



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

Purchase / PCPS

TITLE	Phone: +91 431 2574104/2574072
HC ANALYSER & ACCESSORIES – 6 Sets	Fax : +91 431 252 0233 / 0525
	Email : james@bheltry.co.in

	Reference Number: Enquiry MM/PCPS/HC ANALYSER	Enquiry Date: 12.03.2012	Due date for submission of quotation: 11.04.2012
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

BHEL/Trichy is looking for Supply of **HC ANALYSER & ACCESSORIES**

ENCLOSURE :

- 1) ENQ Ref : MM/PCPS/HC ANALYSER dated 12.03.2012

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited) under enquiry reference “ MM/PCPS/HC ANALYSER ”	
Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For Bharath Heavy Electricals Limited Dy.Manager / Purchase/ PCPS

BHARAT HEAVY ELECTRICALS LIMITED
TRICHY - 6200 014

PROCESS AND CAPTIVE POWER SYSTEMS
ELECTRICALS, CONTROLS & INSTRUMENTATION

PCPS:CI:OPAL:HC REV 00 ✓	PAGE 01 OF 07
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SPECIFICATION FOR HC GAS ANALYSER SYSTEM

REV NO	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
00	22.09.2011	INITIAL ISSUE	S.V. <i>Saihnan</i>	D.KAVITHA <i>D. Kavitha</i>	S.JAYAPRAKASH <i>S</i>

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
1.0	SITE CONDITIONS:		
1.1	Ambient Temperature	5.6 to 47 deg C	
1.2	Altitude	7.1 Mtr Above Mean Sea Level	
2.0	FLUE GAS PARAMETERS:		
2.1	Pressure	30 mm WC	
2.2	Temperature	175 deg C	
2.3	Humidity	90% at 42°C	
3.0	CHIMNEY DIMENSION:		
3.1	Diameter (Inner)	3500mm	
3.2	Wall thickness	Will be specified while indenting	
3.3	Height	80m	
3.4	Location of Tapping	75m from ground	
3.5	Tapping Details	As per BHEL drg no: 4-97-400-82883	
4.0	PRINCIPLE :		
4.1	HC ANALYSER	Flame Ionisation Detector type of analyser with heated sample conditioning system- microprocessor based measurement system with full diagnostics facility. TUV or EPA approved system shall be provided.	
5.0	SCOPE OF VENDOR:	HC analyser with probe and Sample Handling System.	
6.0	SAMPLE PROBE :		
6.1	Material	SS 316	
6.2	Primary Filter	Required	
6.3	Probe Length	1500 mm	
6.4	Probe Mounting	Flanged mounting. The counter flange with gasket and fasteners to be supplied.	
7.0	Distance between Probe & Analyser	150 Mtr (approx). Unit price to be quoted for sampling line with heat tracer.	
8.0	SHS COMPONENTS:	Shall be with the following minimum. V/I converter, Integral digital indicator, Guard filter, gas flow control valve and flow indicator, pressure regulator, pressure gauge five way valve, fine filter, Gas suction pump, Sample cooler, Condensate separator, Two way valve for sample distribution within the panel and sample line blowing outside the panel. Vent header with isolation valve, dryer. 1/2"OD SS316 Sample line with electrical heat tracing, thermostat control and fittings between analyser panel and calibration gas cylinders (10 meters). Any other hardware, required for successful functioning of the total system shall be included. Make and model of each component shall be indicated in the offer. These shall be subject to BHEL's approval after order placement.	

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
9.0	ANALYSER PANEL	Analyser with SHS shall be housed in a free standing panel.	
9.1	Degree of protection	Shall be minimum IP 54.	
9.2	Construction	The panel shall be of free standing type with ISMC 100 base channel & 15 mm antivibration pad. 3mm CRCA sheet steel fabricated. The Panel shall have Double door (Back and Front) with car type lock and key. In addition pad lock and key shall be provided. Glass window fitted with neoprene gasket.	
9.3	Painting	Anti corrosive epoxy based powder coated Painting of color Siemens gray RAL 7032 after adequate sand blasting, seven tank process.	
9.4	Bottom clearance	Bottom clearance of 400mm to be provided with frame work for outdoor installation (For cabling). Drain line brought to a common trough.	
9.5	Power supply	110V AC Power supply at one point near the panel by BHEL. All other distribution including heat tracing shall be by the vendor.	
9.6	Cabling	Screened cabling for signal connections. Power and signal cable bundled in separate cable ducts.	
10.0	APPLICATION:		
10.1	HC Analyser	To monitor continuously the Hydro Carbon in boiler chimney flue gas.	
11.0	RANGE :		
11.1	HC	0-50, 0-100 PPM (selectable)	
12.0	Minimum detectable limit	1 PPM	
13.0	OUTPUT:	One separate continuous isolated 4-20mA, 2 wire 24V DC corresponding to the selected range to be provided for external load (max 500 ohms).	
14.0	ACCURACY	±2% of FS	
15.0	Response time including Dead band (90%value)	Better than 150sec.	
16.0	Zero drift	2% if full scale value / week	
17.0	Linearity error	2% of the span	
18.0	Temperature effect per 10°C	≤±% of the span	
19.0	Signal processing	With microprocessor electronic circuitry.	

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
20.0	Indicator	Indication at panel shall be calibrated in engg. Units and the same shall be integral part of the analyzer transmitter.	
21.0	Alarm contact	Two set points one for high alarm and one for low alarm. The relay shall have 2 SPCO contract rating shall be 5A at 240V AC. Diagnostic alarm message to help maintenance personnel.	
22.0	Communication port	Analyser shall be interface with DCS using RS 485 modbus link.	
23.0	Span & Zero check	Auto zero and span adjustment.	
24.0	CALIBRATION:		
24.1	Type	Auto calibration system shall be offered along with all hardware and software. A write-up on auto calibration feature shall be elaborately furnished in the offer.	
24.2	Gas cylinder	Aluminum Gas cylinder of minimum 10 litre capacity with industrial double stage SS pressure regulator with inlet and outlet pressure gauge for each -Span gas -Zero gas -Carbon steel cylinder of 47 ltr capacity with industrial double stage SS pressure regulator with inlet and outlet pressure gauge for fuel gas. -Any other calibration gas cylinder Concentration of gases in the gas cylinders shall be furnished. Unit price shall be indicated in offer for all calibration cylinders.	
24.3	Calibration gas cylinder at site	Calibration gas cylinder shall be brought to site by vendor's commissioning engineer at the time of system calibration and commissioning.	
25.0	Location of Analyser panel	In Air Conditioned analyzer room.	
26.0	COMMISSIONING:		
26.1	Vendor scope	Separate lump sum price for commissioning shall be furnished in the price bid. <ul style="list-style-type: none"> Any special instrument /tools needed for maintenance work on the analyser Commissioning assistance 	

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
26.2	Commissioning spares	Vendor shall bring the required commissioning spares during commissioning at site.	
26.3	Calibration gas cylinder	Gas cylinders are to be despatched to site one week prior to system calibration and commissioning	
26.4	Commissioning protocol	Vendor shall be responsible for establishing the successful performance of analyzer up to one year from date of commissioning and marking firm protocol with ultimate customer.	
27.0	Proven track record	Proven track record for the system (with all its sub-systems) as being offered / supplied should have been installed and operating satisfactorily in a captive power plant application / hydrocarbon industry like Refinery, Petrochemical or Gas Processing Plant for at least 4000 hrs (as collaborated by user certificate).	
28.0	Testing and Inspection	<p>Vendor shall furnish QP for the analyser and SHS which is subject to BHEL's approval. Total system is subjected to BHEL/Customer's inspection at vendor works.</p> <p>Vendors shall submit the following test certificate and test report for purchaser's review</p> <ol style="list-style-type: none"> 8 hrs repeatability test report Calibration report for all analyser <p>Following test shall be carried out</p> <ol style="list-style-type: none"> Physical dimension verification and workmanship. Leak checking of complete system using nitrogen or instrument air. All analyser shall be calibrated using a test sample showing 50% of scale reading for the component of interest. Deviation of actual calibration from the calibration curve supplied by vendor shall be within $\pm 1\%$ of span. Repeatability shall be demonstrated for period of at least 8 hrs continuously using a standard sample, unless otherwise specified 	

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
29.0	Packing	<p>Analyser /components shall be packed in a thermocole box. Such box shall be placed in a carton / metal case with adequate cushioning material to withstand sea / air transit risks. Mounted components shall be provided with additional support to take care of transit and handling risks.</p> <p>All threaded and flanged opening shall be suitable covered to prevent entry of foreign material. All major parts shall be sealed in thick plastic bags. Suitable moisture absorbent shall be provided for electronic components</p>	
30.0 30.1	Documents Along with the offer	<p>Three copies of following documentation shall be supplied by the vendor.</p> <ol style="list-style-type: none"> 1. Technical leaflets of the analyser . 2. BOM with unit price for all applicable accessories like purging unit, thermocouple, probe, calibration gas cell & any other required accessories. 3. Consumable like electric power and instrument air requirement. 4. Heat dissipation from analyser system including SHS. 5. Any special control & interlock requirement with schematics. 6. Sampling system P&ID. 7. Panel GA with overall dimension & with BOM. 8. Commissioning offer including commissioning spares. 9. Split up prices for gas cylinder. 10. O&M spares / Recommended spares for two years operation. 11. List of Mandatory spares (Unit prices to be indicated in the Commercial Bid) 12. Total weight in the system with break up. 	

