



भारतीय प्रौद्योगिकी संस्थान गुवाहाटी  
Indian Institute of Technology Guwahati

OFFICE OF THE DEAN OF  
INDUSTRIAL INTERACTIONS AND  
SPECIAL INITIATIVES

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Assistant Registrar

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NIQ Ref. No. IITG/IISI/24-25/T18

• To

• Date : 18.04.2024

All interested vendors

SUBJECT: NOTICE INVITING QUOTATION FOR SUPPLY & INSTALLATION OF BATCH PYROLYSIS REACTOR, CONTINUOUS PYROLYSIS REACTOR FOR THE DEPARTMENT OF CHEMICAL ENGINEERING (PROJECT NO. XCLEISPNRL00985XXSS101), IIT GUWAHATI.

Dear Sir/ Madam,

The Director, Indian Institute of Technology Guwahati, invites quotations for design, fabrication, supply and installation of Batch Pyrolysis Reactor and Continuous Pyrolysis Reactor as per details mentioned in the **CHECK- LIST** attached herewith. The quotation in **double bid [Details as per Check List]** is to be submitted in sealed envelopes to the undersigned on or **before 09/05/2024 (1200 HRS)**.

Please note -

- Tender document is divided into two parts i.e. (1) Instruction to Bidders and (2) Terms & Conditions;
- There is no Tender fee and Tender document is to be downloaded from our website given below.  
[https://www.iitg.ac.in/iitg\\_tenders\\_all](https://www.iitg.ac.in/iitg_tenders_all) / NIQ for II&SI
- Duly filled, signed and sealed copy of 'Statement of Compliance to essential Terms & Conditions' and Technical Bid must be submitted along with the quotation.
- The bid documents are not transferable and the seal and signature of the authorized official of firms must appear on all the papers and envelopes submitted.

Kindly read both the Instructions and Terms properly and see that instructions and terms are fully understood and complied. No correspondence shall be entertained in case your quotation is rejected on ground of not complying with our instructions, terms and conditions. In case of doubt please contact us at 0361 258 2948 or the Principal Investigator at 0361 258 3527.

Thanking you.

Yours Sincerely,

सहायक कुलसचिव, औद्योगिक सहभागिता एवं विशेष प्रारंभ  
Assistant Registrar, Industrial Interactions & Special Initiatives  
भारतीय प्रौद्योगिकी संस्थान गुवाहाटी  
Indian Institute of Technology Guwahati  
गुवाहाटी, असम 781039  
Guwahati, Assam 781039

## INSTRUCTION TO BIDDERS

- A) Important Date and Time:
- (i) Last date & Time of receipt of Tender : 09/05/2024 (1200 HRS)
  - (ii) Time of opening Tender : 10/05/2024 (1200 HRS)
  - (iii) Venue of Bid opening : Department of Chemical Engineering, IIT Guwahati.
- B) Quotations will have to be submitted in a **DOUBLE Bid** [Details as per CHECK - LIST]. The address of the firm submitting the quotation and the Officer to whom the quotation is addressed must appear distinctly on sealed covers. Further, on sealed cover, the following are to be written:

<p><b><u>QUOTATION FOR SUPPLY &amp; INSTALLATION OF BATCH PYROLYSIS REACTOR AND CONTINUOUS PYROLYSIS REACTOR FOR THE DEPARTMENT OF CHEMICAL ENGINEERING (PROJECT NO. XCLEISPXNRL00985XXSS101), IIT GUWAHATI</u></b></p> <p><b>LAST DATE OF SUBMISSION: 09/05/2024 (1200 HRS)</b></p> <p><b>NIQ Ref. No. IITG/IISI/24-25/T18</b></p> <p style="text-align: center;">To,</p> <p style="text-align: center;"><b>The Assistant Registrar Industrial Interactions And Special Initiatives Indian Institute of Technology Guwahati Guwahati 781 039, Assam, India.</b></p> <p>From: M/s _____ Phone No.: _____ Email ID : _____</p>
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- C) **Submission of Compliance Certificate:** Duly filled and signed Compliance Certificate (as per format at **ANNEXURE I**) must be enclosed.
- D) **Bid not transferable:** The bid documents are not transferable and the seal and signature of the authorized official of the firm's must appear on all the papers and envelopes submitted.

### TERMS & CONDITIONS:

*(Please note the term 'both foreign & indigenous' wherever mentioned means the term is applicable to both foreign & indigenous purchase)*

01. **Rates:** Rates quoted for indigenous items should be on **FOR IIT Guwahati**, on **DOOR DELIVERY basis**, with break-ups as per details given below, the number of items to be quoted is given in **Annexure III** technical specifications document and example template for price bid given in **Annexure IV (For import items please refer 'Additional Terms for imported goods' below)**.

