



राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला  
NATIONAL INSTITUTE OF TECHNOLOGY AGARTALA  
Fax : 0381 254-6360, Website : [http:// www.nita.ac.in](http://www.nita.ac.in)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023 / 5422-25

Date: 27 / 10 / 2023

**E-Tender Notice**

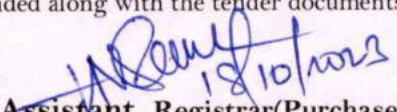
On behalf of National Institute of Technology Agartala, online quotation through Central Public Procurement Portal (CPPP) are invited from the reputed resourceful Manufacturers / Authorized Distributors/ Authorized Suppliers for supply of item(s)/goods/software/chemicals etc. as per specification mentioned in Annexure of tender document available at our website [www.nita.ac.in](http://www.nita.ac.in) and central public procurement portal i.e. [www.eprocure.gov.in](http://www.eprocure.gov.in). The tender document can be downloaded from the website [http:// eprocure.gov.in](http://www.eprocure.gov.in).

Sl. No	Department / Section	Ref. No.	Items	Estimated cost (Rs.)	Last date of receipt of tender	Time and date of opening of Technical bid
1	ME Department	No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023	An integrated set up under Conversion analysis of the syngas production from single-use absorbent waste materials and its applicability for power generation in industries/hospital through RCCI combustion	15,16,300.00	07/12/2023 Up to 3:00 PM	08 / 12 / 2023 At 3:00 PM

The interested Manufacturers / Authorized Distributors/Authorized Suppliers may arrange online submission of the tender through [www.eprocure.gov.in](http://www.eprocure.gov.in) along with scan copy of essential documents mentioned in the tender document.

Tender(s) is/are to be submitted only online through central public procurement portal i.e. "<http://www.eprocure.gov.in>". All the documents are to be scanned and uploaded along with the tender documents.

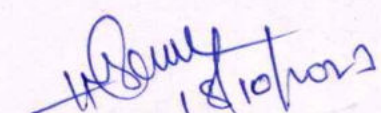
Tender sent by any other mode will not be accepted.

  
Assistant Registrar(Purchase)

Assistant Registrar (Purchase)  
(NIT Agartala)

Copy to:

1. The P.S. to the Director for kind information.
2. The Nodal Officer, e-Procurement, NITA with a request to kindly arrange uploading the Tender Documents in the CPP portal <https://www.eprocure.gov.in/cppp>.
3. Dr. Suman Deb, Asstt. Prof. & Head CSE Department with a request to uploading the Tender documents in the Institute website site.
4. The Deputy Registrar (F & A).

  
Assistant Registrar(Purchase)  
(NIT Agartala)





# राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला

**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023/5412-25 Date: 27/10/2023

## **E- Tender Enquiry**

### **IMPORTANT INFORMATION**

Name of the Institute : NATIONAL INSTITUTE OF TECHNOLOGY AGARTALA  
GST Number of the Institute : 16AAAGN0550K1ZG  
PAN of the Institute : AAAGN0550K  
TAN of the Institute : SHLN00719F  
DSIR No. : TU/V/RG-CDE(1053)/2017 dated 15/03/2018  
Institute Bank A/C No. : 030936141729 (IFSC: SBIN0011491) under SBI, NIT Agartala Branch.  
Name of Department / Branch : ME Department  
Enquiry / Reference Number : No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Some important/Critical dates:

Uploading on CPP Portal and Department's web-site	Date: 15/11/2023	Time: 5:00 PM
Bid submission start date	Date: 15/11/2023	Time: 5:00 PM
Bid submission end date	Date: 07/12/2023	Time: 3:00 PM
Opening of technical bid	Date: 08/12/2023	Time: 3:00 PM



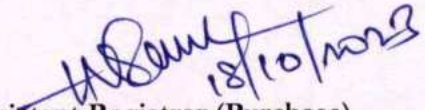
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**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

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## **Details of e-tender document.**

NIT, Agartala intends to purchase the commodities/serie(s) specified in Annexure enclosed and invites quotations in accordance with the terms and conditions detailed in the bid document. If you are interested, kindly submit your offer with prices within the time mentioned above fulfilling all the terms and conditions marked in the bid documents.

  
Assistant Registrar (Purchase)  
National Institute of Technology  
Agartala – 799 046, Tripura

Encl :

- (1) Schedule of requirement, specifications, dates etc.
- (2) Bid document containing detail terms and conditions.





# राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला

**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

1. Schedule of requirements

Sl. No.	Description of Goods/Service	Quantity
01	An integrated set up under Conversion analysis of the syngas production from single-use absorbent waste materials and its applicability for power generation in industries/hospital through RCCI combustion (Details as per list at Annexure-A)	01 Set

2. Specifications and allied Technical Details

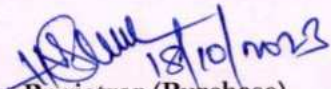
An integrated set up under Conversion analysis of the syngas production from single-use absorbent waste materials and its applicability for power generation in industries/hospital through RCCI combustion  
(Details as per list at Annexure-A)

1. Estimated Cost

₹ 15,16,300.00

- Quotations should be valid for a period of **180** days from the opening date of the technical bid.
- Bid Security or EMD: 2% of the estimated cost of the tender **or** Bidders should submit "**Bid Security Declaration Form**" on company letter head as per annexure-D of this tender document.
- Performance Security: The amount of the Performance Security shall be 3%(three percent) (not applicable for consumable item(s)) of the Purchase Order / Contract value, valid up to 60 days after the date of completion of contract obligations including warranty obligations.
- Delivery Option: 120 (one hundred and twenty) days after receipt of the purchase/work order(s).
- Please go through the enclosed "bid document" carefully for other bidding instructions.
- For any technical details, you may contact through email-id: [buycon20.nit.tr@gembuyer.in](mailto:buycon20.nit.tr@gembuyer.in) / [nitapurchasesection2@gmail.com](mailto:nitapurchasesection2@gmail.com).

Yours sincerely,

  
Assistant Registrar (Purchase)  
National Institute of Technology  
Agartala – 799 046, Tripura





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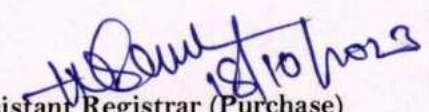
Date: 27/10/2023

## **BID DOCUMENT**

### **1. Instructions to the bidders:**

- 1.1 Bids are invited through e-tender on behalf of the National Institute of Technology Agartala, Tripura, Agartala-799046 from the intending bidders for supply of the goods/stores/ equipments/Learning resources for the Institute as detailed in the enquiry letter.
- 1.2 The bidders should quote their rates in clear terms without ambiguity. The quotation should be only in Indian Rupees.
- 1.3 The last date & time for submission of the bid is marked in the enquiry.
- 1.4 The bids should be submitted online through [www.epuocure.gov.in](http://www.epuocure.gov.in) before the last date & time of submission specified in tender document.
- 1.5 Bids received after the deadline of receipt indicated in para 1.4 above, shall not be taken into consideration.
- 1.6 Each bidder shall submit only one bid **against one enquiry**. A bidder, who submits more than one bid against single enquiry, shall be disqualified and considered non-responsive.
- 1.7 The bidder has to enclose a check list at per Annexure - C duly filled in along with all relevant/supporting documents while submitting technical bid through [www.eprocure.gov.in](http://www.eprocure.gov.in).
- 1.8 Opening of Bids by the Purchaser will be done as per the provisions of the e-procurement system.
- 1.9 At any time prior to the due date for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by amendment.
- 1.10 All prospective bidders are expected to surf the website before formulating and submitting their bids to take cognizance of the amendments.
- 1.11 Custom Duty Exemption Certificate will be provided from the Institute for availing Custom Duty Exemption in trams of notification No. 51/96-Custom dated 23-07-1996, amended by notification No. 43/2017 dated 30-06-2017, further amended by notification No. 42/2022 dated 13-07-2022, as amended from time to time in case of imported items per OM No. F.4/1/2021-PPD dated 01-09-2021.

Yours sincerely,

  
Assistant Registrar (Purchase)  
National Institute of Technology  
Agartala – 799 046, Tripura





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AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023/5422-25

