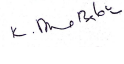


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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. TECHNICAL SPECIFICATION FOR ANALYSER SYSTEM (GAS CHROMATOGRAPH) Owner : M/s Indian Oil Corporation Limited (IOCL) – Paradip Refinery Consultant/PMC : M/s TECHNIP ENERGIES LIMITED Purchaser / LSTK Contractor : M/s Bharat Heavy Electricals Limited (BHEL) Engineering Sub-Contractor : M/s Engineers India Limited (EIL) Site : Paradip Refinery, Paradip, Odisha, India					
Revisions: Refer to record of revisions		Prepared By:  Md. Ghouse	Checked By :  Sujatha Sapavat	Approved :  K. Anand Babu	Date : 13.08.2021



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1. SCOPE

This technical specification covers the Design, Engineering, Manufacturing, System integration, Calibration, Assembly, testing at vendor works, inspection by purchaser, packing and transportation to site with necessary documentation like data sheets, statutory approvals, O&M manuals etc., as required and supervision of Erection, commissioning till final handover of gas chromatograph to End user.

2. Proven Track Record [PTR]

The system (with all its sub-systems) as being offered / supplied should have been installed and operating satisfactorily in a similar Unit application of hydrocarbon industry like Refinery, Petrochemical or Gas Processing Plant for at least 8000 hours (as collaborated by user certificate).

Vendor shall submit necessary supporting documents / past users confirmation supporting to above PTR requirements / end user performance letter (*by mentioning that quoted model is working satisfactorily for more than 8000 hrs*) along with technical offer.

2 INSTRUCTIONS TO BIDDERS

- 3.1 Bidders **are advised to contact BHEL for essential technical queries in writing within one week of issue of Enquiry.** In the event of any conflict between these specifications, data sheets, related standards, codes etc. the vendor shall refer the matter to the purchaser for clarifications before bid submission **and the decision of Purchaser shall be final & binding on Bidder, without any cost & delivery implications. In the event of conflict, most stringent requirements shall be followed in general.** Vendor to sign and stamp each and every page of our specification, otherwise the offer is liable to be rejected.
- 3.2 Offers with incomplete information will not be considered for evaluation, and are likely to be rejected outright without any further interaction with the Bidder.
- 3.3 Any technical features [over & above BHEL enquiry specification requirements] proposed by Bidder will not be given preference for the purpose of evaluation.
- 3.4 Bidder shall submit the "Duly filled & Signed copy of Check list" compulsorily along with technical offer without which offer is liable for rejection without any further interaction with the Bidder

3 List of Annexures (To followed along with this specification)

Document No.	Document Name
Annexure – [A]	Price Bid format
Annexure – [B]	B366-999-YA-MR-2680_Rev-A- Technical specification of analyzer systems (Only Gas chromatograph)
Annexure – [C]	Mandatory spares
Annexure – [D]	Vendor List [MSL] & Blocked vendor list
Annexure – [E]	Quality Requirements
Annexure – [F]	Check list & No deviation format
Annexure – [G]	Other attachments

4 Technical SPECIFICATIONS & supplies – As per Annexure-[A], [B] & [C] of this specification

5 POWER SUPPLY

- 5.1 Power supplies shall be provided as per Annexure-[B] of this specification.
- 5.2 Further conditioning & distribution within package shall be in vendor scope with necessary protections & metering for powering equipments under their scope. Power distribution scheme shall be approved by purchaser.
- 5.3 Vendor shall supply accessories (like cable glands, plugs, etc.) required for termination of purchasers' as well as vendor power cables.
- 5.4 Vendor shall furnish above feeders capacity during bidding stage as well as detail calculations during order execution.
- 5.5 All internal distributions shall be designed such that a single power fault in any instrument branch system shall not cause a trip of the entire system. Each consumer shall be provided with separate switch & isolation fuse.



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6 EARTHING

- 6.1 System earthing shall be carried in-line with Annexure-[B] of this specification.
- 6.2 BHEL shall provide the following:
- Electrical earth connection for panel earthing – 1 No (redundant)
 - Electronics earth connection at bidder supplied Copper bus for system earthing - 1 No (redundant)
- 6.3 All hardware with in package required for earthing & connectivity up to BHEL's earth points shall be in vendor scope.
- 6.4 Scheme for recommended earthing system/earth pit shall be furnished by vendor during order execution.