	Particulars	Rate
I	Basic Price (Ex work)	
II	GST	
III	Transportation charge up to IITG premises	
IV	Transit Insurance covering All Risk up to 10 days after delivery	
V	Installation & Commissioning Charge, if any	
VI	Grand total on door delivery at IIT Guwahati	
VII	Annual Maintenance Contract rate (after expiry of warranty period)	

*Note: Vague terms like "packing, forwarding, transportation etc. extra" without mentioning the specific amount will not be accepted. Such offers shall be treated as incomplete and rejected. Bidders shall indicate their rates in clear/visible figures as well as in words and shall not alter/overwrite/make cutting in the quotation. In case of a mismatch, the rates written in words will prevail.*

02. **Validity of Quotation:** Quoted rates must be valid for **120 days** from the last date of submission of quotation.

03. **Warranty:** The quoted bench/lab scale pyrolysis reactor must be on-site warranted for a minimum for a period of 12 months from the date of successful installation and commissioning. All corrective actions during warranty period shall be completed at no additional cost to IIT Guwahati. The supplier is required to initiate corrective actions within 10 days to repair or replace the defective materials or components after intimation.
04. **Literature a must:** All the quotations must be supported by the printed technical leaflet/literature and the specifications mentioned in the quotation must be reflected/ supported by such printed technical leaflet/ literature. The model and specifications quoted should **invariably be highlighted** in the leaflet/literature for easy reference.
05. **After Sales Service:** In case of imported goods, vendors should clearly state the available nearest after sales service centre and detail address in India, without which their offers shall be liable for rejection.
06. **Dealership Certificate:** Dealers or Agents quoting on behalf of Manufacturer must enclosed valid dealership certificate.
07. **Quality Certificates:** Valid certificate to prove that the products are genuine and of International standard, as mentioned below, must be enclosed:  
(a) Manufacturer's certificate.; (b) ISO/ISI certificate.
08. **Performance Bank Guarantee:** In case of quotations having quoted value Rupees five lacs (INR 5,00,000/-) and above, the successful bidder shall furnish an unconditional Performance Bank Guarantee (as per format at **ANNEXURE II**) valid till 60 days after the warranty period from a scheduled Bank of India for 3% of the Purchase Order value within 21 days of placement of order. Where the performance bank guarantee is obtained by a foreign bank, it shall be got confirmed by a Schedule Indian bank and shall be governed by Indian Laws and be subject to the jurisdiction of courts at Guwahati. In exceptional case or on the request of the Indenting Officer competent authority may allow starting of PBG Period from the date of installation, in which case submission of PBG valid till 60 days after the warranty period may be made within 21 days from the date of installation.

The Performance Bank Guarantee (PBG) guarantees that,

- (a) The Vendor guaranteed satisfactory operation of the Equipment & components against poor workmanship, bad quality of materials used, faulty designs and performance.
- (b) The Vendor shall at his own cost rectify the defects/replace the items supplied, for defects identified during the period of guarantee.
- (c) This guarantee shall be operative from the date of installation till 60 days after the warranty period.
09. **Delivery:**
- a) **Time Limit:** Maximum within 90 (Ninety days) days from the date of issue of purchase order.
- b) **Safe Delivery:** All aspects of safe delivery shall be the exclusive responsibility of the vendor. At the destination site, the package will be opened only in the presence of IIT user/representative and vendor's representative. The intact condition of the package and the seal/indicators for not being tampered with shall form the basis for certifying the receipt in good condition.
- c) **Insurance:** The supplier is to establish 'All Risk Transit Insurance' coverage till door delivery at IIT Guwahati.
- d) **Part Delivery:** Part delivery is not allowed.
- e) **Penalty Delay delivery:** The date of delivery should be strictly adhered to otherwise the Director, IITG reserves the right not to accept delivery in part or full.
10. **Genuine Pricing:** Vendor is to ensure that quoted price is not more than the price offered to any other customer in India to whom this particular item has been sold, particularly to IIT/Institutes and other Government Organization. Copy of the latest price list for the quoted item, applicable in India, must be enclosed with the offer.
11. **Conditional tenders not acceptable:** All the terms and conditions mentioned herein must be strictly adhered to by all the vendors. Conditional tenders shall not be accepted on any ground and shall be rejected straightway. Printed conditions mentioned in the tender bids submitted by vendors will not be binding on IITG.
12. **Goods and Service Tax (GST):**
- (a) Up-to-date Sales Tax clearance certificate, **GST Registration** number of the firm will have to accompany the quotation.
- (b) GST Deduction at source as per Order/ notification of the Govt.
- (c) GST No of IIT Guwahati is 18AAAJI0130P1Z8

(d) HSN/SAC No of the items must be clearly mentioned in the quotation along with GST No.

