

**Indian Institute of Technology, Kanpur**  
**Civil Engineering Department**

**Request for Proposal**

The Director, Indian Institute of Technology Kanpur (IITK) invites proposal in single bid (technical & financial) format from reputed firms as follows: -

Sl. No.	Name of Work	Bid Security	Last Date and Time for submission of tender	Date and Time for opening of Technical Bid
1.	Supply, testing, inspection, packaging, transportation and delivery of Pressure Transmitters and Differential Pressure Transmitters as per Technical Specification covered in Part-1 and Terms and Conditions covered in Part-2 of this tender document for National Aerosol Facility at IIT, Kanpur	Rs. 25,000	16.04.2018 upto 1700 Hrs.	17.04.2018 at 1500 Hrs.

The firms with at least three years relevant experience in above said work are eligible to participate. The proposal duly completed in all respect should be submitted in sealed cover duly marked, so as to reach undersigned on or before 1700hrs on 16.04.18. The tender document with eligibility criteria and other details may be downloaded from [www.iitk.ac.in](http://www.iitk.ac.in). The Institute reserves the right to accept or reject any offer or all the offers without assigning any reasons thereto.

**No. CE/NAF/2017-18/0275, dated: 26.03.2018**

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**NATIONAL AEROSOL FACILITY**

**TECHNICAL SPECIFICATION  
FOR  
PRESSURE TRANSMITTERS**

**PART-1A**

**SPECIFICATIONS FOR  
ELECTRONIC SMART PRESSURE TRANSMITTERS**

**TABLE-1**

Sl. No.	Range	Qty
1	0- 10 kg/cm <sup>2</sup>	30 nos.
2.	Calibration certificates along with Instruction & maintenance manual	30 Sets

The electronic smart pressure transmitters with digital sensor technology are required for pressure measurement in high temperature high pressure facility. Transmitters shall be HART compatible. Type of sensor shall be preferably micro machined silicon sensor having excellent immunity to pressure and temperature changes.

**1.0 FUNCTIONAL SPECIFICATIONS :**

- 1.1 Process fluid : DM water/steam/Ar/He/Air
- 1.2 Range of transmitter : as mentioned in **TABLE-1.**
- 1.3 Over pressure limit : 1.5 times the mentioned range in Table-1
- 1.4 Output : 4 - 20 mA DC
- 1.5 Power supply : 32 V DC maximum and a maximum load of 800 ohms.
- 1.6 Span adjustment : Required with at least 4:1 turndown ratio or better.
- 1.7 Zero Suppression & Elevation : (-100%) to (+100%) of URL
- 1.8 Temperature Limits:
  - 1.8.1 Sensing element : 0 to 120 Deg C. (The sensor should be temperature compensated to ensure minimal drift with ambient and process temperature changes)
  - 1.8.2 Ambient : 0 to 50 deg. C (Compensated)
- 1.9 Humidity : Up to 95% RH
- 1.10 Damping arrangement : Required

**2.0 PERFORMANCE SPECIFICATIONS :**

- 2.1 Accuracy : +/-0.1% of calibrated span. (Inclusive of non-linearity, hysteresis and repeatability)

- 2.2 Stability : +/- 0.25% of calibrated span over a period of 12 months.
- 2.3 Power supply effect : Less than +/-0.01% of calibrated span per volt
- 2.4 Ambient temperature Effect : Less than 0.02 % / deg. C. (Expressed as total effect which includes zero and span effect)
- 2.5 Over pressure effect : For 150% over pressure, zero shift should be less than +/-0.2% of upper range limit.
- 2.6 Time Response : Less than 200 ms time constant (63.2% response to a step change in pressure).

3.0 PHYSICAL SPECIFICATIONS :

3.1 Materials of construction:

- a) Sensing diaphragm and all the wetted parts : 316 S.S.
- b) Pressure connection : 1/2 inch NPT female threaded standard connection.

3.2 Mounting arrangement : Suitable for 2 inches pipe.

3.3 Built-in Indicator : LCD indicator

4.0 INSPECTION:

Inspection of the transmitters shall be carried out by the purchaser's representative at the supplier's factory before dispatch. The calibration certificate shall be approved by the inspector, after witnessing the test. This includes the tests for all the requirements mentioned in the above specifications. i.e.

