

**Minutes of the Pre bid meeting dated 19.07.2022 at 11.00 hours at BSIP,  
Lucknow**

A pre bid meeting committee was constituted by The Director BSIP to discuss the representations received from vendors in relation to Tender No. BSIP/TENDER/STORES & PURCHASE/2022-2023/ 01 for procurement of Three Instruments i.e. (a) Fully automatic isoperibol bomb calorimeter (02 Nos.), (b) Thermo gravimetric analyzer (TGA)- (02 Nos.), (c) CHNS-O Analyser (01 No.).

The committee meeting has been called on 19.07.2022 at 11.00 hours at BSIP, Lucknow and following members were present:

- 1- Dr. Runcie Paul Mathews, Scientist- 'D', BSIP , Lko. - Convener
- 2- Dr. Prasanna K.- Scientist- 'C', BSIP, Lko - Member
- 3- Dr. Divya K. Mishra – Scientist- 'B', BSIP, Lko - Member
- 4- Mr. Mishri Lal, Section Officer (S&P), BSIP, Lko. - Member

**Item No-1: Fully automatic isoperibol bomb calorimeter (02 Nos.):**

- i. M/S Orbit Technologies Pvt Ltd (Representing Parr Instruments) participated in pre bid meeting represented by Mr Raj Kumar Kashyap and there were no technical queries from M/S Orbit Technologies to BSIP , BSIP had communicated and clarified on the following items.
  1. Local supply (f) will be removed and item no 33 changed to –
    - (33) Previous installations: Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.  
Additional items added to the specifications
    - (35) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
    - (36) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
    - (37) Onsite training should be provided to at least 10 users at the time of installation
  2. Local Supplies amended to Local supplies and spares for each Instrument
    - (b) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.

(d) Compatible analytical balance with least count of minimum 0.1mg should be provided.

(e) Gas cylinders- Oxygen & Nitrogen (99.99%) with suitable regulator and filters.

ii. M/s Ultimate Analytics Pvt Ltd. (Representing IKA India Pvt Ltd) participated in pre bid meeting represented by Mr Mayank Gupta and the following queries and request were made by M/S Ultimate Analytics Pvt Ltd to BSIP ,

1. Requested to amend item no.1: In any of the ASTM/ISO/DIN – Nowhere True word used to Calorimeter – Only Adiabatic or Isoperibol is standard Method

**Response from BSIP:** Considered and amended in revised technical specifications

2. Requested to amend item no.4: As per ASTM E144 – Vessel is require to send for Pressure Testing after certain period/test where as Fixed Vessel not compliance ASTM E144

**Response from BSIP:** Considered and amended in revised technical specifications

3. Requested to amend item no.6: Now better Precision 0.05% available in market than in place of going with better RSD as 3rd party lab why chose 0.1% RSD

**Response from BSIP:** Not accepted

4. Clarification and request on item numbers 8,9, 10, 11: All points not clear and seem publish to give advantage to one brand/Model .

**Response from BSIP:** Not accepted. The analysis time per hour is specified considering the sample analytical load at BSIP.

5. Request on item numbers 16: Removable Bomb & Fixed Bucket is standard for all Calorimeter manufacturer to compliance ASTM E144

**Response from BSIP:** Considered and amended in revised technical specifications

6. Request on item numbers 17: Automatic Bomb Washing is proprietary feature of PARR 6400, Which require additional Nitrogen cylinder to use.

**Response from BSIP:** Considered and amended in revised technical specifications

7. Request on item numbers 18: We request please ask bidder to supply complete vessel in place of only Head/Cap of vessel. To compliance ASTM E144 its mandatory to send complete vessel/bomb for pressure test.

**Response from BSIP:** Considered and amended in revised technical specifications

8. Commercial Clarifications

(a) Automatic Bomb Calorimeter also available on GeM portal with compliance of “Make in India” policy.

**Response from BSIP:** The said equipment not available on Gem Portal as per required technical specification and also not possible to comparative chart for the finalization of price.

- (b) The Specification drafted in such way that only one manufacture “PARR Instrument – USA” qualify with Model 6400.