SPECIFICATION FOR HC GAS ANALYSER SYSTEM

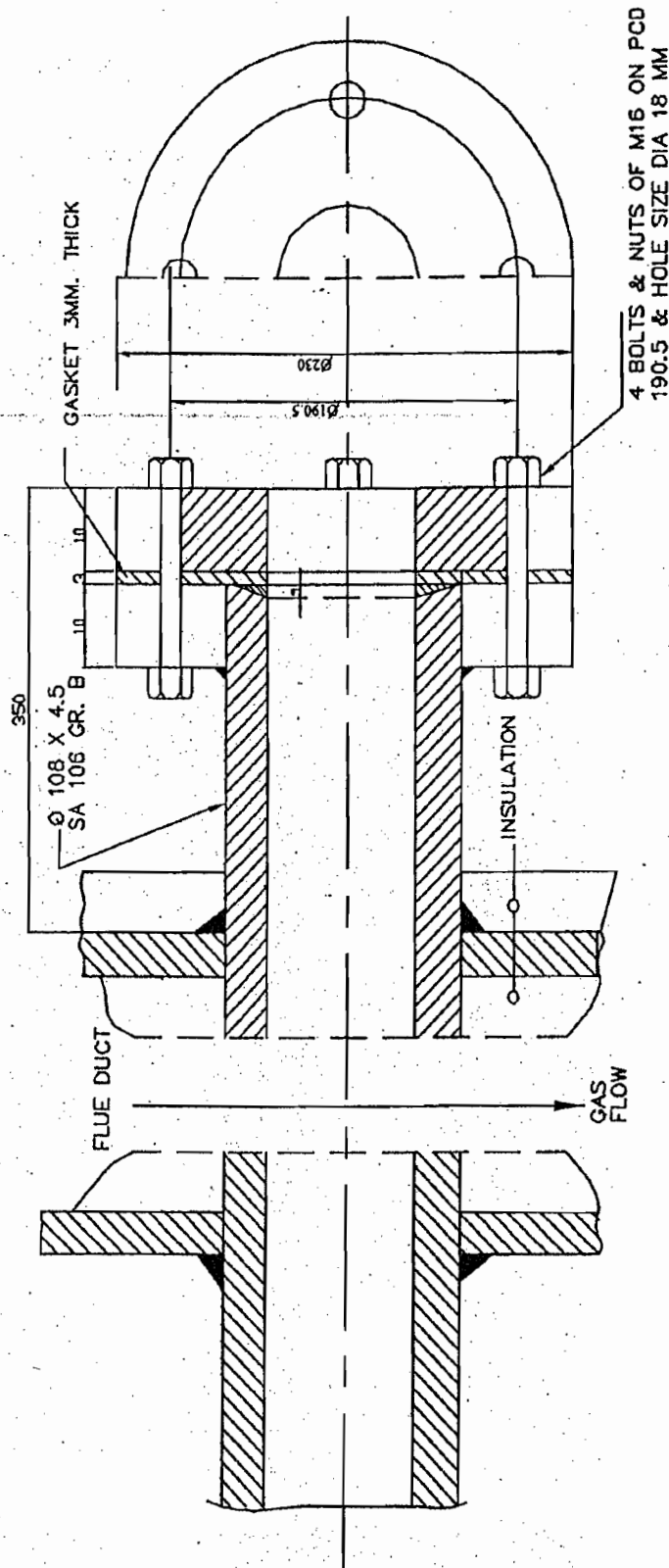
SLNO	SPECIFICATION	BHEL REQUIREMENT	VENDOR COMPLIANCE (YES/NO)
30.2	After ordering	3 sets for approval: <ol style="list-style-type: none"> 1. Panel GA with overall dimension & with BOM. 2. Sample handling system details 3. Panel Wiring details 4. Explosive certificate for calibration and fuel gas cylinder are to be provided. 3 sets of above document with O&M manual of analyzer and sample handling system in Hard copies and 2sets of soft copy in CD	

NOTE:

1. Vendor to fill up the confirmations column, duly signed, stamp all pages and furnish along with the offer.
2. Annual maintenance contract for 5 years shall be furnished separately along with offer.

CAUTION: THE INFORMATION IN THIS DOCUMENT IS THE PROPERTY OF BHEL. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DEPENDANT TO THE INTEREST OF THE COMPANY

ANALYSER POCKET ARRANGEMENT



NAME		SIGNATURE		DATE		CUST.NO	
DRN P.V.Ramam		-SJ-		23.12.2004		BHARAT HEAVY ELECTRICALS LIMITED	
CND P.V.Ramam		-SJ-		23.12.2004		FBC & HRSG	
APPD K.S.Kumar		-SJ-		23.12.2004		TIRUCHIRAPPALLI - 620014	
FILE NAME		4478283.LONG		DEPT		TITLE	
FLOPPY NO		4478283.LONG		361 401		TAPPING DETAILS FOR FLUE GAS ANALYSERS	
				ELEC. C & I		PROJECT	
				3611		STANDARD	
				CODE		SHEET NO	
				3611		DRAWING NO : 4-97-400-82883	
				CUSTOMER CONSULTANT:		REV 02	

ANNEXURE- 1 ✓

LOGISTIC SUPPORT**Certificate For Logistics Support (by Principal)**

(To be signed by Principal's corporate level signatory on company's letterhead)

I, on behalf of M/s _____ confirm that the analyser quoted by M/s _____ for Steam and Power Generation Plant of OPaL Project shall continue to be supported by us. The quoted item shall not be withdrawn from Indian market as a matter of our corporate policy.

I further confirm that in case of placement of order by OPaL on M/s _____ we shall continue to support M/s _____ in providing back-up engineering, maintenance support and spare part to OPaL for a period of 10 years from the date of placement of order.

SIGNATURE WITH SEAL
AUTHORIZED, SENIOR MANAGEMENT LEVEL

Certificate For Logistics Support (by vendor)

(To be signed by Vendor's corporate level signatory on company's letterhead)

I, on behalf of M/s _____ confirm that the analyser quoted by M/s _____ for Steam and Power Generation Plant of OPaL Project shall continue to be supported by us and our principal(s). The quoted item shall not be withdrawn from Indian market as a matter of our corporate policy as supported by attached certificate from our principal(s) M/s _____.

I further confirm that in case of placement of order by OPaL on us, we shall continue to support OPaL in providing back-up engineering, maintenance support and spare part to OPaL for a period of 10 years from the date of placement of order.

SIGNATURE WITH SEAL
AUTHORIZED, SENIOR MANAGEMENT LEVEL
SIGNATORY

Eng ref : MM/PCPS/HC ANALYSER dated 12.03.2012

AA) HOT EXTRACTION TYPE HC ANALYSER AS PER FOLLOWING:

- 1) SPECIFICATION AS PER MOU/TPFH/CEMS
- 2) PROJECT DATA SHEET FBC&HRSG:CI:OPAL:HCDS REV 00
- 3) TAPPING DETAILS AS PER DRG 4-97-400-82883 rev02

MATL. CODE : L601119742106001

QTY : 2 SETS

BB) HYDRO CARBON ANALYSER AS PER FOLLOWING :

- 1) SPECIFICATION NO:PCPS:CI:OPAL:HC, Rev 00,
- 2) TAPPING POINT DRAWING NO:4-97-400-82883, Rev 02 &
- 3) Annexure -1 PCPS:CI:5750:ANA1.

MATL. CODE : L575019742104001

QTY : 4 SETS

S.James
Dy.Manager/Purchase/PCPS



Ref:FBC&HRSG:CI:OPAL:HCDS
REV: 00

Date : 27.04.2011
Page: 1 of 5

SECTION 5.0 : PROJECT DATA SHEET FOR HC (HOT EXTRACTION TYPE) GAS ANALYSER SYSTEM



Ref:FBC&HRSG:CI:OPAL:HCDS
REV: 00

Date : 27.04.2011
Page: 2 of 5

SL.NO	SPECIFICATION	BHEL REQUIREMENTS
5.0.1	Tag No.	AT 8605
5.0.2	Flue Gas Pressure	300mm WC
5.0.3	Flue Gas Temperature	275deg C
5.1	Power supply requirements	110V AC
5.2	No of analysers per Boiler	1
5.3	No of Sampling Probes Required	1
5.4	Moisture Content	8.48% by volume
5.5	Dust Concentration/sample operating conditions	200mg/m3 dust concentration
5.6	Chimney dimension	3.5m Inner dimension
5.7	Tapping point details on chimney	As per BHEL drg no:4-97-400-82883 reg02
5.8	Chimney Wall thickness	25MM
5.9	Stack Height	35m
5.10.0	Components to be Measured & Range	
5.10.1	SO2	-
5.10.2	NO	-
5.10.3	CO	-
5.10.4	CO2	-
5.10.5	HC (C ₃ H ₈)	0-100, 0-500, 0-1000, 0-2000PPM selectable
5.11	Painting of Analyzer Panel and Canopy Requirement/Analyser location	RAL 7032
	Special requirement	<p>The analyser system for flue gas analysis and other analysers shall be interfaced with DCS using dual redundant RS485 MODBUS link.</p> <p>Hardwired signals shall be considered for analysers providing 4~ 20 mA signals which shall be directly connected to the respective section of DCS.</p> <p>g) All analyzers shall be micro-processor based in general and shall be capable of providing detail diagnostic alarms, messages to help maintenance personnel.</p> <p>An Analyser control system shall be provided in the unit, linking together by a</p>



