



सत्यमेव जयते

भारत सरकार
Government of India
भाभा परमाणु अनुसंधान केंद्र
Bhabha Atomic Research Centre
चूर्ण धातु विभाग
Powder Metallurgy Division

बी. ए. आर. सी वाशी कॉम्प्लेक्स
BARC Vashi Complex
नवी मुंबई 400703 -
Navi Mumbai - 400703
दूरभाष (Tel): 91-22-288715/7145

Ref.:PMD/TenderInv/2022/ 467

25 January, 2022

Minor Fabrication

Sub.: Fabrication, supply and installation of dew point, relative humidity and temperature measuring stations with display unit and transmitter for high humidity application- 01 Job as per annexure A.

भारत के राष्ट्रपति की ओर से, धातु चूर्ण विभाग, वाशी कॉम्प्लेक्स, नवी मुंबई- 400 703 में किए जाने वाले निम्नलिखित निर्माण / मरम्मत कार्य के लिए अधोहस्ताक्षरी द्वारा उद्धरण आमंत्रित किया जाता है।

For & on behalf of the President of India, quotation is invited by the undersigned for following fabrication / repair work to be carried out at Powder Metallurgy Division, Vashi Complex, Navi Mumbai- 400703.

Fabrication, supply and installation of dew point, relative humidity and temperature measuring stations with display unit and transmitter for high humidity application- 01 Job as per annexure A.

तकनीकी और वाणिज्यिक उद्धरण निम्न लिखित शीर्षक के साथ 2 सीलबंद लिफाफों में अलग-अलग भेजे जाने चाहिए अर्थात् तकनीकी/वाणिज्यिक " Fabrication, supply and installation of dew point, relative humidity and temperature measuring stations with display unit and transmitter for high humidity application- 01 Job as per annexure A" निम्नलिखित अधिकारियों को संबोधित किया जाना चाहिए, उसे स्पीडपोस्ट/ पंजीकृत डाक द्वारा भारतीय डाक सेवा के माध्यम से निम्नलिखित तारीख या समय से पहले उस तक पहुंचना चाहिए। यह ध्यान दिया जाना चाहिए कि तकनीकी उद्धरण में कोई व्यावसायिक पहलू नहीं होना चाहिए अन्यथा प्रस्ताव को अस्वीकार कर दिया जाएगा।

The Technical and Commercial quotations should be sent together in 2 separate sealed covers super-scribed as Technical/Commercial "Fabrication, supply and installation of dew point, relative humidity and temperature measuring stations with display unit and transmitter for high humidity application- 01 Job as per annexure A." and addressed to the following official which should reach him/her by **Speed Post/Registered Post** through Indian Postal Service on or before the date and time mentioned below. It is to be noted that technical quotation should not contain any commercial aspect otherwise the offer will be rejected.

Shri. Akhilesh Kumar, Scientific Officer 'D' Powder Metallurgy Division, BARC Vashi Complex, Navi Mumbai - 400703	On or before: 08/02/2022
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कार्य का दायरा इसके साथ संलग्न है। निविदा कर्ता को शब्दों के साथ-साथ आंकड़ों में भी लिखना चाहिए, उसके द्वारा उद्धृत दर। सभी सुधारों को निविदाकर्ता की दिनांकित आदतों द्वारा सत्यापित किया जाना चाहिए।

The scope of work is enclosed herewith. The tenderer should write in words as well as in figures, the rate quoted by him. All corrections must be attested by the dated initials of the tenderer. The tenderer must furnish PAN no. and GST no. Any correction must be attested by dated initials of tenderer.

निविदाकर्ता को यह ध्यान देना चाहिए कि यदि उसे काम दिया जाता है, तो उसे BARC / BRIT कॉम्प्लेक्स, नवी मुंबई के अंदर काम के लिए कर्मचारियों के लिए पुलिस सत्यापन प्रमाण पत्र प्रस्तुत करना होगा।

The tenderer should note that if he / she is given work, he / she will have to produce Police Verification Certificate for the employees for work inside the BARC / BRIT Complex, Navi Mumbai.