**Response from BSIP:** Speculative statement. The specifications are open for all the bidders.

9. BSIP had communicated and clarified on the following items.

(32).should be supplied with adequate spare bomb head/complete vessel

(33) Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.

(35) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.

(36) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order

(37)Onsite training should be provided to at least 10 users at the time of installation

#### Local supplies and spares for each Instrument

(b) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.

(d) Compatible analytical balance with least count of minimum 0.1mg should be provided.

(e) Gas cylinders- Oxygen & Nitrogen (99.99%) with suitable regulator and filters.

- iii. M/s LECO Instruments Pvt Ltd. participated in pre bid meeting represented by Mr Satish Kumar and the following queries and request were made by M/S LECO Instruments Pvt Ltd to BSIP ,

1. Change Item number 2. - Instrument: Fully Computer Controlled system calorimeter, with automatic oxygen filling, bucket filling, bomb washing is manually.

**Response from BSIP:** Considered and amended in revised technical specifications

2. Change Item Number 6. Precision:  $\leq 0.05$  % RSD. or better with benzoic acid as well as sample.

**Response from BSIP:** Not accepted

3. Change item number 14.: Water filling in to the Bucket as well as in to the Jacket should be Automatic/Manual .

**Response from BSIP:** Not accepted

4. Change Item number 15. Water draining after completion of analysis should be Automatic/Manually  
**Response from BSIP:** Not accepted
5. Change Item Number 16. Bomb & Bucket: Fixed Type Bomb & Bucket: Fixed Type/Removable type  
**Response from BSIP:** Considered and amended in revised technical specifications
6. Change the item number 22. Water handling System: Bomb Calorimeter should have inbuilt closed loop Water Handling system (measuring 2000ml by Burette) to re-circulate the water and to stabilize the instrument quickly.  
**Response from BSIP:** Not accepted for wider participation
7. Change item number 23. Memory Capacity: Calorimeter should have Unlimited data storage in PC or more, datalogging for jacket and bucket temperature  
**Response from BSIP:** Considered and amended in revised technical specifications
8. Change local supplies item (c) Suitable UPS for instrument  
**Response from BSIP:** Not Considered
9. Include :DEMOSNTRATION PRE/POST Tender can be taken  
**Response from BSIP:** Considered and amended in revised technical specifications
10. Include: At least 10 successful installations in coal analysis facility in last 2 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company  
**Response from BSIP:** Partially considered and amended in revised technical specifications
11. Commercial Clarifications
  - (a) Whether to quote in INR or in Foreign currency  
**Response from BSIP:** Imported Items may be quoted in foreign currency and Local supplies may be quoted in INR
12. BSIP had communicated and clarified on the following items.
  - (32) The instrument should be supplied with adequate spare bomb head/complete vessel
  - (33) Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.
  - (35) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
  - (36) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order

(37) Onsite training should be provided to at least 10 users at the time of installation

Local supplies and spares for each Instrument

(b) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.

(d) Compatible analytical balance with least count of minimum 0.1mg should be provided.

(e) Gas cylinders- Oxygen & Nitrogen (99.99%) with suitable regulator and filters.

**Item No-2: Thermo gravimetric analyzer (TGA) (02 Nos.)**

- i. M/s LECO Instruments Pvt Ltd. participated in pre bid meeting represented by Mr Satish Kumar and the following queries and request were made by M/S LECO Instruments Pvt Ltd to BSIP ,
  1. Change item number 1: Fully automatic Computer Controlled Thermo gravimetric analyzer with window-based system configurable for individual operators. Instrument should have single/dual Carousel system (One for Crucible and one for Cover) for Automatic/Manual placing and lifting of crucible covers as per ASTM 7582.  
**Response from BSIP:** Considered and amended in revised technical specifications
  2. Change item number 23. Instrument must provide a dedicated over temperature protection thermocouple for safety protection (Dual Thermocouple for crucible buoyancy calculation)  
**Response from BSIP:** Considered and amended in revised technical specifications
  3. Change item 27. Carousel and all heating parts should be made of high grade Ceramic material Carousel movement should be pneumatic and rotation should be both Clockwise & Anticlockwise. The carousel should be come with minimum 5 years of replacement guarantee.  
**Response from BSIP:** Partially considered and amended in revised technical specifications
  4. Include item: Suggested New Advance Feature System Should be capable of mobile accessibility for fast result reporting etc.(Minimum Four users)  
**Response from BSIP:** Not Considered
  5. Include :DEMOSNTRATION PRE/POST Tender can be taken  
**Response from BSIP:** Considered and amended in revised technical specifications