- 1) Calibration check
- 2) Span & Zero adjustability
- 3) Rangeability
- 4) Over pressure test
- 5) Power supply effect
- 6) Ambient temperature effect
- 7) Time response test

**NATIONAL AEROSOL FACILITY**

**TECHNICAL SPECIFICATION  
FOR  
DIFFERENTIAL PRESSURE TRANSMITTERS**

**PART-1B**

## Technical Specifications for Smart Electronic Differential Pressure Transmitters

TABLE-1

Sl. No.	Range	Qty
1	0 – 1250 mm WC	2 nos.
2.	0 – 10000 mm WC	10 nos
3..	Calibration certificates along with Instruction & maintenance manual	12 Sets
4.	Universal HART Communicator for Calibration	1 No

### 1.0 General

These Smart electronic pressure/differential pressure transmitters shall be two-wire, **Smart type** having good accuracy and advanced communication features. Single crystal silicon resonant sensor shall be preferred. Its highly accurate and stable sensor can also measure the static pressure which can be shown on LCD indicator. Each transmitter shall be supplied with integral LCD display, mounting accessories, integral three-valve manifold and operation & maintenance manual. 1 nos. of Hand held terminals required for HART calibration shall be in the scope of the supplier.

### 2.0 Functional specifications

- 2.1 Process fluid : Water/Steam/Air/He/Air
- 2.2 Calibration range : as per Table-1
- 2.3 Over range limit : 1.5 times the maximum range.
- 2.4 Turndown ratio : 100: 1.
- 2.5 Output : Two wire 4 - 20 mA DC
- 2.6 Digital communication : HART
- 2.7 Power supply : 24 V –32 Volts DC with maximum load of 600 ohms.
- 2.8 Output current limit : Over scale  $\geq 20.5$  mA  
Under scale  $\leq 3.8$  mA
- 2.9 Span and zero : Span and zero shall be continuously adjustable. Zero elevation /suppression shall be  $-100\%$  to  $+100\%$  of URL.

- 2.10 Maximum permissible process temperature: 120 Deg. C
- 2.11 Damping : 0.2 sec. or better, adjustable damping, bidder to specify the range.
- 2.12 Built-in display : 5 digit LCD meter with user definable display modes.

### **3.0 Performance specifications**

- 3.1 Accuracy : +/- 0.075 % of span (including linearity, hysteresis and repeatability).  
This shall be applicable for calibrated span  $\geq$  1/10 of URL.
- 3.2 Stability : +/- 0.1 % of upper Range Limit (URL) over a period of 36 months.
- 3.3 Static pressure effect : Zero shift +/- 0.1% of URL per 100 bar.
- 3.4 Over range effect : Zero shift -  $\leq$  +/- 0.1% of URL per 100 bar.
- 3.5 Mounting effect : For +/- 10 degree tilt from a reference position of transmitter should not cause noticeable change in output.
- 3.6 Power supply effect : Less than +/- 0.005% per volt of the calibrated span.
- 3.7 Ambient temperature effect: 0.02% of span per deg. C (includes both zero and span error)
- 3.8 Response Time : 90 msec.

### **4.0 Ambient Conditions**

- 4.1 Ambient temperature : 60 deg.C maximum.
- 4.2 Humidity : Up to 95% RH

### **5.0 Physical specifications**

- 5.1 Materials of construction & Sensing diaphragm: Stainless Steel 316
- 5.2 Electronics housing: Die cast Aluminum.
- 5.3 Environmental protection: IP 65
- 5.4 Mounting accessories: Required for 50 mm NB vertical or horizontal pipe mounting.
- 5.5 Integral three valve manifold: Required (made of Stainless Steel 316) with 1/2" NPT (F) process connection.

### **6.0 INSPECTION**

**Predeparture Inspection/Test** will be carried out by the purchaser's representative and shipping release will be issued only after obtaining satisfactory results of the following Tests.

- a) Calibration check
- b) Span & Zero adjustability
- c) Turn down ratio
- d) Over range effect
- e) Static pressure effect
- f) Power supply effect
- g) Ambient temperature effect
- h) Three valve manifold leakage test

Tests such as Calibration check, Span & Zero adjustability, Turn Down ratio and three-valve manifold leakage test will be carried out for all transmitters. Other tests i.e. over range effect, Static pressure effect, Power supply effect and ambient temperature effect will be carried out on any five randomly selected differential pressure transmitter for each range.