Date: 27/10/2023

## 2. General Terms & Conditions:

- 2.1 The rates quoted by the Supplier/Bidders should preferably be on basic price, Annual Maintenance Charges(if applicable), packing, forwarding, freight, Insurance and all other incidental charges including delivery of the Materials at National Institute of Technology, Agartala.
- 2.2 All taxes and duties will be paid extra and such amounts of mandatory/statutory taxes & duties shall be explicitly mentioned in BOQ while submitting of bid. If GST amount not quoted in the BOQ (price bid), the total cost will be treated as inclusive of GST.
- 2.3 Price has to be filled through CPP portal as per BOQ (<https://www.eprocure.gov.in>). The scanned copy of Price Bid, dully filled in, has to be uploaded on the above e-procurement site. The prices filled in the e-procurement site will be treated final and shall be binding to the vendor.
- 2.4 Insurance: The Goods supplied under the Contract shall be fully insured against any loss or damage incidental to manufacture or acquisition, transportation, storage and delivery up to the final destination.
- 2.5 All the Machines/Equipments/goods will be covered by Annual Maintenance Contract (AMC) / CMC/ Warranty beyond the normal warranty/guarantee period. Interested bidders are requested to quote price against AMC/Extended warranty as an optional item in the price bid. **Optional items will not be taken into consideration while selecting L<sub>1</sub> bidder.**
- 2.6 AMC/CMC/Extended Warranty will be awarded after completion of standard warranty period. AMC/CMC/Extended Warranty may be carried out only after receipt of confirmation letter from this Institute. The Institute will not be responsible for any due payments / obligations may arise as a result of execution of AMC/CMC/Extended Warranty without confirmation letter from this Institute.
- 2.7 Conditional discount, if any, offered by the bidder shall not be considered at the time of evaluation.
- 2.8 **The bidders who are registered as a Micro or Small Enterprise under NSIC/MSME organization of Govt. of India for exemption of submitting EMD/Bid security must enclose relevant documentary proof of authentication of their firm's registered as a Micro or Small Enterprise as per latest definitions under MSME rules, Govt. of India.**





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- 2.9 If the bidder is a Micro or Small Enterprise as per latest definitions under MSME rules, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover /Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded with technical bid.
- 2.10 If the bidder is a Startup, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded with technical bid.
- 2.11 National Institute of Technology, Agartala is following and abide with the Public Procurement (Preference to Make in India), Order 2017, DIPP, MoCI Order No. P-45021/2/2017-B.E.II dated 15th June 2017 and subsequent amendments to the order. Accordingly preference will be given to the Make in India products while evaluating the bids, however, it is the sole responsibility of the bidder(s) to specify the product quoted by them is of Make in India product along with respective documentary evidence as stipulated in the aforesaid order in the technical bid itself. A self-declaration as per Annexure- G should be enclosed in the technical bid.
- 2.12 **On site Comprehensive Warranty:**
- The successful bidder shall provide a Comprehensive Warranty for minimum period of 3(three) years (not applicable for consumable item(s)) after thinstallation and commissioning of the instrument / software/items. If within a warranty period after installation any such product or component is proven to be defective such product shall be repaired or replaced by the supplier/vendor. Such repair and replacement shall be sole obligation of supplier/vendor. Supplier / vendor shall be responsible for payment for all charges (to-and-fro) for repair/ replacement. Any design defects or installations deficiencies or any outer defects, if noticed during the warranty/ maintenance period, shall be rectified promptly by the successful bidder with no cost at all the places, which also includes the field installations.
  - Down-time call attendance should be within 48 hrs.
  - In case the Equipment / System remains non-operational for more than 5 days then warranty period will be extended for the equal period for which Equipment / System remained non-operational. Warranty extension in such case shall be done without prejudice to any other Term & condition of the contract.





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**National Institute of Technology Agartala**

AGARTALA - 799 046 (TRIPURA)

- 2.13 The documentary evidence of the bidders qualification to perform the contract if the bid is accepted shall establish to the purchasers satisfaction that:

(a)	The bidder meets the qualification criteria listed in bidding documents, if any.
(b)	Bidder who doesn't manufacture the goods it offers to supply shall submit Manufacturers' Authorization Form using the form specified in the bidding document to demonstrate that it has been duly authorized by the manufacturer of the goods to quote and / or supply the goods/services.

- 2.14 The successful bidder has to furnish "Performance Guarantee/Security" (not applicable for consumable item(s)) for an amount specified in the enquiry by E-Payment System to NITA Account within 15(fifteen) days of intimation of contract/supply order.

Alternatively, "Performance Guarantee/Security" will be retained by the Institute from the billed amount of the contract/supply order which will be released two months after the completion of warranty period (not applicable for consumable item(s)).

- 2.15 **Delivery Schedule:** As per e-Tender.

The item(s)/goods are required to be delivered at the indenting Department of National Institute of Technology, Agartala, and must be dispatched within specified days from the date of placement of the supply/purchase/work order.

If the supplier fails to Supply, Install and Commission the system/instrument as per specifications mentioned in the order within the due date, the Supplier is liable to pay liquidated damages of 0.5% of order value per week of delay subject to a maximum of 3%, as the case may be, beyond the due date. Such money will be deducted from any amount due or which may become due to the supplier. Any exemption towards delay without LD can be resolved through mutual consent under exceptional circumstances.

- 2.16 Force Majeure: Notwithstanding the provisions of clauses relating to Extension of Time, Penalty and Termination for Default the Supplier shall not be liable for forfeiture of its Performance Security, Liquidated Damages or Termination for Default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 2.17 Evaluation of Bid: The Technical Bid shall be evaluated on the basis of technical and other parameters usually taken in to consideration. Financial bid shall be evaluated on the basis of financial parameters. Govt. of India rules shall be taken in to account for evaluating both technical and financial bids.
- 2.18 The successful bidder(s) may be required to execute a contract on the basis of evaluation as per annexure(s) (as applicable).