7 SPARES & Special Tools / Tackels**7.1 CONSUMABLES for ONE-YEAR Operation shall be considered by bidder part of the offer.**

- 7.1.1 Vendor service engineer shall hand carry (or supply prior to commissioning) the shelf life items & consumables.
- 7.1.2 In addition to above, consumables, shelf life items required for ONE (1) year operation shall be included in scope of supply along with main system.
- 7.1.3 Post-Commissioning of the System, vendor shall supply these consumables/shelf life items to site without any time and cost implications in ONE / TWO lots (subject to approval during drawing approval).
- 7.1.4 Vendor shall furnish complete and detailed list with quantity and part number etc., in the technical offer. In case particular consumable item found to be essential for smooth functioning of the analyzer system(GC) but not included in the vendor offer / BOM, such items shall be supplied by vendor on "as required" basis without any time and cost implications.
- 7.1.5 Wherever, consumable shelf life is less than 1 year, the vendor shall make partial shipment of such material at appropriate time.
- 7.2 Bidder as a part of the offer shall consider **Start-up & Commissioning spares.**
- 7.3 **Special Tools and Tackles** required for Operation & Maintenance of analyser system(GC) shall be considered in the offer by bidder. List must be furnished along with the offer.
- 7.4 **MANDATORY SPARES** - If applicable, requirement shall be as per enquiry & Annexure-[B] of this specification.

8 PWAMC (Post warranty annual maintenance contract) - as per annexure-[B] of this specification.**9 Bidder's Scope of SERVICES (supervision of Erection & Complete commissioning)**

- 9.1 Vendor shall provide services on lump sum basis, which includes supervision of Erection, complete commissioning, SAT, making complete system operational and final handing over to end User. No. of man-days & required manpower to be assessed and considered by bidder accordingly.
- 9.2 **Bidder shall own the responsibility of the complete system from the data of supply until handover to the End user.**
- 9.3 Bidder to mobilize concerned competent engineers for above activities within a period of 6 working days of receipt of intimation in this regard from BHEL.
- 9.4 Services charges shall include the travel to & fro travel from vendors work to site, lodging, boarding & local travel. Vendors shall arrange their own lodging, boarding & traveling. Vendors shall arrange their own Test equipment's, commissioning tools, manpower etc as required.
- 9.5 **Project is expected to complete by March 2023. Hence tentative commissioning call may be given to bidder either in Jan/ Feb'23.**
- 9.6 Broad scope marking of E&C between bidder & purchaser is as below:

S.No	Description	V	ER
1	Unloading of system at site, shifting to site stores and documentation for material receipt	S	X
2	Supply Verification as per packing list, Transit damage inspection and preparation of damage assessment report	S	X
3	System Storage at site		X
4	Custody of items in stores		X
5	Issue of Items from Stores		X
6	Transport/shifting of system from site stores to actual/Intended locations	S	X



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7	Provision of Crane/ handling equipment's for Shifting of the equipment's		X
8	Unpacking of equipments in control room	S	X
9	Fabrication of base frames for cabinet / console mounting	S	X
10	Installation of system at Intended locations	S	X
11	Laying of all cables from plant up to panel		X
12	Termination of all cables at panel which are coming from plant	X	S
13	Laying of power supply cables from UPS / other sources up to panel	S	X
14	Termination of power supply cables from UPS / other sources up to panel	X	S
15	Laying of communication cables, FO cables and pre-fabricated system cables	S	X
16	Termination of communication cables, FO cables and pre-fabricated system cables @ panel	X	S
17	Jointing of FO cables, Splicing incl. OTDR testing	X	S
18	Laying of all earthing cables from respective bus bars to cabinets	S	X
19	Termination of all earthing cables	X	S
20	Connecting power supply to System under the supervision of vendor.	S	X
21	System power up, loading of configuration, application software	X	S
22	Cable Lugging, Ferruling, Terminations with in package for incoming / outgoing cables of the system and Special/ network cables	X	S
23	Site Acceptance Test (SAT)	X	S
24	Providing commissioning assistance		S
25	Erection & Commissioning coordination with vendor, customer, BHEL HQ		X
26	Handing over of the system to end user	X	S

X : Primary responsibility

S : Supervision only

ER : Erection Agency of BHEL

V : GC Vendor

10 DOCUMENTATION

10.1 Information to be included with offer - Vendor shall make the offer in detail, with respect to every item of the Purchaser's specifications. Any offer not conforming to this shall be summarily rejected.