Ref:FBC&HRSG:CI:OPAL:HCDS
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	<p>network,</p> <p>9.2.7 Calibration Gas Cylinder/Consumables All calibration cylinders and other necessary items for analyser calibration shall be supplied by the Contractor, considering the requirement of start up / commissioning plus 1 year normal operation. The cylinders shall be located outside the cabinets and Contractor shall provide suitable mounting accessories for the same. Cylinders shall be supplied in two sets, one shall be used and the other for storage and filling. Flue gas analysers for emission monitoring shall be TUV approved or it shall be as per EPA, USA regulations. On line stack analyser point to be approachable location at lowest possible height.</p> <p>LOGISTIC SUPPORT 20.1 Logistic support certificate as per format below from the supplier of DCS, PLC, Machine monitoring system, STG, BMS, CCTV, antisurge controllers, all types of analysers and chromatograph shall be provided on part of each purchase specification Certificate. The logistic support certificate shall be signed by a corporate level person of the vendor/ vendor's principal. 20.2 a) Certificate For Logistics Support (by Principal) (To be signed by Principal's corporate level signatory on company's letterhead) I, on behalf of M/s confirm that the * quoted by M/s for Steam and Power Generation Plant of OPaL Project shall continue to be supported by us. The quoted item shall not be withdrawn from Indian market as a matter of our corporate policy. I further confirm that in case of placement of order by OPaL on M/s we shall continue to support M/s in providing back-up engineering, maintenance support and spare part to OPaL for a period of 10 years from the date of</p>
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Ref:FBC&HRSG:CI:OPAL:HCDS
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Date : 27.04.2011
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		<p>placement of order. SIGNATURE WITH SEAL AUTHORIZED, SENIOR MANAGEMENT LEVEL * DCS/ PLC/ Machine monitoring system/ all types of analysers and chromatograph, Steam Turbine Control System, BMS, ant surges controllers, CCTV system and any other Control System provided by Contractor. 20.2 b) Certificate For Logistics Support (by vendor) (To be signed by Vendor's corporate level signatory on company's letterhead) I, on behalf of M/s confirm that the * quoted by M/s for Steam and Power Generation Plant of OPaL Project shall continue to be supported by us and our principal(s). The quoted item shall not be withdrawn from Indian market as a matter of our corporate policy as supported by attached certificate from our principal(s) M/s . I further confirm that in case of placement of order by OPaL on us, we shall continue to support OPaL in providing back-up engineering, maintenance support and spare part to OPaL for a period of 10 years from the date of placement of order. SIGNATURE WITH SEAL AUTHORIZED, SENIOR MANAGEMENT LEVEL SIGNATORY * DCS/PLC/Machine monitoring system/all types of analysers and chromatograph, Steam Turbine Control System, BMS, ant surges controllers, CCTV system and any other Control System provided by CONTRACTOR. All online process analysers shall be supplied with built-in Auto calibration without operator intervention, complete with required calibration apparatus/ calibration gas cylinders etc. Each analyser shall be complete with fault and maintenance contacts to advise analyser status in the DCS. An Analyser control system shall be provided in an unit, linking together by a network, all analyser systems. This network of analysers shall form the Analyser Data Management System for the unit. The</p>
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Ref:FBC&HRSG:CI:OPAL:HCDS
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Page: 5 of 5

		<p>network shall include an operator interface in the Unit control room/ SRR for the unit and an interface to DCS.</p> <p>the analyser measurement principle shall be based on the Flame Ionisation Detection (FID) for HC Analysers.</p> <p>2.6.2 Probe length shall be provided such that 30% insertion in heater stack and shall be calculated based on the nozzle projection and shall be based on the Stack ID given.</p> <p>2.6.3 Probe & Filter material shall be selected to suit the stack process condition.</p> <p>2.6.4 Unless otherwise specified the analyser shall meet the following performance requirements. Zero/span Drift : $\pm 1\%$ of full span/week Repeatability : $\pm 1\%$ full scale or better. Response time overall : less than 30 seconds.</p> <p>2.7.2 Linearity $\pm 1\%$ of full scale or better.</p>
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***Project specific details will be furnished during detailed Engineering**

CAUTION: The information on this document is the property of BHAKAI HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in anyway detrimental to the interest of the company.



TAPPINGS ARE PROVIDED AT VARIOUS ELEVATIONS
SEPARATED AT AN ELEVATION OF 250 MM.

ANALYSERS OF CROSS DUCT TYPE ALONE WILL BE






MOUNTED IN THE TAPPINGS OF THE SAME ELEVATION.

OTHER TYPES WILL BE MOUNTED AT DIFFERENT ELEVATIONS.

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REV	DATE	ALTD:	REV	DATE	ALTD:
03		CHD :	02		CHD :
		APPD:			APPD:
ZONE			ZONE		

STANDARD

		BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOILER PLANT TRICHURPALLY-620 014.		NAME J. MAHESWARI D. GNANASEKARAN A. NATARAJAN		SIGNATURE   		DATE 16.02.99 16.02.99 16.02.99		NO OF VAR	
DEPT		IPP		DRN CHD APPD		WEIGHT (KG) REF TO ASSY / OLD DWG / / /		SCALE 		NO OF ITEM	
CODE /		GRADE OF UNTOL DIM C/M/F		CARD CODE 101		DRG No. 4-97-400-82883		REV. 02		TITLE TAPPING DETAILS FOR FLUE GAS ANALYSERS	



MEMORANDUM OF UNDERSTANDING
FOR CONTINUOUS ONLINE EMISSION MONITORING SYSTEM

MOU / TPFH / CEMS
REV: 00

Date :
Page: 1 of 19

Memorandum of Understanding

Between

**M/s BHEL / FBC & HRSG
Trichy – 620 014**

And

M/s :THERMO FISHER SCIENTIFIC INDIA PVT LTD

Address:

Thermo Fisher Scientific India Pvt Ltd
Plot No. C - 327, T.T.C. Industrial Area, Pawane,
Navi Mumbai 400 705. INDIA.

Tel:- +91 – 22 – 415 78813
Fax :- +91 – 22 – 415 78801
Mail: tapankumar.rout@thermofisher.com

(Vendor Code : 19565)

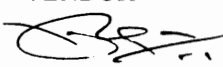

For supplying

**ONLINE CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) CONSISTING
OF
SO₂, NO_x, CO, CO₂ AND HC ANALYSERS
(HOT EXTRACTION NON DILUTION TYPE)**

MOU NO : MOU / TPFH / CEMS, REV.00

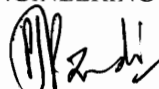
Date : 18/03/2010

Valid upto : 17/03/2012

Signature : 
Date : 18/3/10
Company seal : 


VENDOR

ENGINEERING



P. SAMUTHIRAPANDI
Manager
E.C.S.T. FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

PURCHASE


S. JAMES

Deputy Manager
Purchase / FBC & HRSG
BHEL, Tiruchirappalli - 620 014



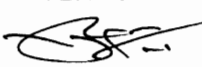

MEMORANDUM OF UNDERSTANDING
FOR CONTINUOUS ONLINE EMISSION MONITORING SYSTEM

MOU / TPFH / CEMS
REV: 00

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SECTION 1.0: GENERAL

- 1.1 This MOU is signed for supplying the CEMS as per the agreed standardized specification so that these details need not be discussed again and again for future supplies.
- 1.2 The various aspects covered in this MOU are as follows :-
 - 1.2.1 The general points are covered in **Section – 1.0 – General**.
 - 1.2.2 The specification requirements are covered in **Section – 2.0 – Specifications**.
 - 1.2.3 The Inspection / Testing and Packing requirements are covered in **Section – 3.0 Testing, Inspection and Packing**.
 - 1.2.4 The documents to be submitted along with the offer & after placement of Order / along with the panel are covered in **Section 4.0 - Data Sheet**
 - 1.2.5 The project specific details / data and if any customer specific requirements shall be covered in **Section 5.0 – Project Data Sheet**. **DEVIATION ON PROJECT RELATED INFORMATION WILL LEAD TO REJECTION OF OFFER.**
 - 1.2.6 If any differences are found between the details given in Section 5.0 and other sections, Section 5.0 shall be considered as final and the vendors shall meet this requirement for that particular project.
- 1.3 Sections 1.0, 2.0, 3.0 and 4.0 are standard and Section 5.0 alone will be furnished to the vendors for their acceptance.
- 1.4 It is agreed that no deviations will be taken standard MOU Specification by the vendors while submitting their offers against future enquiries.
- 1.5 Since the specifications are standardized and an understanding has been reached, the future enquiries will be floated on “SINGLE BID SYSTEM” only. Hence, if any offer is found with deviations, the same will be totally rejected and will not be considered for further evaluation.