लागू होने पर आयकर @ 2% , GST TDS @2% और आयकर पर अधिभार बिल से काटा जाएगा। भुगतान हमारे लेखा प्रभाग द्वारा संतोषजनक ढंग से काम पूरा होने तथा बिल के उत्पादन पर, अग्रिम मुहर लगी रसीद और सामग्री की गुणवत्ता और कारीगरी के लिए गारंटी / वारंटी प्रमाण पत्र काम के पूरा होने की तारीख से एक वर्ष की अवधि के लिए वैध पर ही किया जाएगा। इस निर्माण से संबंधित किसी भी प्रकार के स्पष्टीकरण के लिए पार्टी श्री अखिलेश कुमार (27887667) / डॉ. Amit Sinha (2788-7145) से कार्यालय समय के दौरान (10.00 बजे से 17:00 बजे तक) बात कर सकते हैं।

Income-Tax @2%, GST TDS @2% and surcharge on income-tax as applicable shall be deducted from the bill. The payment shall be done by our Accounts Division only on completion of the work satisfactorily and on production of bill, advance stamped receipt, ITR undertaking with acknowledgement for last two years and guarantee/warranty certificate for material quality and workmanship for a period of one year from the date of completion of the job. For any clarification the party may contact Shri Akhilesh Kumar (022- 27887667) during office hours (10.00 hr to 17:00 Hr).

काम के पूरा होने का समय ६० दिन है। कार्य आदेश जारी करने की तारीख से समान किया जाएगा। निविदा की स्वीकृति बिना किसी कारण बताए पूर्ण या भाग में निविदा को अस्वीकार करने के अधिकार के साथ अधोहस्ताक्षरी पर टिकी हुई है।

The time for completion of work/job is **60 days**. The same shall be reckoned from the date of issue of work order. The acceptance of the tender rests upon the undersigned with a right to reject the tender in full or part without assigning any reason.

अखिलेश कुमार /Akhilesh Kumar
वैज्ञानिक अधिकारी 'डी'/Scientific Officer 'D'

ANNEXURE -A1

Fabrication, supply and installation of dew point, relative humidity and temperature measuring stations with display unit and transmitter for high humidity application– 01 Job

The system shall be capable of sensing and displaying dew point, relative humidity and temperature in a process line where steam + a mixture of carrier gases are the working media. The system shall be able to measure in high humidity environment as well as shall be able to measure rapid changes in humidity with low hysteresis. As the relative humidity of the system can be very high up to >90 % RH, the system must have probe heating arrangement to prevent condensation on the probe head

Scope of work

A. Fabrication and Supply of Dew point Sensors: 06 Nos.

1. The sensor shall be capable of measurement in high humidity application with humidity range Zero to 100% RH
2. Output Parameters: Relative humidity, temperature, dew point temperature, wet-bulb temperature, absolute humidity, mixing ratio, water concentration, water mass fraction, water vapor pressure, enthalpy
3. Sensing technology: Thin film capacitive sensing
4. Measuring Environment: Air, Hydrogen, Nitrogen, Argon, Helium, Oxygen and vacuum
5. Condensation prevention: Must have probe heating and sensor warming technology to prevent condensation on probe.
(Whole probe head heating above dew point, not only sensor).
By setting temperature compensation obtained from a separate temperature probe, humidity at process temperature shall be measured, while avoiding condensation on probe.
6. Accuracy at +23 °C: $\pm 0.8\%$ RH (0 to 90% RH)
7. Probe diameter: 12 mm
8. Probe length: <40 mm

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| 9. T63 response time: | <15 seconds |
| 10. Connector: | M12 5-pin A-coded male |
| 11. Probe material: | AISI 316L |
| 12. Probe body: | AISI 316L |
| 13. Cable jacket: | Fluorinated Ethylene Propylene (FEP) |
| 14. Operating Voltage: | 18-30 VDC |
| 15. Current consumption: | 10 mA typical |
| 16. Digital output: | RS-485, non-isolated |
| 17. Protocols: | Modbus RTU |
| 18. Temperature sensor: | PT100, RTD class F0.1, IEC60751 compatible |
| 19. Temperature measurement range: | -70 to +180 °C |
| 20. Accuracy at 23 °C: | ±0.1°C |
| 21. Operating pressure: | <10 bar |
| 22. Traceability calibration certificate: | 06 points for humidity and 1 point for temperature |
| 23. Construction: | IP 66 with Vapor and pressure proof construction |
| 24. Weight: | <350 grams |
| 25. Sensor purge provision for superior chemical resistance | |

