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TD-106-1
Rev. 5

Form No.



PRODUCT STANDARD
TURBINES AND COMPRESSORS
HYDERABAD

TC65429

REV No.: 01

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GAS FLOW METER

PROJECT	NEW TEST PLANT
OWNER	BHEL
UNIT	NEW TEST PLANT

Rev. No.	Revision	Prepared	Approved	Date
00	First issue	VCCS	RAM	28/09/2018



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INSTRUCTION TO BIDDERS

- 1) Bidders are advised to contact BHEL for essential technical queries in writing within one week of issue of Enquiry. Offers with incomplete information will not be considered for evaluation, and are likely to be rejected without any further correspondence with the Bidder.
- 2) Unsolicited requests from bidders for alterations to their already submitted offer will not be permitted. These would not be taken cognizance, and offers will be evaluated without taking into account such requests/correspondence.
- 3) Any technical features over & above BHEL enquiry specification requirements proposed by Bidder will not be given preference for the purpose of evaluation.
- 4) Bidders shall comply BHEL specifications in total. Incomplete offers will be rejected. In case feasible deviations are proposed by the bidder and subsequently withdrawn, no commercial implications can be claimed by the bidder.
- 5) In the event of any conflict between these specifications, data sheets, related standards, codes etc. the bidder shall refer the matter to the purchaser for clarifications and only after obtaining the same shall proceed with the manufacture / procurement of the items in question.
- 6) Bidder shall submit duly filled deviation format enclosed with this specification along with technical offer, otherwise, it will be presumed that there are no deviations from this specification. Offer without this deviation list will not be evaluated & shall be rejected. If, there are no deviations, bidder shall submit signed copy of deviation format, mentioning "No Deviations".
- 7) Changes if any made by BHEL during technical evaluation on the specification requirements or Bill of material, bidder is requested by the purchase to submit impact price (amount to be reduced or increased to the original offered price) for those changed items only, other items for which there are no technical changes, unit rates shall be maintained as it is.
- 8) **Bidder shall necessarily quote for all the optional items listed in the price schedule. This optional unit prices shall be exercised if there is any change in quantity.**
- 9) In case of any technical query, bidders may contact the following BHEL engineers:

To

Name: Chaturvendra Sagar V C
 Designation: Deputy Manager
 Deptt: Compressor Testing
 Phone: +91 40 2318 4148
 Email: vccs87@bhel.in

CC

Name: Ramniwas Sangwa
 Designation: Manager
 Deptt: TC Engineering
 Phone: +91 40 2318 3548
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SPECIFICATION FOR GAS FLOWMETER

1. SCOPE:

Gas flow meter shall be capable of measuring flow rate of various gases as per selection. The flow meters should be suitable to measure the flow of following gases namely Nitrogen, Carbon di oxide, Helium, R134a etc. and their mixtures. The flow meters shall have pre-programmed calibration data stored for the above gases. Suitable user selectable modes should be available for selecting any specific gas chosen at a time. It shall be possible to create new mixture as per requirement and configure the flow meter accordingly.

2. DESIGN:

- The Gas flow meter shall be with electronic state of the art sensor meeting all functional requirements with software to configure instrument and read the measured flow results.
- The flow meter shall have digital communication to interface with Windows 7/10 OS based PC on RS232 / RS485 with USB converter.
- The digital display shall be preferably integral to the flow. Separate display units is acceptable if cable of suitable length along with plug-in connectors are supplied.
- The flow meters shall be compact construction.
- Flow meter shall also operate on battery for at least three hours continuously.
- Protection: auto shutdown of system/ alarm if the operating pressure or temperature is above the design limit.