VENDOR
Signature : 
Date : 18/8/10
Company Seal : 

ENGINEERING

P. SAMUTHIRAPANDI
Manager
E. C & I / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

PURCHASE

S. JAMES
Deputy Manager
Purchase / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.




MEMORANDUM OF UNDERSTANDING
FOR CONTINUOUS ONLINE EMISSION MONITORING SYSTEM


MOU / TPFH / CEMS
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- 1.6 The validity of this MOU is for TWO years from the date of signing. After the expiry of the period, the same can be extended further with or without any modifications. However, in case any improvements are required, the MOU may be amended before the expiry of the validity.
- 1.7 **Free commissioning spares (if applicable) with price break up as per the list (vide Section 5.0) shall be supplied along with CEMS.**
- 1.8 Two years recommended Spares list with price break up (vide Section 5.0) shall be enclosed alone with vendors offer.
- 1.9 If any special or non-standard tools are required for installation, operation or maintenance, the same shall be supplied along with the Analyser. **The same shall be as part of main supply.**
- 1.10 **The equipment warranty shall be for a period of 18 months from the date of commissioning or 24 months from the date of dispatch, whichever is earlier.**
- 1.11 **Vendor has to provide Bank Guarantee for 10% order value (as per BHEL format) valid for a period mentioned in point No.1.10.**
- 1.12 Despatch clearance will be issued along with PGMA with DU Nos. for the ordered items to vendor after the receipt of acceptable Inspection Report. Vendor agreed to mark the PGMA with DU Nos. in the casing of the packing and in the Packing Slip.
- 1.13 **Materials shall be dispatched on "Door Delivery with or without Consignee Copy attached basis to avoid damage at transporter's godown".**
- 1.14 Since the vendors works alone is approved by BHEL, it is agreed the vendor will manufacture this item in their own works only and will not off-load the jobs to any other suppliers without the written approval by BHEL.
- 1.15 All components should be packed in such a way that it should not get damaged during transport.
- 1.16 BHEL and the Vendor shall have an involvement which will commence at bid stage and follow through the completion and acceptance, thus ensuring total conformity to Purchaser's requirements.

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- 1.17 Vendor to furnish separate offer for site commissioning and obtaining customer protocol after handing over CEMS to customer. This offer shall contain list of commissioning spares to be carried to site for commissioning CEMS.
- 1.18 Sample/Calibration gas cylinders with SS regulators and connecting flexible hoses are to be supplied separately prior to commissioning. The dispatch date requirement will be furnished by BHEL.


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SECTION 2.0: SPECIFICATIONS

SL.NO	SPECIFICATION	BHEL REQUIREMENTS
2.1.0	SITE CONDITIONS	(and) AS PER PROJECT DATA SHEET - Sec.5.0
2.1.1	Altitude above Mean Sea Level	500 Mtr.
2.1.2	Ambient Temperature Condition	40 to 45° C
2.1.3	Relative Humidity	Up to 90 %(Non condensing)
2.1.4	Atmosphere	Tropical, Dusty, Salty, Corrosive and highly polluted
2.2.0	GENERAL SPECIFICATION	
2.2.1	Tag no	As per Project Data Sheet - Sec.5.0
2.2.2	Service	Flue Gas in the Stack Outlet
2.2.3	Purpose of measurement	To detect/monitor concentration of SO ₂ , NO _x , CO, CO ₂ and HC (C ₃ H ₈) in Flue Gas.
2.2.4	Area classification	Safe Area
2.2.5	Operating Principle	NDIR type Analysers shall be quoted
2.2.6	Utilities : (a) Power Supply (b) Instrument air pressure	230V, ± 10%, 50Hz, ± 5% Hz, 1φ , 4 - 5 Kg/Cm ² . (and) As per project data sheet – Sec.5.0
2.2.7	Field Electrical enclosure	Vendor to specify the equipments to be installed in field
2.2.8	Environmental conditions	As per Project data sheet-Sec.5.0
2.2.9	ID of stacks	As per Project data sheet-Sec.5.0
2.2.10	Size details of sample take off points	As per Project data sheet-Sec.5.0
2.2.11	Sample Operating Conditions	As per Project data sheet-Sec.5.0
2.2.12	Range of the components to be measured (Typical)	Refer the Cl.No 4.7.0
2.2.13	Repeatability	0.5% of full scale or better

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2.2.14	Probe/Stream selection (If more than one tapping/stack has to be monitored)	Automatic & Manual (Selectable)
2.2.15	Zero & sensitivity drift	± 2% of full scale per week
2.2.16	Linearity	± 1% of full scale
2.2.17	Distances between sample take off points & proposed location of analysers	Min. 150 mtrs. (including routing length) / Vendor to specify the limitation in maximum distance.
2.2.18	Analysers shall be of robust design requiring minimum maintenance, highly Stable, qualitative & easily maintainable components/parts. Analyser shall be available on continuous basis.	
2.2.19	All the regulators shall be of high quality precision & easily maintainable/ accessible.	
2.2.20	Vendor to note that maximum continuous availability of analyser in terms of Percentage per month or year after commissioning should be 90% or more.	
2.2.21	Analysers system shall be completely user serviceable at site & any requirement of special tools (software & hardware) to be indicated and offered.	
2.2.22	All SHS components shall be from reputed manufacturers as per the list – (Annexure-II) and shall be with proven track record.	
2.2.23	The Sample Handling system (SHS) shall be designed and supplied by OEM and shall ensure the better performance of the system and support for the spares for min. of five years. Services and spares support for CEMS analysers and SHS shall be ensured for 5 years by vendor.	
2.2.24	Two stages of filtering shall be done near the sample tapping point. The Sample shall not be diluted for analysing. The moisture shall be removed near the probe without condensing the sample.	
2.2.25	In case of moisture detection in sample line/dangerous situation, automatic switching off of sample pump shall be provided. All Sequencing and controlling functions shall be done through PLC Programming.	
2.3.0	SPECIFICATION FOR ELECTRONICS AND OPTICAL BENCH OF THE ANALYSERS:	
2.3.1.0	ELECTRONICS	
2.3.1.1	Type	Electronics shall be Microprocessor based design.
2.3.1.2	Display	Minimum with 4 Digit LCD Display in English language.
2.3.1.4	Memory	RAM and ROM (Non volatile memory with battery backup)

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2.3.1.5	Output and Communication	Isolated analog 4 to 20 mA outputs for connecting to DCS (Corresponding to 0 to 100% of spans for SO ₂ , NO _x , CO, CO ₂ , HC (C ₃ H ₈) etc.) for individual Components, Analyzer shall also have RS 232C / RS 485 digital communication protocol.
2.3.1.6	Fault Diagnostics	Abnormality Detection
2.3.1.7	Analysers man/machine interface shall be of user friendly & menu driven type.	
2.3.1.8	Status output via potential free contacts shall be available for following as a Minimum: a) Analysers failure/run. b) High SO ₂ (High set point shall be freely) High NO _x (programmable between 0 to 100% of span).etc,	
2.3.2.0	OPTICAL BENCH	
2.3.2.1	Light source	Single Source Infra red Light.
2.3.2.2	Chopper	Single point Chopper Assembly.
2.3.2.3	Detector	Interference compensating Thermal Flow Sensor Detector.
2.3.2.4	Configuration of Detectors	Placement of detectors should be one behind the other in the same beam path.
2.3.2.5	No of Analyzers for flue gas component measurement	As per Project Data Sheet Sec.5.0.
2.4.0	DESIGN REQUIREMENT	
2.4.1.0	PRINCIPLE OF ANALYSIS:	
2.4.1.1	SO ₂ Analyser	Continuous online sampling, Non – dispersive infra red (NDIR) method.
2.4.1.2	NO _x Analyser	Continuous online sampling, Non – dispersive infra red method.
2.4.1.3	CO analyser	Continuous online sampling, Non – dispersive infra red method.
2.4.1.4	CO ₂ analyser	Continuous online sampling, Non – dispersive infra red method.
2.4.1.5	HC (Propane C ₃ H ₈) analyser	Continuous online sampling, Non – dispersive infra red method.

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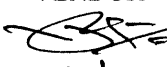


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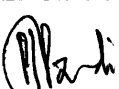
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2.4.2.0	SCOPE OF VENDOR	
2.4.2.1	Main Offer	SO ₂ , NO _x , CO, CO ₂ , HC (C ₃ H ₈) Analyser Optical benches and transmitter with common Probe and Sample Handling System. SO ₂ and NO _x measurement shall be combined in a single analyser. CO and CO ₂ measurement shall be combined in a single analyser HC measurement shall be done by a separate analyser
2.4.3.0	SAMPLE EXTRACTION PROBE :	
2.4.3.1	Material	Vendor to Specify.
2.4.3.2	Primary Filter	Required
2.4.3.3	Probe Length	Vendor to Specify.
2.4.3.4	Probe Mounting	The counter flange with gasket ,fasteners and bolts and nuts to be supplied by the vendor. BHEL will provide the required details.
2.4.3.5	Filter	Vendor to Specify the Material Of Construction (MOC) (Preferable is ceramic with 5 micron)
2.4.4.0	DISTANCE BETWEEN PROBE & ANALYSER	Min. 150 mtrs. (including routing length)

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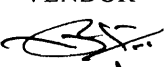


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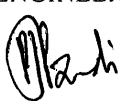
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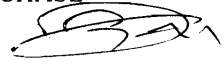
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2.4.5.0	SAMPLE HANDLING SYSTEM	
2.4.5.1	SHS COMPONENTS	<p>Shall be with the following as minimum.</p> <p>1) SHS shall include GASS Module, Heatless Air dryer, Nafion Dryer and Coalescing Filter, Eductor as minimum to complete a system.</p> <p>2) Tubing and fittings between analyser panel and calibration gas cylinders (10 metres).</p> <p>3) SHS accessories/items like Diaphragm/Bellow based pumps, solenoids, filters, flow meters and moisture removal equipment etc. also included for the proper functioning of the system.</p> <p>4) Any other hardware, required for successful functioning of the total system if any shall be considered by the vendor.</p> <p>(Make and model of each component shall be subject to BHEL's approval and it shall be as per Annexure-II).</p>
2.4.5.2	Probe	Probe should be sufficiently long to draw representative Gas sample.
2.4.5.3	Moisture Removal & Sample Transportation	Since Heat traced line require more maintenance and high operating cost, moisture in the sample has to be removed near to sampling point. The moisture shall be removed without condensing the sample and Moisture removing system design shall be as per attached Annexure-I. The dryer shall have minimum hundred Nafion tubes of 24" for ensuring the complete moisture removal and to bring down the sample gas dew point to -10°C to -25 °C range at the outlet of the drier. The dry (moisture free) sample gas shall be transported to the analyzer panel through normal tubes without heat tracing.