(e) **As per Notification No. 45/2007- Central Tax (Rate) dated 14.11.2017 and 47/2017-Integrated Tax (Rate) dated 14.11.2017, issued by Ministry of Finance, IIT Guwahati will avail 5% GST rate, on the items, as mentioned in the Notification.**

13. **Late and delayed tender:** Late and delayed tender will not be considered. In case any unscheduled holiday occurs on the prescribed closing/opening date the next working day shall be the prescribed date of closing/opening.

14. **Payment:**

(a) 30% of the price will be paid in advance **against equivalent bank guarantee** from a scheduled bank provided by the supplier. The remaining 60% shall be released only after receipt and acceptance of materials in good condition and 10% after satisfactory installation and commissioning of the equipment.

OR

(b) 90% Payment against delivery and 10% payment after successful installation and/ or commissioning of the ordered goods at site.

15. **PENALTY FOR DELAYED DELIVERY:**

In case of supply order for the scientific equipments/ apparatus, the date of delivery should be strictly adhered to. In the event of delayed delivery, installation & commissioning i.e. after the expiry of the period as agreed by both the parties, the vendor shall be liable for a penalty deduction at a percentage of the value of the undelivered equipment subject to a maximum of 10% (ten percent) as detailed below:

@1% up to one week;

@2.5% up to two weeks;

@5% up to three weeks;

@10% for four weeks and above

For the purpose of this clause, part of the week is considered as a full week. In case of delayed delivery, the Director, IIT Guwahati reserves the right not to accept the subject consignment.

16. **Enquiry during the course of evaluation not allowed:** No enquiry shall be made by the bidder(s) during the course of evaluation of the tender till final decision is conveyed to the successful bidder(s). However, the Purchase Committee or its authorized representative (IIT Guwahati) can make any enquiry/seek clarification from the bidders. In such a situation, the agency shall extend full co-operation. The bidders may also be asked to arrange demonstration of the offered items, in a short period notice, as such the bidders have to be ready for the same.

17. The acceptance of the quotation will rest solely with the Director, IITG, who in the interest of the Institute is not bound to accept the lowest quotation and reserves the right to himself to reject or partially accept any or all the quotations received without assigning any reasons.

18. **Force Majeure:**

If the performance of the obligation of either party is rendered commercially impossible by any of the events hereafter mentioned that party shall be under no obligation to perform the agreement under order after giving notice of 15 days from the date of such an event in writing to the other party, and the events referred to are as follows:

I) any law, statute or ordinance, order action or regulations of the Government of India,

II) Any kind of natural disaster, and

III) Strikes acts of the Public enemy, war, insurrections, riots, lockouts, sabotage.

19. **Termination for default:** Default is said to have occurred

(a) If the equipment or any of its component is found having poor workmanship, faulty designs, poor performance and bad quality of materials used.

(b) If the supplier fails to deliver any or all of the services within the time period(s) specified in the purchase order or any extension thereof granted by IIT.

(c) If the supplier fails to perform any other obligation(s) under the contract.

- (d) Under the above circumstances IIT may terminate the contract / purchase order in whole or in part and forfeit the PBG as applicable. In addition to above, IIT may at its discretion also take the following actions: IIT may procure, upon such terms and in such manner, as it deems appropriate, goods similar to the undelivered items/products and the defaulting supplier shall be liable to compensate IIT for any extra expenditure involved towards goods and services obtained.

**20. Applicable Law:**

- (a) The contract shall be governed by the laws and procedures established by Govt. of India and subject to exclusive jurisdiction of Competent Court and Forum in Guwahati or India only.
- (b) Any dispute arising out of this purchase shall be referred to the Director IIT Guwahati, and if either of the parties hereto is dissatisfied with the decision, the dispute shall be referred to the decision of an Arbitrator, who should be acceptable to both the parties, to be appointed by the Director of the Institute. The decision of such Arbitrator shall be final and binding on both the parties.

**ADDITIONAL TERMS FOR IMPORTED GOODS**

Following terms besides the fore mentioned terms will be applicable in case of foreign purchases:

21. **Rates:** Prices quoted must be for destination including freight and insurance charges inclusive of **delivery up to the door of department/centre IIT Guwahati premises**, as per details below.