6. Include: At least 10 successful installations in coal analysis facility in last 2 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company

**Response from BSIP:** Partially considered and amended in revised technical specifications

7. BSIP had communicated and clarified on the following items.
- (36). Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.
- (38) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
- (39) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
- (40) Onsite training should be provided to at least 10 users at the time of installation

Local supplies and spares for each Instrument

(a) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.

(h) Item (h) previously mentioned stands removed

(p) Included variable necessary CRM standards

- ii. M/s Verder Scientific Pvt Ltd. participated in pre bid meeting represented by Mr Lalit Chauhan and there were no technical queries from M/S Verder Scientific Pvt Ltd. to BSIP ,and the following requests were made

1. Remove item f and h in local supplies

**Response from BSIP:** Partially considered and amended in revised technical specifications

2. Commercial Clarifications

(a) Whether to quote in INR or in Foreign currency

**Response from BSIP:** Imported Items may be quoted in foreign currency and Local supplies may be quoted in INR

(b) Validity of the tender weather it is 120 days or upto march 2023

**Response from BSIP:** March 2023 was included to specify the financial year

(c) Format for EMD exemption declaration for MSEs registered firms:

**Response from BSIP:** Declaration format may submit as per rules 170 GFR 2017

3. BSIP had communicated and clarified on the following items.
  - (36). Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.
  - (38) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
  - (39) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
  - (40) Onsite training should be provided to at least 10 users at the time of installation

Local supplies and spares for each Instrument

- (a) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
- (h) Item (h) previously mentioned stands removed
- (p) Included variable necessary CRM standards

**Item No-3: CHNS-O Analyser (01 No.)**

- i. M/s LECO Instruments Pvt Ltd. participated in pre bid meeting represented by Mr Satish Kumar and the following queries and request were made by M/S LECO Instruments Pvt Ltd to BSIP ,
  1. Change title to Fully Automatic Computer controlled MACRO rapid determination of Carbon, Hydrogen, Nitrogen, Sulphur and Oxygen Analysis by Differential method in diversified Coal and Coke samples.  
**Response from BSIP:** Partially considered and amended in revised technical specifications
  2. Change to Fully Automatic Computer controlled rapid determination of Carbon, Hydrogen, Nitrogen, & Sulphur and Oxygen Analysis via Differential method for Macro samples of coal , coke etc.  
**Response from BSIP:** Partially considered and amended in revised technical specifications
  3. Include. The analysis method must comply fully with ASTM D5373 ,ASTM D3176 & ASTM5016 and ASTM D4239(Part1&2) for Coal and Coke Analysis.  
**Response from BSIP:** Partially considered and amended in revised technical specifications

4. Change to The system should have two totally Independent furnaces( Vertical & Horizontal)Furnace  
Facility should be there to use the same furnace for solid / liquid samples as per the application requirement.  
The Furnace should have warranty of 12 years under standard operating conditions  
**Response from BSIP:** Partially considered and amended in revised technical specifications
5. Change to Separation: Suitable column or equivalent Combustion technique.  
**Response from BSIP:** Considered and amended in revised technical specifications
6. Change to :  
Detectors:  
System should use Three Independent detectors (IR for C,H,S) and TCD for N.  
- 10 year warranty under standard operating conditions.  
Automation of Furnace: Automated switchover (computer controlled) from the left channel (furnace) to the right channel (furnace) or vice-versa. No manual intervention should be needed  
**Response from BSIP:** Partially considered and amended in revised technical specifications
7. Change to. Sample Size: MACRO  
50.0 Mg to 1000 Mg or more depending upon sample nature. Provision for direct Injection of Liquid Samples for high sensitivity. The system must be able to operate one or more elements such as N, C, H, S .  
**Response from BSIP:** Partially considered and amended in revised technical specifications
8. Change to: Suitable balance made by Mettler or sartorius for macro sample analysis  
**Response from BSIP:** Partially considered and amended in revised technical specifications
9. Change. Consumables: Consumables needed for 5000 sample analyses should be included in the offer and two year spares part included.  
**Response from BSIP:** Considered and amended in revised technical specifications
10. Include: In Macro system Oxygen analysis by Differential method with CHN&S analyser for globally for accurate result.  
**Response from BSIP:** Not Considered
11. Include: DEMONSTRATION PRE/POST Tender can be taken  
**Response from BSIP:** Considered and amended in revised technical specifications
12. Include: At least 10 successful installations in coal analysis facility in last 5 years of the quoted model and has to submit performance certificate for