- Duly filled & Signed copy of Check list (To be submitted compulsorily without fail)
- Bidder to submit the "No deviation format" given in this specification with "NIL" deviations (To be submitted compulsorily without fail)
- Unpriced price schedule (To be submitted compulsorily without fail)
- Proven Track record i.e. end user performance letter (To be submitted compulsorily without fail in-line with cl. 2 of this specification)
- Power Consumption Details (To be submitted compulsorily without fail)
- List of Consumables (To be submitted compulsorily without fail)
- List of Special tools & Tackles (To be submitted compulsorily without fail)
- Responsibility definition (in case the bidder is "system integrator")
- Copy of the Certificate of flameproof from statutory body like PESO, BASEEFA, FM, PTB, CMRI etc. as applicable
- Bill of materials (*only for information*)
 - All the details regarding type, construction, materials, accessories etc. along with technical catalogue
 - Detailed sketch showing various components of sampling and sample conditioning system
 - Sample flow rates required achieving response time, the recommended length and size of the sampling tube between process tap and sampling system
 - Any special cabling requirements including shielding and grounding requirements
 - Consumption figures of electrical power and other utilities for analyzer system (GC).
 - Overall dimensions of analyzer system (GC) panels.

10.2 Documentation after P.O. Placement

- Submission of documents as per "Master documents schedule" (which will be finalized in Kick-off meeting after award of the contract) within 2 weeks of placement of LOI (for approval by BHEL and / or BHEL's customer in 4 sets)

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b) *All vendor documents of analyser and its sub-items shall be submitted to BHEL/EIL/IOCL/PMC for approval during order execution. Any comment furnished by BHEL/EIL/IOCL/PMC shall be taken care by vendor during ordering execution.*

c) Further BHEL will provide comments on vendor submitted document within 25 working days for revision & resubmission. Vendor shall follow up with BHEL for non-receipt of comments/approvals.

d) Revised drawings / Documents shall be submitted by Bidder in 07 days of receipt of comments / observations from BHEL. BHEL shall revert within 25 days on receipt of these revised documents / drawings from vendor for approvals.

e) *All the approvals required for manufacturing shall be completed with 2months from P.O to meet the P.O delivery schedule.* Accordingly vendor shall ensure the submission of approval category documents (which are required for manufacturing) and obtain their approvals.

f) Vendor shall obtain final approvals on all technical + quality aspect documents before inspection dates.

g) It is vendor's responsibility to obtain approvals from BHEL as earliest as possible to meet PO delivery schedules. Accordingly vendor to plan and execute the supplies in time.

10.3 Documents to be submitted during final shop testing and before equipment dispatch. **(Note: submission of these documents are commercially linked)** - all in 16 sets (2 sets to be included with item dispatch and balance to BHEL purchase department).

a) Complete O& M manual.

b) Approved Engg documents

c) As-Shipped documents

d) As-Built documents

e) Guarantee and all test certificates for review and acceptance by BHEL and / or BHEL's Customer

3 sets of CD-ROM – containing **O&M manual and Engineering documents** (1 set to be included with item dispatch and balance to BHEL purchase department).

11 MARKING, PACKING AND DESPATCH

11.1 All items shall be marked (stamped/etched) in accordance with the applicable code/standard/specification. In addition, the item code, if available, shall also be marked.

11.2 For ease of identification, the color of painted strip (wherever required) shall be as per the applicable standard.

11.3 Part number/Dispatch link-up of all the equipment's/items supplied and also their co-relation with system/drawing/approved BOQ.