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2.4.5.4	Sample Tubing	Unheated Sample tubing preferably of SS / PTFE material with adequate Mechanical Protection should be used.
2.4.5.5	Air Dryer	Instrument Air dryer for the system should be heat-less self-regenerating type only & shall be installed near tapping point.
2.4.5.6	NO ₂ to NO Converter	Low Temperature Reduction Converter with Metal Catalyst should be used.
2.4.6.0	ANALYSER PANEL	
2.4.6.1	Degree of protection	Analyser with SHS shall be housed in a freestanding panel. The analyser panel shall be of IP54 .
2.4.6.2	Construction	The panel shall be with following minimum: Free standing with ISMC 100 base channel & 15mm anti vibration pad. 3mm CRCA sheet steel fabricated. Double door (Back and Front) with car type lock and key. In addition pad-locking facility with pad lock and key shall be provided. Glass window fitted with neoprene gasket.
2.4.6.2.1	Painting of Analyzer Panel	Shall be as per RAL 7032 / 7035 (OR) As per Project data sheet Sec5.0.
2.4.6.2.2	Canopy	Shall be provided for out door installation only (OR) As per Project data sheet Sec.5.0
2.4.6.3	Power Supply	230V AC Power supply at one point by BHEL. All other internal distribution of power and signal cables shall be by the vendor.
2.4.7.0	MEASURING RANGE (TYPICAL):	(OR) As per Project data sheet-Sec.5.0
2.4.7.1	SO ₂ :	0-500,0-1000 PPM selectable.
2.4.7.2	NO _x :	0-500, 0-1000 PPM selectable.
2.4.7.3	CO	0-500, 0-1000 PPM selectable.
2.4.7.4	CO ₂	0-25%
2.4.7.5	HC (C ₃ H ₈)	0-1000 PPM.

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2.4.8.0	Accuracy	+/-1 or 2% of FS. Suitable gas cylinders shall be selected.
2.4.9.0	RESPONSE TIME INCLUDING DEAD BAND (90% VALUE)	30 sec. or less
2.4.10.0	ZERO and SPAN DRIFT	$\leq 2\%$ if full scale value / week
2.4.11.0	LINEARITY DEVIATION	$\leq 1\%$ of the span
2.4.12.0	TEMPERATURE EFFECT PER 10°C	$\leq \pm 1\%$ Of the span
2.4.13.0	SIGNAL PROCESSING	With microprocessor electronic circuitry.
2.4.14.0	INDICATOR	Field indicator shall be calibrated in engg. Units and the same shall be integral part of the analyser transmitter.
2.4.15.0	ALARM CONTACT	Two set points one for high alarm and one for low alarm. The relays shall have 2 SPDT contacts. Contact rating shall be 5 A at 230V AC.
2.4.16.0	SPAN & ZERO CHECK	Manual by integral electronics for zero and span adjustment.
2.4.17.0	CALIBRATION	
2.4.17.1	Type	Manual calibration facility with flow meters & valve regulator including zero & span gas cylinder. Alternatively Auto calibration system shall be offered along with all hardware and software.
2.4.17.2	Gas cylinder	Aluminium Gas cylinders with industrial SS pressure regulator and pressure gauge for - Span gas (for individual measuring

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		parameters like SO ₂ ,NO,CO,CO ₂ etc) -Zero gas
2.4.17.3	Calibration gas cylinder at site	Calibration gas cylinders shall be despatched to site one week prior to system calibration and commissioning.
2.4.17.4	LOCATION OF ANALYSER PANEL	In an Air Conditioned room /Analyser shelter or As per project data sheet.
2.4.17.5	Automatic & Manual calibration, calibration check/ verification facility shall be available.	
2.4.17.6	Calibration gas shall be supplied in CS/Aluminum cylinder of min. 10-liter water Capacity with certificate traceable to National/International approving body. Calibration blend composition & range shall match the instrument measuring range. Calibration cylinders shall be supplied with CCOE approval.	
2.4.17.7	All components required for Calibration set up (Two stage cylinder regulators, zero gas, span gas including SOV's, etc.) as required for automatic & manual calibration shall be included in scope of supply.	
2.4.17.8	Vendor to furnish following details: a. Composition of calibration standard gas. b. Consumption of calibration standard gas for single calibration. c. Calibration time required for each instrument/ total system for ➤ Manual calibration ➤ Calibration check/ verification ➤ Auto calibration. d. Calibration frequency. e. Span & Zero stability/week/ month e. Capacity of the cylinder.	
2.4.17.9	Standard gas/Reference Instrument /Apparatus shall have traceability to National /International Standards.	
2.4.18.1 0	Recommended Vendors/Manufacturers for SHS Accessories (as per Annexure-II)	
2.4.19.0	COMMISSIONING	
2.4.19.1	Vendor scope	Commissioning of the total analyser system with signing the protocol with customer shall be in vendor's scope. Separate lump sum price for commissioning shall be furnished in the price bid.

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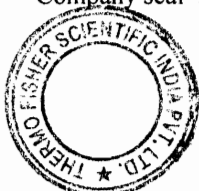
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2.4.19.2	Commissioning spares	Vendor shall bring the required commissioning spares during commissioning at site. List of commissioning spares to be furnished on receipt of commissioning order
2.4.19.3	Commissioning Protocol	Vendor shall be responsible for establishing the successful performance of analysers' up to one year from date of commissioning and making firm protocol with ultimate customer.
2.4.20.0	DOCUMENTS	
2.4.20.1	Along with the offer	<p>The vendor shall supply three copies of following documentation.</p> <ol style="list-style-type: none">1. Technical leaflets of the analyser.2. BOM with unit price for all applicable accessories like Purging unit, sample probe, calibration gas cylinder & any other required accessories.3. Consumable like electric power and instrument air requirement.4. Heat dissipation from analyser system including SHS.5. Any special control & interlock requirement with schematics.6. Sampling system P& ID.7. Panel GA with overall dimension & with BOM.8. Commissioning offer including commissioning spares.9. Split up prices for gas cylinders.10. O & M spares/ mandatory Spares for two years operation with unit price.11. Total weight of the system with break up

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2.4.20.2	AFTER ORDERING:	Six sets of the following for BHEL's approval before manufacturing is started (Within one month from the date of LOI): 1. P & ID of Analyser systems with scope and terminal point details. 2. GA with internal arrangement and foundation. Details for the analyser panel. 3. Panel wiring diagram. 4. Specification and data sheet for each have the SHS component and analyser proper. 5. List of despatchable components in line with the packing slip. 6. Recommended storage and preservation procedure
2.4.20.3	Before despatch:	6 sets of the following final documents: 1. P & ID of Analyser systems with scope and terminal point details. 2. GA with internal arrangement and foundation details for the analyser panel. 3. Panel wiring diagram 4. Specification and data sheet for each have the SHS component and analyser proper. 5. Interconnection wiring drg. 6. Test and calibration. Certificates of the analyser and SHS components. 7. Type test certificates from National bodies (3 copies only). 8. O & M Manuals (should contain detailed write up on the system operation and DO'S AND DON'TS . Categorical instructions shall be made available for periodic and preventive maintenance.

