Fe, Cu, Al and Ni) mentioned in the PMT system, the CCD OES should be capable of analysing 6 more bases including, Zn, Pb, Sn, Ti, Co, Mg with rare earth.	

4	<p>Certified Reference Metal: In addition to CRMs mentioned in H-PMT-II, 2 CRMS each of different compositions for each for the 6 additional bases including Zn, Pb, Sn, Ti, Co, Mg bases have to be provided with preferable one of them being pure base metal. The other can CRM of the same base may belong to most commonly used alloy. For example, Ti- Ti 6 Aluminium 4 Vanadium. All CRMs should be from BAS with standard size. Find catalogue in the link below:</p> <p>http://www.basrid.co.uk/images/pdf/BAS_Catalogue_No._872_Mar2019.pdf</p>	
5	<p>Analytical matrix: Examples of detailed analytical matrix with the elements and its concentration ranges of each element in Fe, Cu, Al, Ni, Ti bases is attached in Annexure-H-PMT-I. Calibration for Global Orientation, Low Alloy Steel, Free Cutting Steel, Hi-Cr/Hi-Ni Steel and Cast iron is provided. Similarly, for different bases, detailed analytical matrix for important class of alloys of that base should be given along with technical bid. Offers without this complete data for all bases will not be considered.</p>	
6	<p>The system shall be capable of analysing Nitrogen in LAS & Stainless Steels at 0.005 - 1.00%</p>	
7	<p>Spectrometer systems shall be online upgradable to include additional alloying element, Software upgradation etc.</p>	
8	<p>The instrument shall be factory calibrated to cover our total analytical range in ferrous & non-ferrous 10 bases and it shall be viable to calibrate single element / total alloy online (using team viewer). A complete set of recalibration / Set-up standards against respective alloys are to be supplied with the spectrometer. Single sample per base is not acceptable.</p>	
9	<p>The spectrometer should include BAS CRMs provided or CRMs available at user end in regression curve.</p>	
10	<p>Each system shall have high precision and accuracy traceable to International Standards like ASTM, NIST, BS etc., Application data with the precision details should be furnished and the same data will be verified after installation.</p>	
III	Spark Stand:	Applicable to both systems
1	<p>Spark stand should be open and Air cooled.</p>	
2	<p>With pneumatic clamp, ease of handling, easily exchangeable, argon flushed (preferably co-axial argon flow) using Grade-I argon gas</p>	
3	<p>OES system shall have argon saver mode (for optimal / minimum usage of argon).</p>	

4	The spark stand should be without water cooling.	
5	Analysis of sample diameter & thickness from 1.0 mm (using universal or various sizes of adaptors) to the maximum permissible size as per the machine specification	
IV	Excitation System:	Applicable to both systems
1	Shall have a digital current generation power source to generate the spark for perfect plasma generation, by using maintenance free 2 - phase pulse width modulation generator. The source should generate high speed bit stream serial data of not lesser than 10 m bits/s. it should have inductive ignition system	
2	The excitation system and control system should be enclosed in a totally dust proof environment and provided with high capacity cooling fans	
V	Optics:	Applicable to both systems
1	High resolution advanced CCD / scientific grade photo diode array CCD detectors (at least 8 nos. or more) with high pixel resolution for detection of elements	
2	The spectrometer shall have a Paschen-Runge vacuum polychromator with a focal length of minimum 400mm	
3	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.	
4	Effective wavelength range to be at least 130- 600 nm or better	
5	Automated profiling	
6	The optical system shall be argon flushed for UV optic (without vacuum pump to avoid spluttering of pump oil in the optic chamber).	
7	Shall have a thermal conditioning optical chamber to minimize drift.	
VI	Software & Readout System:	Applicable to both systems
1	The Operational Software should have facility to reduce Interference of close wavelength. Dedicated Inter element / clear spectrum technology is preferable.	
2	Machine shall be able to connect with personnel computer using software running on windows 10 or better versions. This software shall be easy to use for calibration as well as analysis and also have provision to generate reports of analysis and transmit the result to an upper computer via TCP/IP. Microsoft office 360 should be pre-installed in the PC.	

3	The control software should be user friendly and should incorporate SQL Database. The software should be compatible with material quality control internal & external limit check, material identification of unknown samples, storage, sorting, filtering, display, searching, printing, archival, comprehension statistical evaluation and internal standards library (ASTM and other International standards to identify the specification of the sample)	
4	Should have auto diagnosis monitoring of different parameters for checking the flawless functioning of the equipment in software.	
5	The spectrometer control shall be fully digitized with status measuring card, A/D converters and attenuators for each channel.	
6	Shall be supplied along with external state of the art computer system using latest configuration, with licensed Windows Operating System (Windows 10 or Latest Version), colour monitor, CD/DVD ROM, colour printer.	
7	Software should have automatic Carbon Equivalent calculation (CE), bad burn detection capabilities	
8	Along with the equipment the supplier shall provide the original analytical software and also a back-up copy.	
VII	Argon Purifying system:	Applicable to both systems
1	The system should have state of the art external Argon purifying system which can maintain Ar purity at 99.999%. Argon consumption must be comparable with PMT based systems i.e. during analysis not more than 5L/min and during Sleep not more than 0.1L/min or/else 1000 or more sparks per standard 7 cuM cylinder.	
2	3 number of Ultra High Purity (>99.999%) Argon Gas Cylinder/ with 2 ESAB branded Ar regulators with dual pressure sensors should be provided	
VII	Other additional features:	Applicable to both systems
1	On-line sine wave UPS of minimum 3KVA rating with isolation transformer with 1 hour backup facility.	
2	Warranty for CCD based systems will be up to 5 years warranty and 2 years AMC after the end of 5 years warranty will be included.	
3.	Maximum breakdown period should not exceed 72hrs. For any breakdown exceeding this duration warranty period will be proportionally extended.	

VIII	Acceptance Criteria	Applicable to both systems
1	The system will be thoroughly checked for all the promised features over a period of few days during which the company should demonstrate compliance on all BAS CRMs with at least two repetitions preferably one test on each system. A deviation (by more than 5% or a maximum deviation value mentioned in BAS certificate) in any single element will attract disqualification.	

It is decided to extend the Bid submission date by following dates

Last date for Bid submission : 14/01/2020, before 4.00 p. m.

Bid opening date(tentative) : 17/01/2020 @ 3.30 p.m.

Sd/-

Buyer

Dr. Sumanth Govindarajan

Sd/-

Chairman

Central Research Facility
NITK, Surathkal