the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company

13. **Response from BSIP:** Partially Considered and amended in revised technical specifications
14. BSIP had communicated and clarified on the following items.

(10) Party should have at least 10 successful installations in coal analysis facility of the quoted model in the past 3 years and has to submit performance certificate or installation reports for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.

(11) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.

(12) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order

(13) Onsite training should be provided to at least 10 users at the time of installation

#### Local Supply:

- a) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window 11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
  - b) Gas cylinders (99.999% purity, 47 litre capacity): Argon (if needed), Helium, Oxygen with applicable regulators
  - c) UPS of 5 KVA capacity with 3 Hours back up.
  - d) Consumables: All the Spares for two years and Consumables including catalysts needed for 5000 sample analyses should be included in the offer.
  - e) Warranty: 3 years comprehensive warranty
  - f) Local on call availability of service support
- ii.** M/s Elementar India Pvt Ltd. participated in pre bid meeting represented by Mr Alok Pandey and the following queries and request were made by M/S Elementar India Pvt Ltd to BSIP ,
1. Change to. Fully Automatic Computer controlled rapid determination of Carbon, Hydrogen, Nitrogen, & Sulphur Analysis in coal/ coke/ biomass samples etc.  
**Response from BSIP:** Partially considered and amended in revised technical specifications
  2. Change to. Facility should be there for oxygen determination (by pyrolysis) & CHNS as per the application requirement  
**Response from BSIP:** Considered and amended in revised technical specifications

3. Change to Thermal Conductivity Detector /IR detector. add IR detector for analysing Trace Sulphur  
**Response from BSIP:** Considered and amended in revised technical specifications
4. Remove automation of furnace.  
**Response from BSIP:** Considered and amended in revised technical specifications
5. Remove: No manual intervention should be needed  
**Response from BSIP:** Considered and amended in revised technical specifications
6. Remove: Liquid samples: autosampler with 10 or more samples capability  
**Response from BSIP:** Considered and amended in revised technical specifications
7. Include analysis Range  
0 -  $\geq$  100mg Absolute  
0 -  $\geq$  15mg Absolute  
0 -  $\geq$  50mg Absolute  
0 -  $\geq$  15mg Absolute  
**Response from BSIP:** Considered and amended in revised technical specifications
8. Remove. Provision for direct injection of liquid samples for high sensitivity  
**Response from BSIP:** Considered and amended in revised technical specifications
9. Change to. The system must be able to operate one or more elements such as N, C, H, S and separate oxygen Mode (by pyrolysis) if requires  
**Response from BSIP:** Considered and amended in revised technical specifications
10. Remove. Facility to upgrade to isotopic Ratio Mass Spectrometer for Analysis of CHNS isotopes  
**Response from BSIP:** Considered and amended in revised technical specifications
11. Change to Semi – microbalance: branded semi micro balance capable of direct transferring the data to the analyser.  
Weighing Range 1.0 g  
Readability: 0.01mg or better  
Repeatability (nominal): sd 0.02 mg or better  
**Response from BSIP:** Considered and amended in revised technical specifications
12. Remove Argon cylinder  
**Response from BSIP:** Not Considered
13. Commercial Clarifications  
(a) EMD Percentage:

**Response from BSIP:** 3% as mentioned in the document and may also read 3% in the annexure - VI page no.33 of the tender document.

