



**NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA-769008 (ODISHA)**

An Institute of National Importance under Ministry of HRD, GOI

NOTICE INVITING TENDER

Tender Notification No: NITR/PW/CR/2020/205

Dated: 09/11/2020

The National Institute of Technology, Rourkela invites bids from the eligible bidders for procurement and installation of **BET surface area and pore size analyzer** at NIT Rourkela.

Last date of Submission of Bid : **10/12/2020 by 11:00 AM**

Date of opening of techno-commercial Bid: **11/12/2020 at 11:00 AM**

For Details:

https://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx

Contact: Prof. S.K. Pratihar, CR;

Ph: +91-661-2462206; 9437391103

Email: skpratihar@nitrkl.ac.in

Bidding through: <https://eprocure.gov.in/eprocure/app>

**Sd/-
REGISTRAR**



**NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA-769008, ODISHA**

(OPEN TENDER NOTICE NO.: NITR/PW/CR/2020/205

Dated: 09/11/2020)

Procurement of BET Surface area and Pore size analyzer

Item No	Description	Quantity
1	BET Surface area and pore size analyser (Complete system with accessories and spares as mentioned in Annexure I)	01 Unit

1. Quantity required: **As mentioned above (All information regarding technical specification provided in the Annexure-I)**
2. Delivery : Within **90 days** from the date of purchase order
3. **Last Date of submission of bid : 10/12/2020 by 11:00 AM**
4. **Date of opening of techno-commercial bid: 11/12/2020 at 11:00 AM**
5. The firm should not have been black listed at any time.
6. The submission of following bids by the tenderer should be through <https://eprocure.gov.in/eprocure/app> Please follow the guidelines as per the portal.

BET Surface area and pore size analyzer
(Tender Notice No.: NITR/PW/CR/2020/205 Dated: 09/11/2020)
Due on 10/12/2020 by 11:00 AM

7. **Liquidated damage clause** will be charged for any delay in supply of goods.
8. The validity of the tender shall be **120 days** from the date of opening of the bids.
9. Detailed advertisement including all tender documents is also available in our website at http://nitrkl.ac.in/OldWebsite/Jobs_Tenders/9Equipment/Default.aspx
10. NIT reserves the right to qualify or deny prequalification of any or all applicants without assigning any reasons.

(REGISTRAR)
NIT, Rourkela
Fax No- 0661-2462022
Ph. No -0661-2462021

TENDER SPECIFICATIONS OF BET SURFACE AREA AND PORE SIZE ANALYZER

Automatic BET surface area and a Pore size analyzer

- Fully automatic, high-resolution gas sorption analyzer for the determination surface area, mesopore and micropore size and its distributions from 0.35 to 500 nm is required for high throughput micropore BET Measurements
- The system should handle samples in the form of powder, pellets, etc.
- The system should have the provision for up-gradation for chemisorption at a later date on site.

Key features:

- The system should have continuous P_o measurements using a dedicated P_o cell and transducer without interruption of analysis. P_o cell will be of the same material as that of the sample holder.
- Fully integrated, built-in vacuum system using an oil-free turbo pump package backed by a mechanical pump.
- **The system should have a minimum of 2 number of Micropore analysis stations with in build/external 4 or more number of degassing stations.**
- The system should be able to use any non-corrosive gas such as nitrogen, argon, krypton, carbon dioxide, hydrogen, carbon monoxide, butane, etc.
- Each sample analysis station manifold should be equipped with a minimum of four pressure transducers: three for analysis 1000, 10, 0.1 mm Hg, and an independent P_o transducer with 1000 torr.
- Each sample station works independently and or simultaneously, thus the instrument can perform sorption experiments on different samples at the same time.

Techniques and Reports:

- System software should display and interpret data in various methods, including,
- Single or Multi-point BET Surface area
- Adsorption and Desorption isotherms
- Langmuir surface area
- External Surface area (Statistical Thickness Method)
- BJH Pore Size Analysis
- t-Plot
- HK Pore Size Analysis
- SF Pore Size Analysis

- DFT method
- Average pore size, total pore volume

Basic Measurement Specifications:

- a) Surface area using nitrogen: 0.01 m²/g and above
- b) Maximum P/P₀ using nitrogen/argon: 10⁻⁷ – 0.998

Pressure Specifications of the Analyzer:

- Accuracy 1 to 1000 torr range: ~ ± 0.20% FS or better
- Minimum and max. P/P₀ using nitrogen/argon: 10⁻⁷ – 0.998
- Ultimate vacuum: ~ 7x10⁻¹² mmHg

Analysis Features:

- a. A High-vacuum construction using metal-to-metal seals is expected for long-life performance
- b. Small void volumes
- c. Provision to constantly monitor the measurement of manifold temperature and pressure.
- d. Multiple dosing modes using a target P/P₀ or fixed volumes in multiple ranges.
- e. Measurement void volume automatically or re-use value already measured
- f. Measurement of saturation pressure constantly or user entered.
- g. At least 3 litres or larger Dewar to extend uninterrupted analysis time to 72 + hours without a refill.
- h. The instrument should have a minimum of 5 number of gas input ports.

Degassing Features:

- a. The system should degas four or more samples simultaneously.
- b. Degassing should be able to program for multiple heating ramps and hold times
- c. The system should have programmable evacuation to avoid elutriation.
- d. The system should have smart degassing to monitor pressure and pause heating if requested.
- e. The smart degassing should be able to automatically terminate heating according to a programmable test.
- f. The system with automatic backfill from dedicated gas input or isolate under vacuum at the end of degassing.
- g. The Degassing protocols should be able to be saved for later use.
- h. The Degassing protocols should be able to be stored along with analysis data.
- i. The Vacuum path should have a refillable cold trap for best degas vacuum levels.
- j. Heating mantles with dual, independent thermocouples for over-temperature safety.
- k. Max. Temp of Heating mantle ~ 350° C.

Power requirement: 200-240 V, 50Hz, single-phase power supply.

Essential Accessories to be supplied along with the system:

- a. 5 KVA UPS system with 30 min backup
- b. Compatible desktop computer (minimum i5 configuration) and b/w laser printer
- c. Sample cells (in different capacities): 5 each for powders, pellets, and granules.
- d. "O" rings & filler rods (6 sets and 4 sets, respectively).
- e. Suitable standards for micropore/mesopore range
- f. Gas Cylinders with 47 Liter with Two-stage SS gas regulators Gas cylinders (filled with ultra-purity gases, 99.999%) of Nitrogen, Helium, CO₂.
- g. Liquid Nitrogen Container (capacity 10 Lit): 2 Nos
- h. Multiple user license software must be provided.