(a)	Particulars	Rate
I	Basic Price (Ex work)	
II	FCA/FOB dispatch port,	
III	Total CIP/CIF Kolkata	
IV	CIP IIT Guwahati Price (Freight and Insurance charge from Kolkata to IIT Guwahati)	
V	Grand total on door delivery at IIT Guwahati	
(b)		
VI	Installation & commissioning charge if any	
VII	Custom duty (Approximate)	
VIII	Agency Commission if any	
IX	Annual Maintenance Contract rate (after expiry of warranty period)	

Note:

- (i) Vague terms like “packing, forwarding, transportation etc. extra” without mentioning the specific amount will not be accepted. Such offers shall be treated as incomplete and rejected. Bidders shall indicate their rates in clear/visible figures as well as in words and shall not alter/overwrite/make cutting in the quotation. In case of a mismatch, the rates written in words will prevail.
- (ii) Rate of Foreign Exchange shall be the rate prevailing on the date of quotation opening.

22. **After Sales Service:** In case of imported stores, foreign manufacturing firms should indicate facilities available for after sales service in India without which their offers are liable to be ignored.

**23. Delivery:**

- (a) Delivery of goods at IIT Guwahati, will have to be maximum within 95(ninety-five) days from the date of issue of the Purchase Order.
- (b) **Delivery at IIT Guwahati only.**
- (c) While transshipment will be allowed, part shipment will not be allowed.

**24. Payment:**

- (a) **Above INR 5 Lacs:** By an irrevocable letter of Credit at CIF/CIP Kolkata value negotiable through any overseas branch of State Bank of India/ AXIS Bank with unrestricted provision.
- (b) **Below INR 5 Lacs by FDD/Wire Transfer as given below:**
- (i) **Advance payment Against Bank Guarantee:** 90% of the price will be paid in advance **against equivalent bank guarantee** from a scheduled bank provided by the supplier/Indian Agent. The remaining 10% shall be released only after receipt and acceptance of materials in good condition or after satisfactory installation and commissioning of the equipment.
- or**
- (ii) **Payment Against Proof of Despatch:** 90% of the price will be paid against receipt of proof of dispatch such

as AWB, Invoice, Packing List, Insurance certificate, etc. The remaining 10% shall be released only after receipt and acceptance of materials in good condition or after satisfactory installation and commissioning of the equipment.

or

- (iii) **100% Payment Basis:** On request by the supplier/s 100% payment by FDD will be made. In this case on receipt of your Order Acknowledgement an FDD will be established for total ordered value, thereupon, a Xerox copy of the FDD will be sent to you which will enable you to send the materials. On satisfactory receipt and acceptance of the materials or satisfactory installation and commissioning of the equipment the Original FDD will be sent to you.

Note: Please note FDD/LoC will not be opened unless and until Letter of Acknowledgement in original is received at IIT Guwahati, directly from the principal (Even in case of firms having subsidiary office in India). The Indian agents are therefore advised to submit quotation after consultation with their respective principals).

26. **Customs Duty:** The Institute is generally **exempted** from payment of Customs Duty vide GOI Notification No.51/96-Customs, dated 23.07.96, with Regn. No. TU/V/RG-CDE (351)/2006, dated 14.09.2006. [CUSTOMS DUTY EXEMPTION CERTIFICATE WILL BE MADE AVAILABLE BY THE INSTITUTE IN REGARD TO QUOTES IN FOREIGN CURRENCY ONLY [ **NOT AGAINST QUOTES MADE BY A FIRM IN INDIAN CURRENCY, UNLESS THE CONCERNED FIRM IS A FOREIGN HOLDING COMPANY WITH 'FDI' CERTIFICATE ISSUED BY THE MINISTRY OF FINANCE, GOVT. OF INDIA**].
27. **Agency Commission:** The percentage of ex-works value to be paid to Indian agent in equivalent Indian currency as agency commission as applicable will have to be clearly stated in the quotation.
28. **After Sales Service:** For equipment to be imported the quotation will have to clearly state the available nearest after sales service centre and contact no. in India.
39. **Country of Origin:** While Country of Origin Certificate will not be insisted, the same however will have to be stated in the Original Invoice for payment through LoC.
30. **LoC Amendment:** LoC/FDD amendment charges due to mistake on the part of the supplier, if any, will have to be borne by the supplier.
31. **Materials Rejection:** IIT Guwahati reserves the right to reject any materials, components, or equipment supplied that do not meet the specified quality standards or technical specifications outlined in the NIQ document and as per final PO. Except any modification in PO has agreed due to manufacturing difficulties with IIT Guwahati after PO issuances. Rejected materials must be replaced by the supplier at no additional cost to IIT Guwahati, including all associated shipping and handling expenses.
32. **Subletting of Work:** If the supplier intends to subcontract the manufacturing of any sub-components of the items specified in this Notice Inviting Quotation (NIQ) for the Supply and Installation of Batch Pyrolysis Reactor and Continuous Pyrolysis Reactor, then IIT Guwahati reserves the right to obtain information on the subcontracting party, including their details and reputation.
33. **Intellectual Property Rights Notice:** The work outlined in this Notice Inviting Quotation (NIQ) for the Supply and Installation of Batch Pyrolysis Reactor and Continuous Pyrolysis Reactor encompasses intellectual property rights that are owned by IIT Guwahati. Accordingly, suppliers are required to enter into a Non-Disclosure Agreement (NDA) to access the comprehensive design of the system described in this project. Furthermore, suppliers must verify that all sub-components utilized in the construction of these bench/lab scale reactors, as detailed in the NIQ, do not violate any intellectual property rights held by third parties.