The tests shall be arranged by the supplier. The test equipment, standard instruments and the calibration agency shall be subjected to the approval of the purchaser.



# **National Aerosol Facility**

## **Terms & Conditions (General & Financial)**

### **PART-2**

## **General terms and conditions:**

1. The Bidder shall bear all costs associated with the preparation and submission of its bid, and in any case IIT, Kanpur (IITK) will not be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
2. It is in the bidder's interest to visit the site and understand the local conditions. IITK shall not be held responsible for any cost implications because of local conditions or for bidder not visiting site.
3. The bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the Bidder and IITK shall be written in English language.
4. Bidder is advised to submit the technical and price bid in a sealed envelope. Both the documents will be opened at the same time.
5. The bid and all attached documents should be signed by the bidder as a token of acceptance.
6. IITK has to finalize its purchase within a limited time schedule. Therefore, it may not be feasible for IITK to seek clarifications in respect of incomplete offers. Prospective bidders are advised to ensure that their bids are complete in all respects and fulfil IITK's terms, conditions and bid evaluation criteria of the tender. Bids not complying with IITK's requirement may be rejected without seeking any clarification.
7. Bidder has to sign a **Non-Disclosure Agreement** with IITK. Any technical document, drawings in the form of soft or hard copy shall not be disclosed to anybody outside the working team. All the hard copies shall be destroyed immediately after the use.
8. The bidder should **submit a declaration** to the effect that neither the bidder themselves, nor any of its allied concerns, partners or associates or directors or proprietors involved in any capacity, are currently serving any banning orders issued by IITK debarring them from carrying on business dealings with IITK.
9. Bidders should quote prices in Indian rupee only. Prices quoted in any other currency shall not be considered.
10. The **Bid shall be valid for acceptance for the period of 90 Days** and shall not be withdrawn on or after the opening of bids till the expiration of the validity period or any extension agreed thereof.
11. **The earliest period by which the job can be executed in total should be clearly stated in the quotation and such period should be strictly adhered to in the event of a work-order.**
12. Bids qualified by vague and indefinite expressions such as "Subject to availability" etc. will not be considered.
13. The bid along with all technical details, appendices and copies of documents should be submitted to IITK. The Technical bid shall contain all details required as per the specifications.
14. In case the bidder needs to clarify and/or understand the full scope of his work before submitting the quotation, he may do so by taking prior appointment or by writing email to **Prof. S. N. Tripathi, CE Dept., IIT Kanpur** (e-mail id [snt@iitk.ac.in](mailto:snt@iitk.ac.in)). The Client will respond by email to such requests and copies of the response (including an

explanation of query but without identifying the source of enquiry) will be sent to all invited bidders who intend to submit the proposal, and also posted at Tenders link of IITK website (if found necessary).

15. The successful bidder shall be responsible for the correctness and accuracy of the drawings, documents and reports prepared by him. Approval of the drawings and documents by IITK/their representative shall not relieve him of his responsibility for correctness and accuracy of such drawings and documents. No compensation or extra payment shall be made by IITK for any correction or changes made in the execution work.
16. Bidders should ensure that they qualify for all the items of the assignment. The bidders shall have experience and expertise in the scope of work as detailed in this tender.
17. Bidder must have at least three similar jobs executed, and the name of the organization for which the works were carried out should be furnished with the Bid. Copy of Completion Certificate may be furnished.
18. The acceptance of bids will rest with Director, IITK who does not bind himself to accept the lowest bid and reserves to himself the authority to reject any or all the bids received without assignment of any reason. Also, Director, IITK reserves to himself the right to accept the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