B. Fabrication and Supply of temperature probes: 06 Nos

1. By running this probe in parallel with the dew point probe, it should be possible to measure relative humidity in actual process temperature while using probe heating in the relative humidity probe (above dew point temperature). The relative humidity shall be back calculated based on the true process temperature measurement from This temperature probe.
2. Temperature accuracy at + 23 °C: ±0.1°C
3. Temperature measurement accuracy: -70 to 180 °C
4. Sensor: PT100 RTD class F0.1 IEC 60751
5. Probe Body : IP66
6. Probe head and cable: IPX8/IPX9
7. Operating voltage: 15-30VDC
8. Current consumption: 10 mA typical

9. Digital Output:	RS-485, non-isolated
10. Protocols:	Modbus RTU
11. Output Parameter:	Temperature (°C) and Water vapour saturation pressure
12. Connector:	M12 5-Pin A-code male
13. Weight:	<250 grams
14. Probe material:	AISI 316L
15. Probe body:	AISI 316L
16. Cable Jacket:	Fluorinated Ethylene Propylene (FEP)

C. Fabrication and supply of Transmitter with display and power supply module: 06 Nos

- The transmitter with display shall be compatible with the dew point and temperature sensor.
- Each transmitter shall be able to function and control 02 dewpoint sensors at a time.
- Any output parameter from the probe can be assigned to control the analog channels and relays
- No. of outputs: 04 configurable galvanically isolated analog outputs (configurable to mA or V)
- Selectable voltage output types: 0 to 1 V, 0 to 5V, 0 to 10V scalable
- Selectable Current output types: 4 to 20 mA, 0 to 20 mA scalable
- Accuracy of analogue outputs at 20 °C: ± 0.05 % Full scale
- Temperature dependence: ± 0.005 % /°C (full scale)
- No. of configuration relays: 02 pcs, SPDT
- Maximum switching power, current, voltage: 30W, 1A, 40VDC/ 28VAC
- Max wire size: 16 AWG
- Ethernet connector: 8P8C (RJ45)
- Ethernet supported standards: 10BASE-T, 100BASE-TX
- Supported protocols: Modbus TCP/IP, HTTPS
- AC Mains: 100-240 VAC, 50/60 Hz, Max current 1A, Fuse: 10A
- IP Rating: IP 66

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| 17. Enclosure: | Corrosion resistant AISi10Mg |
| 18. Display: | Touchscreen display made of chemically strengthened glass IK08 |
| 19. Mounting option: | Wall, DIN Rail or pole mounting |
| 20. Weight: | <1.5 Kg |
| 21. Dimensions (mm): | L<200, W< 150, Depth <80 |
| 22. Operating Temperature: | -20 to +55 °C |
| 23. Operating humidity: | 0 to 100 % RH |
| 24. The probes shall be easily detachable from the transmitter for maintenance and calibration. | |
| 25. The probes shall be connected with expandable cables up to 10 meters | |

D. Integration of the dew point and temperature measuring system in to existing ¼" process line

1. The supplier shall interface the dew point sensor and temperature probe with the transmitter for displaying dew point and process temperature as output
2. Necessary interfacing to ensure continuous display of the output values i.e. dew point and process temperature even during the time of probe heating
3. Installation of PC based software for configuring the transmitter and extract other output parameter from the sensor if needed
4. Mounting the probes and transmitters on existing ¼" steam+ carrier gas mixture line in such a way to ensure there is no leakage at point of probe insertion
5. Any accessory needed to mount the sensors on the ¼" line shall be supplied by the vendor

Important Notes:

1. The tender would be two-part tender with separate technical bid and commercial bid. Technical bids would be opened first and if any vendors fail to qualify technical bid, his price bid would not be opened
2. Individual items cannot be quoted and bids for part tender would be rejected.
3. Point wise compliance report as well as any deviation must be submitted in technical bid against each item and its specifications.
4. Quotation can be rejected on technical ground for failing to match any of the specifications.
5. L1 would be chosen from the vendors who successfully qualify the technical bid.

6. All fittings and related materials for integrating the dewpoint measuring system in to an existing ¼" line shall be provided by the vendor.
7. All the fitting related works will be carried out at PMD, Vashi complex.
8. Party may also note that the staff to be employed for execution of work at site should have valid police verification certificate (PVC).
9. A warrantee certificate for **a period of one year** should be submitted on completion of the work.
10. Payment shall be made only on satisfactorily completion of work and on submission of bills (in triplicate) addressed to Accounts Officer, BARC, Trombay sent to the undersigned
11. The work shall be completed within **60 days** after issue of Work order.
12. **No free issue material will be provided.**
13. For any query party may contact Akhilesh Kumar, Scientific Officer/D on 022 2788 7667 (kakhilesh@barc.gov.in)