**34. Training and Documentation:**

Suppliers must provide comprehensive training to s personnel on the operation, maintenance, and safety procedures of the supplied reactors. Additionally, detailed documentation, including user manuals, installation guides, and maintenance protocols for complete system, must be provided in both digital and printed formats.

**35. Pre-qualification Criteria:**

**Previous Performance:** Specify that bidders must have successfully executed projects involving the supply and installation of equipment similar in complexity and technology to reputable public or government institutions. It should be noted that bidders must demonstrate a track record of supplying equipment to esteemed institutions such as IITs, NITs, CSIR labs, or other recognized government research organizations.

**Years of Operation:** The vendors should have been engaged a minimum of 5 years in the manufacturing and supply of the similar type of reactor, indirectly verifying their financial stability and industry experience.

Technical and Service Capabilities: Vendor should have technical expertise in equipment manufacturing and servicing, encompassing in-house engineering proficiency, post-sales support, and the availability of spare parts.

Turnover Requirement: 2 crore INR minimum annual turnover for past three years

\*If required bidder will be asked to provide online technical presentations while opening technical bid.

The following documents should be submitted by the bidders to fulfill the pre-qualification criteria:

- A list of projects involving the supply and installation of equipment similar in complexity and technology to the reactor, along with purchase order copies, completion/handover certificates, detailed case studies or reference projects showcasing client feedback or performance certifications.
- A certificate of incorporation or registration of the vendor, indicating the date and place of establishment and the nature of business.
- Audited financial statements for the past three years, showing the annual turnover, profit and loss, and balance sheet.
- A technical brochure or catalogue of similar equipment supplied previously, detailing its specifications, features, and benefits.
- A declaration of warranty and after-sales support, specifying the terms and conditions, duration, and scope of coverage.



**Asstt. Registrar (II&SI)**

**Encl.: CHECK LIST**

**Encl.: ANNEXURE**

**CHECK – LIST**

FOR THE DEPARTMENT OF CHEMICAL ENGINEERING (PROJECT NO. xCLEISPxNRL00985xxSS101):

<u>S.N.</u>	<u>Item Name &amp; NIQ Ref. No.</u>	<u>Bid Type</u>
<b><u>01</u></b>	<b><i>Item: Batch, Continuous Pyrolysis Reactor system with required utilities (as per purchase option given in Annexure III Qty: As per details given in Annexure III Details: As per description in Annexure III</i></b>  <b><i>[For any technical clarification required please contact. Ph. No: 0361- 2583527] NIQ Ref. No. IITG/IISI/24-25/T18 dated 18/04/2024</i></b>	<b><u>DOUBLE Bid</u></b>



**ANNEXURE -I**

**COMPLIANCE CERTIFICATE**

**(A certificate of compliance to NIQ term to be enclosed in the Technical bid)**

<b>Sl. No.</b>	<b>NIQ Terms and Conditions</b>	<b>Yes/No</b>
01	<b>Rate</b> quoted as per instruction	
02	<b>AMC rate</b> after warranty provided	
03	<b>Validity</b> of quoted rate for 120 days agreed	
04	<b>PBG</b> term agreed	
05	<b>Payment</b> term agreed	
06	<b>Delivery terms</b> agreed	
07	<b>Warranty period</b> agreed	
08	<b>Literature:</b> Printed Literature provided	
09	<b>Dealership</b> / distributorship certificate (in case of dealers/agents) provided	
10	<b>Sales Service</b> :address of after Sales Service centre in India provided	
11	<b>Manufacturer</b> certificate provided	
12	<b>ISO/ ISI</b> certification provided	
13	<b>Applicable law</b> terms agreed	
14	<b>Pre-qualification criteria</b>	
	Previous Performance	
	Years of Operation	
	Technical and Service Capabilities	
	Turnover Requirement	
	Above mentioned documents	

**Sign.** :.....

**Vendor : M/s**.....

**Official seal of the vendor**

**ANNEXURE - II**

**PERFORMANCE BANK GUARANTEE**

To:

Registrar,  
Indian Institute of Technology,  
Guwahati- 781 039

**WHEREAS** ..... (Name of Supplier) hereinafter called "the Supplier" has undertaken, in pursuance of Contract No: ....., dated: ..... 20... to supply ..... (Description of Goods and Services) hereinafter called "the order".