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3.0	TESTING, INSPECTION & PACKING	
3.1	TESTING AND INSPECTION	Generally as per standard quality plan QA: CI: STD : QP : 48 : Rev 02 Vendor to submit their QP for BHEL's approval. The total system is subject to BHEL and ultimate customer's inspection at vendors works. 6 sets of final inspection report shall be submitted to BHEL.
3.2.	Packing	Analyser components shall be packed in a thermocole box. Such box shall be placed in a carton / metal case with adequate cushioning material to withstand sea / air transit risks. Mounted components shall be provided with additional support to take care of transit and handling risks.
3.3	Protocol	Vendor is responsible for establishing the successful performance of the analyser up to one year from the date of commissioning and making firm protocol with ultimate customer

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**SECTION 4.0 - DATA SHEET / Documents shall be submitted along with their offer.
Offer will be rejected, if this details are not available with the offer.**

	BHEL Requirement for evaluation of Offer	Confirmation YES / NO
4.1	Confirmation for supplying materials as per the Section 5, Project Data Sheet	YES
4.2	Confirmation for supplying materials as per the MOU, ref: MOU / TPFH / CEMS, REV.00	YES
4.3	Confirmation for supply of materials as per Quality Plan enclosed along with the Offer	YES
4.4	Documents to be submitted along with the offer as per Cl. 2.4.20.1	YES
4.5	Acceptance for document submission as per Cl. 2.4.20.2	YES
4.6	Acceptance for document submission as per Cl. 2.4.20.3	YES
4.7	Confirmation for no deviation	YES
4.8	If deviation taken, list of deviation enclosed along with the Offer	YES

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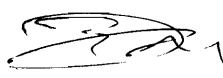
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SL.NO	SPECIFICATION	BHEL REQUIREMENTS
SECTION 5.0: Project data sheet		
5.0.1	Tag No.	*
5.0.2	Flue Gas Pressure	*
5.0.3	Flue Gas Temperature	*
5.1	Power supply requirements	*
5.2	No of analysers per Boiler	*
5.3	No of Sampling Probes Required	*
5.4	Moisture Content	*
5.5	Dust Concentration/sample operating conditions	*
5.6	Chimney dimension	*
5.7	Tapping point details on chimney	*
5.8	Chimney Wall thickness	*
5.9	Stack Height	*
5.10.0	Components to be Measured & Range	
5.10.1	SO ₂	*
5.10.2	NO	*
5.10.3	CO	*
5.10.4	CO ₂	*
5.10.5	HC (C ₃ H ₈)	*
5.11	Painting of Analyzer Panel and Canopy Requirement/Analyser location	*

***Project specific details will be furnished during detailed Engineering**

Signature :
Date :
Company seal :



VENDOR


18/3/10

ENGINEERING


P. SAMUTHIRAPANDI
Manager
E. C & I / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

PURCHASE


S. JAMES
Deputy Manager
Purchase / FBC & HRSG
BHEL, Tiruchirappalli - 620 014

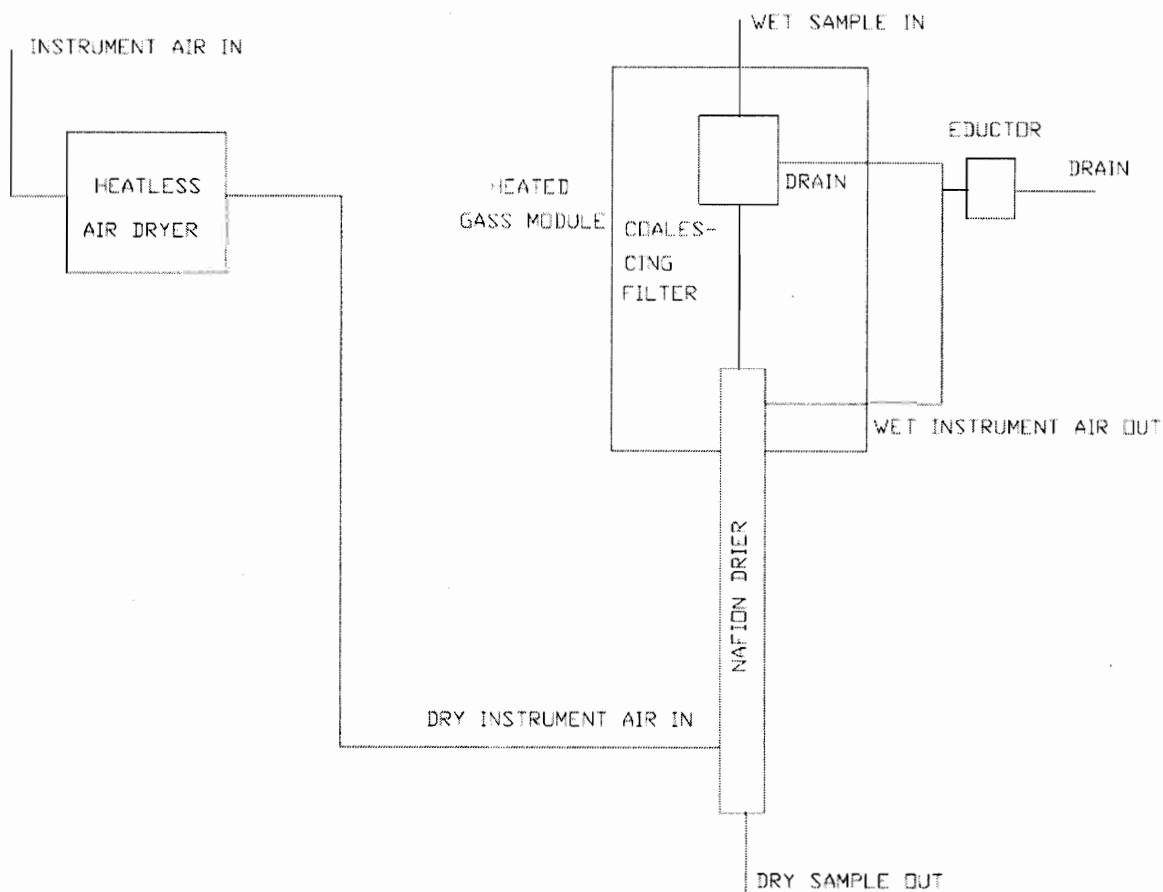


MEMORANDUM OF UNDERSTANDING
FOR CONTINUOUS ONLINE EMISSION MONITORING SYSTEM

MOU / TPFH / CEMS
REV: 00

Date :
Page: 18 of 19

ANNEXURE-I
MOISTURE REMOVAL SYSTEM DESIGN - TYPICAL



Signature :
Date :
Company seal :



VENDOR

[Signature]
18/8/10

ENGINEERING

[Signature]
P. SAMUTHIRAPANDI
Manager
E C & I / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

PURCHASE

[Signature]
S. JAMES
Deputy Manager
Purchase / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.



MEMORANDUM OF UNDERSTANDING
FOR CONTINUOUS ONLINE EMISSION MONITORING SYSTEM

MOU / TPFH / CEMS
REV: 00

Date :
Page: 19 of 19

ANNEXURE – II

Recommended Vendors /Manufacturers for Sample Handling System (SHS) Accessories

1. Sample Pump

Charles Austen-UK / KNF, Buhler Germany/Analyzer OEM Make.

2. Solenoid Valves

ASCO (Red hat) / IMI Norgren Herion.

3. Pressure Regulators ,PRV's & NRV's

Analyzer OEM or Reputed Make.

4. Flow Indicators

Brooks / Eureka / Analyzer OEM or Reputed Make

5. Pressure and Temperature Gauges.

NESS/WIKA/NKS/Liebenberg/ or Reputed make with stainless Casing

6. MCB's

Havells / Schneider / Siemens

7. Programming Logic Controller (PLC)

Allen Broadley / Schneider Electric / Analyzer OEM Make.

8. All Other Accessories/ items shall be of reputed make and shall be subject to BHEL's approval.

Signature :
Date :
Company seal :



VENDOR

[Signature]
18/8/10

ENGINEERING

[Signature]

P. SAMUTHIRAPANDI
Manager
E. C & I / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

PURCHASE

[Signature]
S. JAMES
Deputy Manager

Purchase / FBC & HRSG
BHEL, Tiruchirappalli - 620 014.

(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT AND THE EXPIRY DATE OF BG MUST BE AFTER 60 DAYS FROM THE DATE OF COMPLETION OF WARRANTY PERIOD)

PERFORMANCE BANK GUARANTEE

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India undertaking, a company incorporated under the Companies Act 1956 having its Registered Office at "BHEL House", SIRI Fort, New Delhi 110 049) through its High Pressure Boiler Plant Division located at Tiruverumbur, Tiruchirapalli- 620 014 (hereinafter called 'the Company') having entered into a contract withhereinafter called 'the said contractor' which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the contract No..... Dt Between BHEL, Trichy and as per the contract, the contractor / supplier is to furnish a performance Bank guarantee for Rs. for the due performance of the equipment to be supplied under the above referred contract and for the fulfillment of all the terms and conditions of the contract, We(indicate the name of the bank) (herein after referred to as the bank) at the request of (Contractor(s)) do here by undertake to pay the company an amount not exceeding Rs.....against any loss or damage caused to or suffered or would be caused to or suffered by the company by reason of any breach by the said contractor (s) of any of the terms and conditions contained in the said agreement.

2. We(indicate the name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

3. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We.....(indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____ Office / Department/ Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. (I) Unless a demand or claim under this guarantee is made on us in writing on or before the _____ we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL dispatched by Registered Post with Ack.Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim / demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the bank personally.

6. We(indicate the name of Bank), further agree with the company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. It shall not be necessary for the company to proceed against the contractor before proceeding against the guarantor-bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.

9. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirapalli.