11.4 Paint or ink for marking shall not contain any harmful metal or metal salts which can cause corrosive attack either ordinarily or in service. Special items/smaller items shall have attached corrosion resistant tag providing salient features.

11.5 The equipment shall be transported to site by the vendor in fully assembled condition. However, in case some components are liable to be damaged during transit, the same shall be dismantled and supplied separately, to be reassembled at site the vendor. Assembly of the item supplied loose at site and repairing of any item damaged during transport shall be in the vendor's scope. The vendor shall send each consignment to site with a detailed packing list.

11.6 All the equipment shall be divided into several sections for protection and ease of handling during transportation. The equipment shall be properly packed for transportation by ship/rail or trailer. The equipment shall be wrapped in polythene sheets before being placed in crates/cases to prevent damage to the finish. Crates/cases shall have skid bottom for handling.

11.7 Special notations such as 'Fragile', 'This side up', 'Center of gravity', 'Weight', 'Owner's particulars', 'PO Nos.' etc. shall be clearly marked on the package together with other details as per purchaser order.

11.8 The equipment/items may be stored outdoors for long periods before installation. The packing shall be completely suitable for outdoor storage in areas with heavy rains/high ambient temperature, unless otherwise agreed.

11.9 The following minimum packing procedures shall be followed: -

a) All items shall be dry, clean and free from moisture, dirt and loose foreign material of all kinds.

b) All items shall be protected from rust, corrosion, and mechanical damage during transportation and handling.

c) Each variety and size of item shall be supplied in separate packaging marked with the purchase order no., item code (if available), and the salient specifications.

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		d) All electrical, instrumentation etc., shall be properly packed to prevent damage during transport, storage, handling at site. e) All the items which the Bidders considered liable to be damaged during shipment or storage, shall be packaged for separate shipment. If instruments are removed from the panel, they and their connection shall be suitably tagged to ensure simple re installation at the job site. Each instrument shall be sealed in plastic bags containing moisture absorbing desiccants. f) It shall be bidder’s sole responsibility to protect all the material during period of dispatch, storage and erection against corrosion, incidental damage due to vermin, sunlight, rain, high temperature, humid atmosphere, rough handling in transit and including delays in transit. g) Mandatory Spare parts shall be packaged separately and clearly marked as ‘Mandatory Spares’. h) Commissioning spares, Tools & tackles to be packed separately & suitably tagged. 11.10 If mandatory spare items are ordered, same shall be sent in pre-decided lots in containers /secure boxes distinctly marked in GREEN color with boldly written "S "mark on each face of the containers /secure boxes 11.11 Loose vendor items sent by vendor to sites shall be quantified/numbered/tagged and not merely mentioned as ONE lot of loose items. 11.12 A packing list covering items having shelf life are to be intimated to site. Also, shelf life items shall be packed separately in black color painted box for easy identification at site. 12 TESTING, INSTALLATION, COMMISSIONING & ACCEPTANCE –Annexure-[B] of this specification 12.1 Final Inspection including document verification as per approved QAP shall be carried out by CUSTOMER /CONSULTANT/ CUSTOMER’s Third Inspection Agency & BHEL/BHEL’s Third Party Inspection Agency / EIL at vendor works. 12.2 Inspection & Factory Acceptance Test at Vendor works – by BHEL/EIL + VENDOR + PMC + IOCL as per approved FAT procedure 12.3 Site Acceptance Test at site - by BHEL/EIL + VENDOR + PMC + IOCL as per approved SAT procedure 13 DEFECT LIABILITY PERIOD / WARRANTY - The Defect Liability Period / warranty shall be as per commercial terms & conditions of the NIT. 14 SUB VENDOR LIST Bidder to follow the makes for bought out items as per Annexure-[D] of this specification. If any of the items are not figuring in above document, then bidder shall propose the vendors such items during order execution for IOCL/PMC’s approval meeting proven track record as per cl. 2 of this specification. Note: Blocked vendor list is attached. Bidder to make a note that none of vendors from the blocked list shall be selected for supplies.					

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RECORD OF REVISIONS

Rev. No.

Date _____

Revision Details

Revised By

Approved By

00

13.08.2021

Original issue

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K. Anand Babu *K. Anand Babu*

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