(b) Tender in Hard copy

**Response from BSIP:** Yes

14. BSIP had communicated and clarified on the following items.

(10) Party should have at least 10 successful installations in coal analysis facility of the quoted model in the past 3 years and has to submit performance certificate or installation reports for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.

(11) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.

(12) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order

(13) Onsite training should be provided to at least 10 users at the time of installation

Local Supply:

a) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.

b) Gas cylinders (99.999% purity, 47 litre capacity): Argon (if needed), Helium, Oxygen with applicable regulators

c) UPS of 5 KVA capacity with 3 Hours back up.

d) Consumables: All the Spares for two years and Consumables including catalysts needed for 5000 sample analyses should be included in the offer.

e) Warranty: 3 years comprehensive warranty

f) Local on call availability of service support

1. M/S Shiva Global Technosys (Representing Euro Vector SRL) participated in pre bid meeting represented by Mr Bhaskar Kumar and there were no technical queries from M/S Shiva Global Technosys to BSIP. BSIP had communicated and clarified on the following items.

(10) Party should have at least 10 successful installations in coal analysis facility of the quoted model in the past 3 years and has to submit performance certificate or installation reports for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.

(11) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.

(12) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order

(13) Onsite training should be provided to at least 10 users at the time of installation

Local Supply:

- a) Branded Computer: Computer specifications: Desktop PC with Monitor, Printer & all accessories: 01 SET (With i7 Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
- b) Gas cylinders (99.999% purity, 47 litre capacity): Argon (if needed), Helium, Oxygen with applicable regulators
- c) UPS of 5 KVA capacity with 3 Hours back up.
- d) Consumables: All the Spares for two years and Consumables including catalysts needed for 5000 sample analyses should be included in the offer.
- e) Warranty: 3 years comprehensive warranty
- f) Local on call availability of service support

1. Commercial Clarifications

- (a) EMD Percentage:

**Response from BSIP:** 3% as mentioned in the document and may also read 3% in the annexure - VI page no.33 of the tender document.

The meeting was held and above mentioned issues were discussed. The firms have been asked for submission of their queries through Email and reply will be given through email to them. The meeting has been ended with the thanks to chair.

Dr. Runcie Paul Mathews

Dr. Prasanna K.

Dr. Divya K Mishra

Mr. Mishri Lal

## **Technical Specification of Fully Automatic Bomb Calorimeter**

1. Type/Method: Isoperibol.
2. Instrument: Automatic microprocessor/computer controlled calorimeter, with automatic oxygen filling, bucket filling, bomb washing, as well automated vessel fill and rinse.
3. Safety lock system for bomb: The lid should automatically lock electronically when the instrument is in operation mode.
4. Thick walled, acid resistant combustion vessel made of high strength material with proper insulation arrangement and capable of withstanding high pressure. Combustion vessel should be hydrostatically tested to 3000 PSI and comply with ASTM E144.
5. Measurement Range: Instrument should analyze a one gram sample with gross calorific values from 6,000 to 15,000 BTU/lb with a resolution of 1 BTU/lb.
6. Precision:  $\leq 0.1\%$  RSD or better with benzoic acid as well as sample.
7. Resolution: 1 BTU/lb
8. Analysis Mode: Equilibrium mode/Dynamic mode.
9. Analysis time:  $\leq 8$  minutes in Isoperibol Method.
10. Operator time per test: ONE MINUTE.
11. Tests per hour: 6 to 8 tests.
12. Temperature Measuring Resolution:  $0.0001^{\circ}\text{C}$
13. Oxygen filling and Venting should be Automatic.
14. Water filling into the Bucket as well as into the Jacket should be Automatic.
15. Water draining after completion of analysis should be Automatic.
16. Bomb & Bucket: Fixed Type/removable type
17. Bomb washing: Fully Automatic/manual
18. Jacket Type: Water Jacket with facility to maintain / control the jacket temperature with an accuracy of  $\pm 0.1^{\circ}\text{C}$  to meet the ASTM/BIS Standards.
19. Display: Graphical display with touch screen. Should have option to operate through PC.
20. Correction: Spiking, Ash/ Nitrogen or Acid, Fuse wire, Sulphur, moisture, hydrogen and net heat of combustion
21. Diagnostic mode: Diagnostic mode should be available for automatic report generation and message display for pretesting cycle, bomb leak, poor bucket stirring, lid not etc. for easy diagnosis
22. Water handling System: Bomb Calorimeter should have inbuilt closed loop Water Handling system to re-circulate the water and to stabilize the instrument quickly.
23. Memory Capacity: Calorimeter may have inbuilt minimum 1,000 tests results or computer controlled unlimited data storage, data logging for jacket and bucket temperature
24. Printer/Balance/Computer Connection: RS232 Interface, USB, Ethernet.