10. The guarantor hereby declare that it has power to execute this guarantee and the executant has full powers to do so on its behalf under the proper authority granted to him/them by the guarantor

11. We(indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we....., (indicate the name of Bank) have hereunto setout Bank Seal the _____ day _____ month 200

LIST OF NATIONALISED BANKS

- 01. ALLAHABAD BANK**
- 02. ANDHRA BANK**
- 03. BANK OF INDIA**
- 04. BANK OF BARODA**
- 05. BANK OF MAHARASTRA**
- 06. BHARATH OVERSEAS BANK**
- 07. CANARA BANK**
- 08. CENTRAL BANK OF INDIA**
- 09. CORPORATION BANK**
- 10. DENA BANK**
- 11. INDIAN BANK**
- 12. INDIAN OVERSEAS BANK**
- 13. OREINTAL BANK OF COMERCE**
- 14. PUNJAB NATIONAL BANK**
- 15. PUNJAB AND SIND BANK**
- 16. STATE BANK OF INDIA**
- 17. STATE BANK OF TRAVANCORE**
- 18. STATE BANK OF MYSORE**
- 19. STATE BANK OF BIKANER & JAIPUR**
- 20. STATE BANK OF HYDERABAD**
- 21. STATE BANK OF PATIALA**
- 22. STATE BANK OF MAHARASTRA**
- 23. SYNDICATE BANK**
- 24. UCO BANK**
- 25. UNION BANK OF INDIA**
- 26. UNITED BANK OF INDIA**
- 27. VIJAYA BANK**

OTHER BANKS	
28	ABN AMRO BANK N.V.
29	CITI BANK N.A.
30	DEUTSCHE BANK AG
31	HDFC BANK LTD.
32	ICICI BANK LTD.
33	IDBI LTD.
34	STANDARD CHARTERED BANK
35	THE HONGKONG AND SHANGHAI BANKING CORPORATION LTD.

BHEL/FBC&HRSG/Purchase

TERMS AND CONDITIONS (for ENQUIRY)

1 (a) **QUOTATION:** Each tender should be sent in double cover, inner cover should be sealed with tender's distinctive seal and superscribed with correct tender No, item of supply and due date of opening. The outer cover should only bear the address of this office and should not have any indication that a tender is within. Two or more quotation should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.

(b) Tenders should be free from **CORRECTION AND ERASURES**. Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

© Price should be net F.O.R dispatching station inclusive of risk in transit and remain valid for 60 days from due date.

(d) If any Sales Tax is payable as extra to the quoted price it should be specifically stated in quotations along with CST & TNGST No. failing which the purchaser will not be liable for payment of Sales Tax. Our T N G S T No.3560005 Dt.01-04-1995, CST No.239383 Dt.11.06.1991.

(e) No revision of prices will be entertained after tenders are opened.

(f) Manufacturer's Name, Trade Mark or Patent No, if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation wherever necessary.

(g) Product with I S I Certification marks will be preferred.

h) The Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.

2. **SAMPLES:** Wherever possible, sample should be submitted separately whether specifically requested or not so as to reach the Purchaser on or before the due date of the enquiry. They should be clearly marked with the enquiry No and the date on the outside cover to facilitate identification.

3. **PACKING AND MARKING:** The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.

4 **TERMS OF PAYMENT:** Payment will be made within 30 days of satisfactory receipt of materials at site. Wherever required by the purchaser, the successful tenderer must send the operation & maintenance manuals, test certificate, drawings etc., for the materials ordered. These should be sent immediately after dispatch of the materials and a statement to that effect should be made in the invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods dispatched either by V P P or by the document presented through bank will not be accepted unless agreed to by the Purchaser.

The duplicate copy of the invoice meant for the transporters should accompany the material as stipulated under C.E Rules 52A and 173C (or) 57GG. A Photostat copy of the above invoice for each delivery challen should be submitted along with the original bills routed through bank or submitted directly to BHEL Finance Department.

5 SECURITY DEPOSIT: For purchases over Rs.5,000/- the successful tenderer/s may be requested to furnish a Bank Guarantee. Security Deposit for an appropriate value as may be determined by BHEL.

6 LIQUIDATED DAMAGES/PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:

If the supplier fails to deliver the raw material / equipment / components within the period in the contract the purchaser shall deduct Liquidated Damages a sum equivalent to 0.5% of the price for each week of delay up to a maximum of 15% of the price of the delayed/undelivered goods. In addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price/total advance paid.

7 RISK PURCHASE: Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has filed to delivery or dispatch within the time stipulated as aforesaid of if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in clause 6 above.

8 PREFERENTIAL DELIVERY: It should be noted if a contract is placed on a higher tender as a result of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F O R destination, including all elements of freights, sales tax, duties and other incidental in case of complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.

9 MODVAT/CREDIT: If any Excise Duty is payable, the chapter head/sub-head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for his input materials, the effect of proforma credit should be passed on to the purchaser. Tender under " MODVAT" shall be preferred.

10 GENERAL : The Purchaser reserves the right to split up the tender and place order for individual items with different tenders and also increase or decrease the quantity.

Any other conditions which might have been quoted by the Seller and are in contravention to the terms prescribed in the order and which have not been specifically accepted in by Purchaser will not be applicable to the contract.

BHARAT HEAVY ELECTRICALS LIMITED
PCPS / PURCHASE

Ref: MM/PCPS/HC ANALYSER

Dated 12.03.2012

SPECIAL CONDITIONS

1. This tender is for the supply as per the enclosed Enquiry and specification. The offered price shall be valid for 6 months from the date of quotation. The vendor shall have adequate experience in manufacturing of this item.
2. The tender is in TWO parts. One part consisting of Technical Bid with Commercial terms & conditions along with Quality plan for the supply in-line with our requirements and another part containing Price Bid. Techno-Commercial bid and Price Bids are to be submitted in separate sealed covers. In addition to technical and commercial conditions, vendors who are not registered vendors of BHEL, Trichy have to submit the filled in "Supplier Registration Forms" (available in www.bhel.com website) along with the technical bid. Based on this and other conditions, as well as capacity and capability and approval by customer vendor will be shortlisted. Both these covers are to be put in a single cover duly super scribing the Enquiry Number. The technical bid with commercial terms & conditions will be opened on the due date and based on the acceptance of techno-commercial bid and vendor evaluation, the price bid of the qualified vendors will be opened on a suitable date with due intimation.

Following will be the criteria for short-listing the vendors

- Evaluation of dully filled Supplier Registration Forms.
- Availability of minimum manufacturing, handling, testing and measuring facilities as detailed in the Supplier Registration Form.
- BHEL will have the right for spot assessment of the facilities.
- Meeting our techno-commercial requirements of the enquiry.
- Customer approval for the vendors before ordering.

Accepting & entering in to Integrity Pact (IP).

3. BHEL reserves the right to Negotiate with the L1 vendor.
4. BHEL reserves the right to re-float the tender opened, if L1 price is not the lowest acceptable price to them inter-alia other reasons.
5. The materials are to be dispatched to M/s. ONGC Petro additions Ltd, Dahej, Near Baruch, Vadodara Dist., Gujarat, **in case of indigenous** vendors on FOR/Destination basis. **in case of foreign vendors on FOB/Nearest seaport basis.** Mode of packing & delivery shall be clearly specified in your quote.
6. Desired delivery within 16 weeks from the date of order. For the delayed delivery, LD is applicable at 0.5% per week, subject to a max. of 15% on undelivered portion.
7. Offers will be evaluated on FOR / OPAL Site cost basis only. Necessary loading factor for internal freight & insurance will be added from sea port to OPAL site in case of foreign vendors.
8. 100% payment will be effected on receipt and acceptance of materials at site in case of indigenous vendors. 100% payment on collection basis thro' bank will be effected for foreign vendors. PBG should be submitted as per proforma attached for 10% value of the order along with dispatch / negotiation documents.
9. Applicable commercial terms & conditions shall be clearly spelt out in the offer.
10. Quotes should be submitted only by the principals. Orders will be placed only on the principals. Ordering on Indian agent will not be done. Qualified L1 vendor will be considered for ordering.

11. Full details can be downloaded from BHEL's website <http://www.bhel.com> (Tender Notifications page > NIT_XXXX) or from the Govt. Tenders website <http://tenders.gov.in> (Public Sector Units > Bharat Heavy Electricals Limited page against Ref. No. NIT_XXXX) or from CPP portals. Interested parties may submit their offers to the following address, **along with vendor registration requirement in BHEL format hosted in BHEL web site.**

SR. MANAGER / PURCHASE / PCPS, 4TH FLOOR, BLDG.79, Bharat Heavy Electricals Ltd.,
HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI - 620 014, TAMILNADU, INDIA.
Ph: (0431) 2574104 / 2574163, FAX: 2520233
E-mail : james@bheltry.co.in, nsmani@bheltry.co.in

Dy. Manager/Purchase/PCPS

BHEL / FBC & HRSG / Purchase

TERMS & CONDITIONS (FOR IMPORT ENQUIRY)

I OFFER:

Offer in English Language and in Triplicate in a sealed cover super scribing the Enquiry Number and the due date shall be submitted (addressed) to:

The Manager/Purchase/FBC&HRSG
Building No.79
Bharat Heavy Electricals Limited
High Pressure Boiler Plant
TIRUCHIRAPALLI - 620 014
Tamil Nadu, India

Offer should be firm for net FOB Nearest Sea Port and C&F Chennai Port price indicating the shipping specifications and the earliest delivery in respect of offers from overseas suppliers. Offer from indigenous sources shall be firm for F.O.R TIRUCHIRAPALI.

II DOCUMENTS:

- (i) offer should be accompanied by detailed technical literature, Catalogue and detailed dimensional drawing in English and In Triplicate or otherwise, the offer will not be considered.
- (ii) In case Overseas suppliers route their offer through their accredited selling agents, a letter of authority should be furnished mentioning the name and address of their selling agents who are authorized to bid, negotiate and concluded a contract on their behalf.