**AND WHEREAS** it has been stipulated by you in the said order that the Supplier shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the order.

**AND WHEREAS** we have agreed to give the Supplier a Guarantee:  
**THEREFORE, WE** hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of ..... (*Amount of the Guarantee in Words and Figures*) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the order and without cavil or argument, any sum or sums within the limit of ..... (*Amount of Guarantee*) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the ..... day of ..... 20.....

Signature and Seal of Guarantors

.....  
.....  
.....

Date.....20....

Address:.....

.....  
.....

All correspondence with reference to this guarantee shall be made at the following address:

Registrar,  
Indian Institute of Technology,  
Guwahati- 781 039, Assam.

Attention: Asst. Registrar (II&SI)

## ANNEXURE – III

**Title of Document:** Technical Specification Document for Bench/Lab scale Batch & Continuous Pyrolysis Reactors

**Date of preparation:** 30th March 2024

**Version of Doc.:** Final

### Table of Contents

- 1 Introduction
- 2 Scope of Works
- 3 Technical Specification of all the equipment
  - 3.1 Equipment
  - 3.2 Material of construction
  - 3.3 Heating System
  - 3.4 Electrical Control System
  - 3.5 Operating Conditions
  - 3.6 Insulation
  - 3.7 Safety Features

#### **1 Introduction:**

This technical specification document outlines the requirements for batch & continuous pyrolysis reactors designed for converting bamboo dust/briquettes into charcoal and chemically activated charcoal. The reactors should have capacities of 2 litre/batch, 100 litres/batch, 200 litres/batch & 10 kg/hr suitable for laboratory-scale and larger-scale operations, respectively.

#### **2 Scope of Works:**

Design, fabrication, supply of all equipment and accessories, including electrical batch pyrolysis reactor, heating elements, temperature controllers, stirring mechanisms, safety features for pyrolysis, physical & chemical activation as per technical specifications.

#### **3 Technical Specification of all the equipment:**

##### **3.1 Equipment:**

##### **Equipment 1 - Bench Scale Batch Reactor**

Capacity: 2 Liters/Batch with operating pressure range 2 Mpa with following example sub components

- a. Integrated steam generation system
- b. Accessories:
  - Agitator, Starter kit for reactor operation, including loading/ unloading tools, cleaning equipment & etc.
- c. Control & Monitoring System
- d. Electrical Control Panel
- e. Heating system
- f. Built-in pressure relief valves and explosion-proof design & Emergency Shut-off

##### **Equipment 2 - Bench Scale Batch Reactor**

Capacity: 2 Liters/Batch with operating pressure range atm. Pressure with following example sub components

- a. Integrated steam generation system

- b. Accessories:  
Agitator, Starter kit for reactor operation, including loading/ unloading tools, cleaning equipment & etc.
- c. Control & Monitoring System
- d. Electrical Control Panel
- e. Heating system
- f. Built-in pressure relief valves and explosion-proof design & Emergency Shut-off

### **Equipment 3 - Lab Scale Batch Reactor**

Capacity: 100 Liters/batch with following example sub components

- a. Integrated steam generation system
- b. Accessories:  
Agitator, Starter kit for reactor operation, including loading/ unloading tools, cleaning equipment & etc.
- c. Control & Monitoring System
- d. Electrical Control Panel
- e. Heating system
- f. Built-in pressure relief valves and explosion-proof design & Emergency Shut-off

### **Equipment 4 - Lab Scale Batch Reactor**

Capacity: 200 Liters/batch with following example sub components

- a. Integrated steam generation system
- b. Accessories:  
Agitator, Starter kit for reactor operation, including loading/ unloading tools, cleaning equipment & etc.
- c. Control & Monitoring System
- d. Electrical Control Panel
- e. Heating system
- f. Built-in pressure relief valves and explosion-proof design & Emergency Shut-off

### **Note:**

- a. The reactor should have an integrated steam generation system for activation purposes & proper inlet and outlet system should be provided. Chemical mixing with biomass/ charcoals the appropriate sprinkling & agitation mechanism to be provided.
- b. Gas sampling provision needed for gas analysis