25. SampleCrucibleCapacity:0.5 gm –1.5gm.
26. Sample Crucible: Metal crucibles with Ni-Cr Alloy/SS/Quartz
27. Standard test methods compliance: ASTM E144, ASTM D 5865, ASTM D 240, ASTM D 4809, ASTM D 5468, ASTM E711, ISO1928, AS1038.5, BS1016, DIN51900, JISM8814 etc.,
28. Certification: Instrument should have CE certification and vessels should have national/international certification.
29. Power requirement: 230VAC+/-10%, 50/60HZ as per Indian condition.
30. Reporting options: The value of GCV should be reportable in Kcal/100gm, Cal/gm, MJ/kg and BTU/lb.
31. Oxygen bomb: The oxygen combustion bomb should make with special stabilized stainless steel to resist the mixed nitric acid and Sulphuric acid produced in combustion. It should have PED Certification.
32. The instrument should be supplied with adequate spare bomb head/complete vessel
33. Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.
34. Performance of the instrument should be proven at the time of Installation with Calcium Oxalate.
35. Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
36. Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
37. Onsite training should be provided to at least 10 users at the time of installation

**Local supplies and spares for each Instrument**

- a) Standard accessories: Gelatine capsules (5000 Numbers), Pellet press (1 Number).
- b) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
- c) 5 KVA UPS with minimum power back up of 03hours: 01 No
- d) Compatible analytical balance with least count of minimum 0.1mg should be provided.
- e) Gas cylinders- Oxygen & Nitrogen (99.99%) with suitable regulator and filters.
- f) Warranty: Comprehensive Warranty for 36 months from date of commissioning
- g) Service support-Local on call availability
- h) Accessories: Consumables, spares and Standards for at least 5000 Samples

## **Technical Specification of Thermo Gravimetric Analyzer (TGA)**

- 1) Fully automatic Microprocessor /Computer Control Based Thermo gravimetric analyzer with window-based system configurable for individual operators. Instrument should have dual Carousel system (One for Crucible and one for Cover) for automatic /manual placing and lifting of crucible covers.
- 2) Thermo gravimetric analyzer (TGA) is for coal, coke and biomass samples testing for determining of Moisture, Ash, and Volatile Matter content.
- 3) The instrument should meet the requirements of standard ASTM D- 7582-15, BIS & ISO standards for coal and coke or latest amended versions.
- 4) The instrument should have the capability to analyse at least 19 samples +01 reference simultaneously with no limit on the minimum number of samples to be loaded.
- 5) The system should automatically monitor and calculate weight loss for moisture, volatile matter, and ash, loss on ignition (LOI), or fixed carbon in the range exceeding 0% to a total weight loss of 100%.
- 6) The instrument must incorporate integrated balance should be in-built, top loading with auto calibration facility and a sensitivity of + / -0.0001 gm.
- 7) The balance should be shielded and protected for any interference from other internal components adapted for high temperature.
- 8) Weighing Range of Integrated balance is 10 mg-220 gm or more and Readability of balance shall be (Min.) 0.0001 gm
- 9) Sample feed Size: 50 mg to 10 gm.
- 10) Instrument precision: Instrument must perform a standard weight-loss for an inert sample with a precision of < 0.02% standard deviation. This test should be performed at various temperatures, flow rates, and atmospheres.
- 11) Crucible Type: Ceramic
- 12) Furnace Temperature Range: Up to 1000 °C.
- 13) Temperature Control: User Selectable.
- 14) Built in diagnostic facility.
- 15) Operating Temperature: Up to 25 deg C.
- 16) Facility for automatic lifting of carousels at a pre-defined temperature and atmosphere.
- 17) Programmable Ramp time & hold time shall be clearly defined for optimum coal standard analysis.
- 18) Process Control System: Default / User defined programs/ as per optimum coal standard analysis