**Commercial terms & conditions:**

1. The bids will be evaluated on the basis of technical suitability and financial quotation.
2. Technical and price bids should be submitted in a single sealed envelope along with all the relevant details and documents. The reference of our enquiry should be clearly written on the top of the envelope. The bid should be addressed to **Prof. S. N. Tripathi**, Department of Civil Engineering, IITKanpur, Kanpur-208016 and should reach IIT Kanpur on **or before the due date as mentioned in the cover page.**
3. Price bids should clearly mention the detailed price break-up of scope of work as given in Part-I of tender and taxes separately for supply and installation jobs. **If the tax value differs for different items, these shall be mentioned separately.**
4. Technical evaluation will be based on the criteria detailed in the General Terms and Conditions and the scope of work as given in Technical Specifications. If required, evaluation of the bidder's resources would be undertaken by the client by visiting the bidder's premises.
5. IITK is partially/fully exempted from payment of customs/excise duty, if applicable. As the above statutory provisions are frequently reviewed by the Govt., the bidders are advised to check the latest position in their own interest and IITK will not bear any responsibility for any incorrect assessment of the statutory levies by any bidder.

6. Government of India's guidelines on **GST** shall be complied.
7. The Bid Security is required to protect the IITK against the risk of Bidder's conduct which would warrant the security's forfeiture. **The value of bid security is mentioned in the cover page.**
8. Central Government Departments and Central Public Sector Undertakings are exempted from payment of Bid Security. MSEs units (and not their dealers/distributors) who are themselves manufacturer of the items/ provider of services, they intend to quote which are themselves registered with District Industry Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or any other body specified by Ministry of MSME are also exempted from payment of Bid Security irrespective of monetary limit mentioned in their registration certificate provided they are registered for the Services they intend to quote.
9. The Bid Security shall be acceptable in the following form: Bank Draft in favour of '**REGISTRAR, IIT Kanpur**', payable at Kanpur.
10. The bidders shall submit Bank draft / Bank Guarantee from any scheduled bank incorporated in India.
11. The Bid Security shall be forfeited by IITK in the following events:
  - 11.1. If Bid is withdrawn during the validity period or any extension thereof duly agreed by the Bidder.
  - 11.2. If Bid is varied or modified in a manner not acceptable to IITK during the validity period or any extension of the validity duly agreed by the Bidder.
  - 11.3. If a Bidder, having been notified of the acceptance of its bid, fails to furnish **Performance Bank Guarantee (PBG)** within 30 days of notification of such acceptance.
  - 11.4. In case at any stage of tendering process, it is established that bidder has submitted forged documents/certificates/information towards fulfilment of any of the tender/contract conditions.
12. The Bid Security of unsuccessful Bidders will be returned after finalization of the bid.
13. The Bid Security of successful bidder will be returned on receipt of **Performance Bank Guarantee (PBG)**. **The validity of PBG would cover the period starting from the acceptance of the contract to the end of the warranty period.**
14. If the contract is awarded, the bidder shall furnish the **Performance Bank Guarantee (PBG) for the value of 10% of the overall cost (excluding taxes) to IIT, Kanpur.**

This PBG will be released after the guarantee period is over by IITK based on the satisfactory performance of supplied system/item.

15. **80% funds (installation and commissioning cost excluded) may be released** after delivery of items and balance **20% on completion of the scope of work**. All the payments for installation & commissioning will be paid **only at the completion of the job**.
16. IITK shall make payments only through Electronic Payment mechanism (viz. NEFT/RTGS/ECS). A successful Bidder should invariably provide the required bank details as and when required by IITK.

**General Notes to Bidder/Supplier:**

1. **Pre-dispatch inspection at supplier's factory is needed. Post supply inspection is not permitted.**
2. The facility for pre-dispatch inspection / testing for the indented item shall be available with the supplier. Inspection of all the items ordered shall be carried out in presence of purchaser's representative at the supplier's factory. The inspector shall approve the test results, after witnessing the test. This includes the tests for all the requirements mentioned in the indent specifications. Supplier shall provide all the inspection, testing facilities and test reports.
3. Shipping clearance will be issued only after the satisfactory test results.
4. All the relevant catalogues, manufacturer's test certificates in standard format and Operation & Maintenance Manual shall be submitted along with the material.
5. The material shall conform strictly to the relevant specifications and standards.
6. The supplier shall submit a certificate for guarantee of the material/service against any defects **for 18 months from the date of supply.**
7. The material shall be properly packed to avoid damage of any kind during transit. IITK is not responsible for any damage during transit. The safe door delivery at IITK is in the scope of supplier.
8. All the work mentioned in the tender document shall be executed at **National Aerosol Facility (NAF), IIT-Kanpur, Kanpur-208016, UP.**