3. TECHNICAL SPECIFICATIONS:

Service	Gas flow measurement: a) Nitrogen b) Helium c) Carbon di oxide d) R134A
Flow Meter Type	Differential Pressure / Thermal Mass Flow
Flow Range	Refer variant table
Maximum Operating Pressure	20 Kg/Cm ² g
Temperature	-10 to 65 DegC
Humidity	0-100%
Ingress Protection	IP40 minimum
Measurement Accuracy	+/- 0.8% of reading +0.2% of full scale
Repeatability	+/- 0.2% full scale
Power supply	240 V AC +/-10 V
Battery operated	Yes
Display	LCD Display to view flow rate and instrument configuration.
Keypad / Pushbutton	Required for configuration / program changes
Driver Software	Necessary Inbuilt software to communicate with instrument through hard / soft buttons, configure instrument and view measured results.
PC based Software (Optional Quote Required)	A PC based software program that should interface with the RS-232 and RS 485 communication. The graphical user interface (GUI) shall provide automatic configuration, session saving for easy Configuration and experiment setup reloads, data capturing and logging (including a graphing tool), simple and advanced script building for automating meter and control command sequences, software alarms and support for multiple devices.
Span and zero shift	0.02% full scale



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Response Time	<10 ms
Turn down ratio	100:1
Accessories	a) PC interface cable b) Power supply with connecting cable
Proven Performance	Vendor shall have a well proven performance record of operating instrument satisfactorily in process industries and labs.
Process Connection	NPT to Compression Fitting
Electrical Connection	Vendor to specify
Body material	SS316 minimum for parts in contact with process

4. IDENTIFICATION & MARKING:

- The following minimum identification markings shall be stamped on to an identification tag / label fixed to the flow meter.
- Manufacturers Type / Model Number.
- Max Pressure input and Range limit.
- The serial number of the device.
- Year of construction.
- 12 digit BHEL material code.

5. PAINT COATING:

Manufacturer's proven anticorrosive paint shall be used (If painting is done on any part).

6. INSPECTION AND TEST REQUIREMENTS:

- Calibration test certificate shall be furnished. Detailed information shall be provided with calibration certificate for each gases mentioned above for the flow meter.
- Vendor shall provide detailed procedure to create different gas mixtures and configure the flow meter.
- Vendor shall have an established calibration lab in India, if BHEL requires to recalibrate the flow meter. Vendor to provide optional price for calibration services.

7. Training:

Vendor shall provide training to the user in terms of operation and trouble shooting.

8. GUARANTEE CERTIFICATE:

A guarantee certificate for minimum 24 months of trouble free operation from date of shipment.

9. DOCUMENTATION:

The following Technical Information / Documents shall be furnished.

- Along with offer:
 - Model number recodification.
 - Technical catalogues / literature.
 - GA Drawing, mounting details.
- After placement of order.
 - Operation and Maintenance manual.
 - Inspection and Test certificates.
 - Guarantee certificate.
 - Calibration certificate
 - Critical spare list with part numbers.



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10. PACKING:

The material shall be properly packed to ensure that it is capable of withstanding transit risks without damage.

11. MARKING ON PACKING CASE :

The following details shall be marked on packing case.

- Manufacturers name.
- BHEL purchase order number.
- BHEL product standard number.
- Packing box no / total boxes.

12. VARIANT TABLE:

Var. No	Measurement Range	Item Description	BHEL Material Code
01	0 to 20 SLPM	FLOW METER 0~20 SLPM	TC9765429010
02	0 to 50 SLPM	FLOW METER 0~50 SLPM	TC9765429029

13. PRICE SCHEDULE:

Enquiry ref no.

Date:

Offer ref no.

Date:

SI no.	DESCRIPTION	Qty	PRICE
A	<u>MAIN ITEMS</u>		
1	Flow meter 0~20 slpm: TC9765429010		
2	Flow meter 0~50 slpm: TC9765429029		
B	<u>OPTIONAL ITEMS: UNIT PRICE</u>		
1	Windows based GUI software	Unit price	
2	Critical spares	Unit Price	
3	Calibration Service	Unit price	
C	<u>Additional price to withdraw the deviations to following clause no and Item / Item Qty with Unit Prices (Vendor may attach annexure for unit prices:</u>		
D	Total Price for L1 Evaluation A (1+2) + C + additional items from UNIT PRICE (if required, BHEL shall inform during technical evaluation)		

Notes:

- The Optional prices for items quoted shall be valid for one year from the date of order.
- Any additional requirements which are essential for proper functioning of the flow meter, however not indicated in this specification shall be explicitly listed and included in the offer by vendor.

VENDOR SEAL & SIGNATURE.