- 19) Gas Requirement: Should run with standard 99.9% Oxygen, Nitrogen & compressed Air (99.5%, moisture free). Drier Unit for all gases to be provided with the instrument for moisture free gas.
- 20) Gas Flow Rate: The rate of gas or atmosphere flow should be user select able (01-10L/Min)
- 21) Exhaust / Ducting facility: Exhaust tube / standard ducting facility.
- 22) Furnace Temperature Stability / resolution (Furnace Power Rating): - + / - 2 °C or better.
- 23) Instrument must provide a dedicated over temperature protection thermocouple for safety protection. Dual thermocouple for uniform temperature reading.
- 24) The system must provide temperature reading of location of the crucible.
- 25) Atmosphere: Both Oxidizing & Inert atmosphere with Facility for automatic change from one atmosphere to another. Also, facility to change over from one atmosphere to another as per requirement should be there.
- 26) Ducting facility: Vent pipe (5-10 M) will be connected to ext. blower & routed through an opening in the wall.
- 27). Carousel movements should be pneumatic and rotation should be both Clockwise & Anticlockwise. The carousel and all the heating parts should be made of high grade ceramic material.
- 28) Memory & data Storage facility: Inbuilt programmable memory for storage of analytical data & methods.
- 29) User Login & password Facility: Ability to protect methods, results, and Data. Export and import of data to & from LIMS.
- 30) Data Output & Interfaces: USB ports/ Ethernet to Printer, printer facility user friendly operating system MS WINDOWS latest Version compatible with the latest version of Instrument Software. Built in operational program to perform all calculations as well as control heating temperature, atmosphere, duration and heating rate should be available with the instrument. Programmable memory for the storage of analytical methods and results should be provided with built in PC interface.
- 31) Instrument Software support along with up gradation for one year.
- 32) Extensive Diagnostic Function: Instrument must have facility for Extensive Diagnostic Function for problem investigation.
- 33) Supplier must give declaration for availability of spares in case of obsolesces of the equipment.
- 34) Power: 230 +/-10V AC, 50 Hz, and Single-phase A/C.
- 35) All the Technical Specification mentioned above must be supported with documentary evidence (like Brochure) from OEM.
- 36) Party should have at least 10 successful installations in coal analysis facility in last 3 years of the quoted model and has to submit performance certificate for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.



- 37) Performance of the instrument should be proven at the time of Installation with Calcium Oxalate.
- 38) Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
- 39) Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
- 40) Onsite training should be provided to at least 10 users at the time of installation

### **Local supplies and spares for each Instrument**

- a) Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window 11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
- b) NOTE: -PC Configuration should be latest which will be compatible with the latest Version of Instrument software.
- c) Air Compressor (Dry, oil free, minimum 4-7 kg/cm<sup>2</sup>, 20 l capacity) with moisture Trap: 01 No.
- d) Double Stage Pressure Regulator for Oxygen: 01 Nos.
- e) Double Stage Pressure Regulator for Nitrogen: 01 Nos.
- f) Double Stage Pressure Regulator for Air: 01 Nos.
- g) Moisture filter set; one each for N<sub>2</sub>, O<sub>2</sub> & Air: 03 Nos.
- h) 5 KVA UPS with minimum power back up of 03 hours: 01 No
- i) Total Nos. of crucibles with lid: 40 Nos. (20+20)
- j) External Blower, Cables & Accessories: As required.
- k) Coal standards with proper trace ability and certificate of uncertainty (300 Gm each): 03 Nos. (Each with different Ash & VM content)
- l) Dust Cover: 01 No.
- m) Operation and Maintenance Manual: 01 Nos.
- n) Oxygen gas cylinders 1 Nos. (99.95% With purity certificate and proper traceability).
- o) Nitrogen gas Cylinders 1 Nos. (99.95% With purity certificate and proper traceability).
- p) The total package-instrument with all necessary accessories (Compressor, Exhaust vent hood, Gas Cylinders, connecting conduits) with sufficient spares must be supplied in ready to use condition. All the remaining accessories, spares, tool kits and variable necessary CRM standards other than

mentioned above which are required for normal functioning of equipment and analysis of at least 5000 samples shall be supplied along with main equipment.