### **Equipment 5 - Lab Scale Continuous Reactor**

Reactor Size: 10 kg/hr without syngas & liquid fuel storage with flaring arrangements for burning syngas and following example sub components

- a. Hopper system
- b. Control & Monitoring System
- c. Electrical Control Panel
- d. Screw speed controller system
- e. Loading/Unloading Mechanism

- f. Heating system
- g. Built-in pressure relief valves and explosion-proof design & Emergency Shut-off

**Note:**

- a. Suitable of mass flowrate of 10 kg/hr with the following density consideration of the feedstock material
- b. Density of the bamboo dust  $\rho$  (Without compression) = 100 - 170 kg/m<sup>3</sup>;
- c. Hopper system capacity: 1.5 m<sup>3</sup>
- d. Height of the system should approachable (**Max.:** 5 feet height)
- e. Gas sampling provision needed for gas analysis
- f. The char collection mechanism should be such that the gases do not leak out when char is being at the other end of the reactor.

Loading/Unloading Mechanism: Feed hopper that ensures controlled flow rates of biomass or feed into the screw reactor. The feed hopper should be integrated with an air lock mechanism that prevents gases to escape or leak through the hopper.

Screw speed control- Proper Speed control mechanism should be provided such that the screw speed in (rpm) can be varied as per wish.

**Equipment 6** – Hot Syngas & liquid fuel storage system and corresponding components as follows

- a. Storage Tanks
- b. Piping and Valves
- c. Pressure Relief Valves
- d. Pumps and Compressors
- e. Gas Flare System
- f. Cooling Systems
- g. Measurement and Control Instruments

**3.2 Material of Construction**

Reactor Body: AISI 316 Stainless Steel/Suitable grades of steels with the protective coating, suitable for high-temperature operations and resistant to corrosion and chemical attacks

**3.3 Heating System:**

Type: Electrical heating with integrated heating elements with three phase connections Note: Method of heating - Microwave/Induction

Control & Monitoring System: Digital temperature controller with PID control for precise temperature management. The system should include thermocouples located strategically for accurate temperature measurements.

**3.4 Electrical Control System:**

Electrical control panel to monitor and control the reactor running performance with components with panel made up of SS Fabricated IP65 enclosure accordance with relevant industry standards and regulations.

**3.5 Operating Conditions:**

Operating Temperature: 300°C to 1000°C, adjustable to support both pyrolysis and steam/ chemical activation processes.

**3.6 Insulation:**

Coating Material: Ceramic fiber insulation or equivalent/suitable, capable of minimizing heat loss and ensuring operator safety.

**3.7 Safety Features:**

Pressure Relief: Built-in pressure relief valves and explosion-proof design.

Emergency Shut-off: Quick action emergency shut-off mechanism for immediate shutdown in case of emergency.

Depending upon the L1 price quoted by the vendor and available fund in the project any one of the purchase option given in below table will be purchased. Therefore, vendors are requested to submit the technical bid for all six equipment and price bid for all 8 options.

Purchase Options	Equipment 1	Equipment 2	Equipment 3	Equipment 4	Equipment 5	Equipment 6
1	Y	N	Y	N	Y	N
2	Y	N	N	Y	Y	N
3	Y	N	N	Y	Y	Y
4	Y	N	Y	N	Y	Y
5	N	Y	Y	N	Y	N
6	N	Y	N	Y	Y	N
7	N	Y	N	Y	Y	Y
8	N	Y	Y	N	Y	Y

**Annexure IV:**

Example template for technical and price bid

1. Technical Bid Template

Specification Item	Details	Compliance (Yes/No/Partially)	If partial, provide remarks
<b>Equipment 1 - Bench Scale Batch Reactor</b>	<p><b>Capacity:</b> 2 Liters/Batch with operating pressure range 2 Mpa with following example sub components</p> <ul style="list-style-type: none"> <li>a. Integrated steam generation system</li> <li>b. Accessories: Agitator, Starter kit for reactor operation, including loading/unloading tools, cleaning equipment &amp; etc.</li> <li>c. Control &amp; Monitoring System</li> <li>d. Electrical Control Panel</li> <li>e. Heating system</li> <li>f. Built-in pressure relief valves and explosion-proof design &amp; Emergency Shut-off</li> </ul>		
<b>Equipment 2 -</b>	<b>Capacity:</b> 2 Liters/Batch with operating		