III AGENCY COMMISSION:

- (i) In respect of the offer from Overseas suppliers, agency commission, if any, payable to their agents in India, shall invariably be shown separately in the pro forma invoice and this will be paid by us IN INDIA in Indian Rupees, on satisfactory completion of the contract.
- (ii) If overseas principal has any tie up with any third party in respect of Agency Commission it should be declared while submitting the offers.
- (iii) Copies of current Agency Agreement / Authorization Letter in respect of Agency Commission shall be furnished along with offer, if not made available earlier.
- (iv) For calculation of Rupees equivalent of Agency Commission, exchange rate as prevailing on the date of order will be taken.

IV SPARES:

The tender should quote separately for spares that are required for two years trouble free operations. The spares offer should accompany the offer of main equipment otherwise the quotation will be overlooked.

V VALIDITY:

The offers for main equipment and spares shall be kept open for acceptance for 120 days (one hundred and twenty days) from the date of opening of the tender.

VI TEST CERTIFICATES, OPERATING AND MAINTENANCE MANUALS:

The tender shall clearly mention in their offer that the Test certificate and Operating and Maintenance Manuals etc., as called for in the Technical specification in the required number of copies will be provided at no extra cost. If any amount is payable as extra, the same shall be indicated separately in the offer.

VII TERMS OF PAYMENT :

In the event of an order the Purchase will arrange for an Irrevocable Letter of Credit against presentation of documents. Under no circumstances confirmed and irrevocable letter of credit will be established by the Purchase.

VIII GENERAL:

- (i) Preference will be given to suitable indigenous or ex-stock imported offers failing which imported offers from incoming consignment against the indigenous supplies " stock and sale licence" will be accepted. If stock and sale licence is not available with the indigenous suppliers, the same shall be indicated in their offer.
- (ii) Bank Guarantee: The supplier in the event of an order should furnish a Bank Guarantee from an approved Bank at no extra cost in a pro forma which will be supplied to the Supplier, along with the order, for an amount equipment to 10% of the value of the contract. The Bank Guarantee should remain in full force and effect during the period that would be taken for successful completion of the contract and shall continue to be enforceable till 12 months from the date of receipt of consignment at Purchaser's site or 18 months from the date of last shipment at the Port of delivery whichever is earlier.

XI LD/PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIERY:

" If the supplier fails to deliver the equipment / components within the period specified in the contract the Purchaser shall deduct Liquidated Damages a sum equivalent to 0.5% of the price for each week of delay up to maximum 15% of the price of the delayed / undelivered goods, in addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price / total advance paid"

kundan/En_Anc_Fm



BHARAT HEAVY ELECTRICALS LIMITED
FBC & HRSG / PURCHASE
TIRUCIRAPPALLI - 620 014 , TAMILNADU

445 - 407 (Rev.01)

INSTRUCTIONS TO TENDERERS (INDIGENOUS)

- 01.a Tenderers shall quote their price on **Ex-Works / FOR Despatching point** basis. Materials will be transported by road through **BHEL / TRICHY approved transport carriers** to respective destinations indicated in the tender.
- b Split-up prices must be furnished by the tenderer for the basic Instrument / Equipment and for all accessories quoted.
02. Offer must include Spares required for:
 - a) Commissioning of the equipment.
 - b) 2 years trouble free operation.
03. If the tender specification calls for various alternatives, all such alternatives are to be quoted by the tenderers.
04. Data sheet as called for in the enquiry shall be filled by the tenderer in full and submitted along with the quotations.. **Offers with incomplete information in data sheet are liable for rejection.**
05. Offers shall be accompanied by copies of drawings, catalogues, illustrated leaflets as called for in the tender specification.
06. In case of tenders invited in two parts, vendors shall furnish **Un-priced Complete Bill Of Materials in the technical bids** for our evaluation. Technical bids alone will be opened on the tender due date.
07. Manufacturer's quality plan must be sent along with the offer. The Vendor shall submit along with the offer the list of components made in house and the list of bought out components, the source, the quality requirements for the same. A copy of the product catalogue with all the relevant information shall also accompany the offer. **In case BHEL Standard Quality plan is applicable, vendor to confirm for their compliance.**
08. Each and every point of BHEL specification / data sheet must be either confirmed or commented upon without fail either in typed form or in neatly hand written form bringing out clearly the deviations (if any) taken by the tenderers. However, the tenderers must make all efforts to adhere to BHEL specifications in toto. Offers received without such point to point confirmations / comments shall be considered incomplete and liable for rejection.
09. **Status of tender submission shall invariably be informed to BHEL either over E-Mail / Fax atleast two days in advance of due date, failing which no extension of due date is entertained.**

10. **No advance will be made along with order.** Our payment terms will be **100% within 45 days after receipt and acceptance of materials at our works / site.** Please note that finalisation of tender is not only on the price factor but also on your accepting our terms of payment.
11. The equipment shall be guaranteed for a period of **12 / 18 months** from the date of putting the equipment in use or **18 / 24 months** from the date of despatch whichever is earlier.
12. Vendor to confirm for providing **Bank Guarantee for 10% order value (as per BHEL format)** valid for a period mentioned in the point No.11 .
13. Please quote **DGS&D** rates if the equipment is covered under the current rate contract. A copy of current rate contract shall also be enclosed with the offer.
14. The purchase also reserves the right to allow to the Public Enterprises price preference facilities as admissible under Government policy.
15. The rate of excise duty prevalent on the date of quotation shall be clearly indicated in the offer itself for incorporation in the Purchase Order. It will be payable at the quoted rates subject to completion of delivery within the stipulated dates. However revision due to statutory variations will be applicable.
16. In case of an order, **3 sets of hard copies of detailed dimensional drawings, O&M instructions & manuals and 2 sets of soft copies in CD** will have to be furnished by the supplier **at no extra cost.**
17. If the component requires approval of the prospective supplier's drawing before manufacture, such drawings must be furnished within two weeks from the date of Letter of Intent unless contracted otherwise. Drawings to be submitted for approval must be complete in all respects without necessitating submission of revised drawings for approval.
18. **"Original Invoice for Buyer"** should be submitted along with the advance copy of documents to, The Manager / Purchase / IPP, Bldg.No.79, BHEL, Trichy-14 for each of the despatch made, for processing payment.
19. Detailed offer should reach us before the due date indicated in the tender. Telegraphic offers will normally be not accepted and will be treated as incomplete.
20. Offers must reach us latest **before 2.30 P.M.** on the date of opening of tender viz:
21. The materials are to be despatched to :

QUOTATION DATA SHEET

THE TENDERS SHALL FURNISH THE PARTICULARS CALLED FOR IN THE QUOTATION DATA SHEET ENCLOSED AND SUBMIT THE FILLED IN DATA SHEET ALONG WITH THE QUOTATION WITHOUT FAIL OFFERS WITH INCOMPLETE INFORMATION IN DATA SHEET ARE LIABLE FOR REJECTION. IN CASE OF DISCREPANCY, INFORMATION CONTAINED IN THIS DATA SHEET SHALL BE CONSIDERED FOR EVALUATION.

PLEASE STRIKE OUT WHICHEVER IS NOT APPLICABLE:

PROJECT:

ENQ.NO & DATE :

DUE DATE :

01	VALIDITY	UPTO
02	DELIVERY PERIOD	..... MONTHS / WEEKS
03	DELIVERY PLACE	
	(a) EX-WORKS PLACE	
	(b) FOR / DESPATCHING POINT	
04	EXCISE DUTY	..... % / NOT APPLICABLE
05	TAX	..... % / NOT APPLICABLE
	(a) C S T	..... % / NOT APPLICABLE
	(b) LOCAL TAXES (SUPPLY WITHIN THE STATE)	..... % / NOT APPLICABLE
06	OCTROI CHARGES	..... % / NOT APPLICABLE
07	PACKING CHARGES	..... % / NOT APPLICABLE
08	FORWARDING CHARGES	..... % / NOT APPLICABLE
09	FREIGHT CHARGES	..... % / NOT APPLICABLE
10	INSURANCE CHARGES	..... % / NOT APPLICABLE
11	TESTING / IBR CHARGES (LUMPSUM)	..... % / NOT APPLICABLE
12	COMMISSIONING CHARGES (LUMPSUM)	..... % / NOT APPLICABLE
13	PAYMENT TERMS	
14	ACCEPTANCE FOR PROVIDING BANK GUARANTEE AS PER BHEL PROFORMA	YES / NO / APPLICABLE
15	DIMENSIONAL DRGS / DATA SHHETS	ENCLOSED / NOT APPLICABLE
16	ANY OTHER ADDITIONAL FACTORS	
17	LD CLAUSE @ 0.5% PER WEEK MAXIMUM 15% FOR THE DELAYED DESPATCHING	
18	GUARANTEE PERIOD SHALL BE 18 / 24 MONTHS	

WE CONFIRM THAT THE STATUTORY LEVIES, DUTIES, TAXES ETC FURNISHED ABOVE ARE BASED ON THE LATEST GOVT NOTIFICATION. WE ALSO CONFIRM THAT WE HAVE GONE THROUGH ALL THE CONDITIONS OF THE ENQUIRY AND OUR OFFER IS ACCORDINGLY SUBMITTED

SIGNATURE WITH SEAL