q) Instrument should have a comprehensive Warranty for 36 months from date of commissioning.

r) Local on call availability of service support.

## CHNS-O Macro Analyser Specifications

1. Fully Automatic Computer controlled rapid determination of Carbon, Hydrogen, Nitrogen, Sulphur and Oxygen Analysis in Coal/coke Samples.
2. Flash Combustion design with oxidation & reduction process (Double Furnace) with Chromatographic separation by column or equivalent system will be preferable. The analysis method should comply with ASTM D5373 and ASTM D4239
3. Furnace:
  - a) The system should have two totally Independent furnaces
  - b) Facility should be there for oxygen determination (by pyrolysis) & CHNS as per the application requirement.
  - c) Facility should be there to use the same furnace for solid / liquid samples as per the application requirement.
  - d) The Furnace with the element should have warranty of 12 years under standard operating conditions
4. Separation: Suitable column or equivalent combustion technique.
5. Detectors:
  - a) Thermal Conductivity Detector and Infra red (IR) for Sulphur compliant with ASTM D4239.
  - b) > 10 year warranty under standard operating conditions.
6. Autosampler:
  - a) Single Autosampler with 60 or more samples capability for CHNS-O for both solid and liquid samples
7. Analysis range:

C = 0.01% to 100 % or 0 -  $\geq$  100mg Absolute

H = 0.01% to 100 % or 0 -  $\geq$  15mg Absolute

N= 0.01% to 100 % or 0 -  $\geq$  50mg Absolute

S = 0.01% to 100 % or 0 -  $\geq$  15mg Absolute

O = 0.01% to 100 % or 0 -  $\geq$  6mg Absolute

8. Sample Size:
  - a) Macro size (0.1 Mg to 1000 Mg or more) depending upon sample nature.
  - b) The system must be able to operate one or more elements such as N, C, H, S analysis and O separately.
9. Micro Balance:
  - a) Mettler or Sartorius Semi or suitable micro-balance capable of direct transferring the data to the analyser
  - b) Weighing Range: 1.0 g or more
  - c) Readability: 0.01 mg or better
  - d) Repeatability (nominal) (sd): 0.02 mg
10. Party should have at least 10 successful installations in coal analysis facility of the quoted model in the past 3 years and has to submit performance certificate or installation reports for the quoted model for minimum one year of operation from user of reputed PSU/Govt./Private Company.
11. Demonstration at BSIP or at any facility of the choice of the bidder at their cost for four persons before the commercial evaluation.
12. Delivery and installation of the equipment within 12 weeks from the date of issue of purchase order
13. Onsite training should be provided to at least 10 users at the time of installation

14. Local Supply:

- a) Branded Computer: Computer specifications: Desktop PC with Monitor, Printer & all accessories: 01 SET (i7 with latest generation Processor, 16GB RAM or better, 1TB HDD or better, USB Slot, DVD writer, with Window11 Pro or better OS; 24" LCD Monitor; HP Lazerjet Pro MFP M126nw or equivalent latest compatible B/W Laser printer, licensed version of latest MS office, Key board & Mouse along with all instrument software.
- b) Gas cylinders (99.999% purity, 47 litre capacity): Argon (if needed), Helium, Oxygen with applicable regulators
- c) UPS of 5 KVA capacity with 3 Hours back up.
- d) Consumables: All the Spares for two years and Consumables including catalysts needed for 5000 sample analyses should be included in the offer.
- e) Warranty: 3 years comprehensive warranty
- f) Local on call availability of service support