<b>Bench Scale Batch Reactor</b>	<p>pressure range atm. Pressure with following example sub components</p> <ul style="list-style-type: none"> <li>a. Integrated steam generation system</li> <li>b. Accessories: Agitator, Starter kit for reactor operation, including loading/unloading tools, cleaning equipment &amp; etc.</li> <li>c. Control &amp; Monitoring System</li> <li>d. Electrical Control Panel</li> <li>e. Heating system</li> <li>f. Built-in pressure relief valves and explosion-proof design &amp; Emergency Shut-off</li> </ul>		
<b>Equipment 3 - Lab Scale Batch Reactor</b>	<p><b>Capacity:</b> 100 Liters/batch with following example sub components</p> <ul style="list-style-type: none"> <li>a. Integrated steam generation system</li> <li>b. Accessories: Agitator, Starter kit for reactor operation, including loading/unloading tools, cleaning equipment &amp; etc.</li> <li>c. Control &amp; Monitoring System</li> <li>d. Electrical Control Panel</li> <li>e. Heating system</li> <li>f. Built-in pressure relief valves and explosion-proof design &amp; Emergency Shut-off</li> </ul>		
<b>Equipment 4 - Lab Scale Batch Reactor</b>	<p><b>Capacity:</b> 200 Liters/batch with following example sub components</p> <ul style="list-style-type: none"> <li>a. Integrated steam generation system</li> <li>b. Accessories: Agitator, Starter kit for reactor operation, including loading/unloading tools, cleaning equipment &amp; etc.</li> <li>c. Control &amp; Monitoring System</li> </ul>		

	<ul style="list-style-type: none"> <li>d. Electrical Control Panel</li> <li>e. Heating system</li> <li>f. Built-in pressure relief valves and explosion-proof design &amp; Emergency Shut-off</li> </ul>		
<b>Equipment 5 - Lab Scale Continuous Reactor</b>	<p><b>Reactor Size:</b> 10 kg/hr without syngas &amp; liquid fuel storage with flaring arrangements for burning syngas and following example sub components</p> <ul style="list-style-type: none"> <li>h. Hopper system</li> <li>i. Control &amp; Monitoring System</li> <li>j. Electrical Control Panel</li> <li>k. Screw speed controller system</li> <li>l. Loading/Unloading Mechanism</li> <li>m. Heating system</li> <li>n. Built-in pressure relief valves and explosion-proof design &amp; Emergency Shut-off</li> </ul>		
<b>Equipment 6</b>	<p>Hot Syngas &amp; liquid fuel storage system and corresponding components as follows</p> <ul style="list-style-type: none"> <li>a. Storage Tanks</li> <li>b. Piping and Valves</li> <li>c. Pressure Relief Valves</li> <li>d. Pumps and Compressors</li> <li>e. Gas Flare System</li> <li>f. Cooling Systems</li> <li>g. Measurement and Control Instruments</li> </ul>		
Material of Construction	Reactor Body: AISI 316 Stainless Steel or suitable grades of steels with protective coating.		
Heating System	<p>Type: Electrical heating with integrated heating elements,</p> <p>Control: Digital temperature controller with PID control.</p>		
Electrical Control System	Features: SS Fabricated IP65 enclosure electrical control panel to monitor and control reactor performance.		
Operating Conditions	Operating Temperature: 300°C to 1000°C,		



	adjustable.		
Insulation	Material: Ceramic fiber insulation or equivalent, for minimizing heat loss and ensuring operator safety.		
Safety Features	Includes pressure relief valves, explosion-proof design, and emergency shut-off mechanism.		

2. Price Bid Template:

**Purchase Option 1:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 1	
	Equipment 3	
	Equipment 5	

**Purchase Option 2:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 1	
	Equipment 4	
	Equipment 5	

**Purchase Option 3:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 1	
	Equipment 4	
	Equipment 5	
	Equipment 6	

**Purchase Option 4:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 1	
	Equipment 3	
	Equipment 5	
	Equipment 6	

**Purchase Option 5:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 2	
	Equipment 3	
	Equipment 5	

**Purchase Option 6:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 2	
	Equipment 4	
	Equipment 5	

**Purchase Option 7:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 2	
	Equipment 4	
	Equipment 5	
	Equipment 6	

**Purchase Option 8:**

Particulars		Rate (Specify currency)
I. Basic Price (Ex work)		
II. GST		
III. Transportation charge up to IITG premises		
IV. Transit Insurance covering All Risk up to 10 days after delivery		
V. Installation & Commissioning Charge, if any		
VI. Grand total on door delivery at IIT Guwahati		
VII. Annual Maintenance Contract rate (after expiry of warranty period)	Equipment 2	
	Equipment 3	
	Equipment 5	
	Equipment 6	