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- 2.19 NIT Agartala will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive or coercive practices in competing for the Contract in question.
- 2.20 The bidder has to submit valid trade license, GST registration certificate, Last filled ITR and last filed GST return.
- 2.21 Payment: **100% will be made in INR (Indian National Rupees)** after successful Installation, Commissioning of item against submission of Performance Guaranty (PG) otherwise an equal amount of PG will be retained by the Institute till the completion of warranty obligations.

**Note:** All payments due under the contract shall be paid after deduction of statutory levies at source (like ESIC, IT (TDS), GST, LBT / Octroi etc.), wherever applicable.

- 2.22 In the event of any dispute arising out of the bid or from the resultant contract, the decision of the Competent Authority, National Institute of Technology, Agartala shall be final.
- 2.23 The bid document/resultant contract will be interpreted under Indian Laws.
- 2.24** National Institute of Technology, Agartala will not take any responsibility for arranging road permit/way bill or clearance from tax department for delivery of goods. All such requirements should be completed by the bidder for delivery of goods at National Institute of Technology, Agartala. GST payment, if required, should be paid by successful bidder and if GST not paid, National Institute of Technology, Agartala will deduct the applicable amount from successful bidder's bills and pay the same to Tax Authority. If there is any mandatory tax(es) other than GST/other taxes mentioned in this tender document, imposed by State Govt., the same may also be deducted from the bills of the successful bidder, as applicable.
- 2.25 Competent Authority of National Institute of Technology, Agartala reserves the right to cancel the entire e-tendering process at any stage of the procurement process without mentioning any reason.**
- 2.26 Legal disputes, if any with NIT Agartala will be restricted within the jurisdiction of Agartala only.**

Yours sincerely,

Assistant Registrar (Purchase)  
National Institute of Technology  
Agartala – 799 046, Tripura





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AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023 / 5422-25 Date: 27/ 10 /2023

### 3. Special Terms & Conditions:

- 3.1 Acceptance of Technical bid strictly depends on National Institute of Technology, Agartala's requirements credentials, manufacturing capability, quality control systems, past performance, after-sales service, financial background, commercial terms & conditions etc. of the supplier(s).
- 3.2 Detailed Specifications, brand, make, model & parts number, tolerance limit, resolution, corresponding ISO standard etc. of quoted Equipments/Items should be mentioned with supported leaflet/catalogue/brochure and list of buyers for acceptance of technical bid.
- 3.3 The technical bid and the financial bid should be submitted through [www.eprocure.gov.in](http://www.eprocure.gov.in). The technical bids shall be opened and evaluated by the competent committee/authority. At the second stage, financial bids of only the technically qualified bidders shall be opened for further evaluation and recommendations for awarding the purchase order/contract.

It may specifically be mentioned whether quotation is strictly as per terms and conditions of the tender. Deviation, if any, must be spelt out specifically in technical bid. In the absence of this, the quotation may be rejected.

- 3.4 Installation & Commissioning: Within 15 (fifteen) days after delivery (if applicable).
- 3.5 The Quantity of each Item(s)/Equipment(s) may increase (as per Govt. Norms) or decrease at the time of issued of Purchase / Supply / Work Order. The Institute reserves right to purchase partly or not to purchase any item / cancel the entire process at any stage of procurement process.
- 3.6 Penalty: Penalty will be charged @ 0.5 % of per week except for force majeure conditions for the unexecuted part of the supply/work order.
- 3.7 Arbitration: All disputes should be attempted to be resolve mutually between the National Institute of Technology, Agartala and the suppliers failing which jurisdiction of any Court of Agartala shall be applicable.
- 3.8 The successful bidder has to give at least 3-4 days on site training for each & every items/equipments by Certified Person (if required).
- 3.9 Model No. of the product should be given with catalogue (if any).
- 3.10 Items/Goods should be sent through Registered Transporter (preferably).
- 3.11 Bidders are required to upload a declaration on letter head stating that the bidder has not been black-listed & holiday listed by any Ministry/Department/Organization.





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- 3.12 Bidder(s) is/are required to upload a self-certificate as per applicability (Annexure- E or F) regarding offered item(s) as per Office Memorandum No. 6/18/2019-PPD dated 23-07-2022 & 24-07-2020 and Office Memorandum No. F.18/37/2020-PPD dated 8<sup>th</sup> February, 2021 issued by Department of Expenditure, Procurement Policy Division, Ministry of Finance, Govt. of India.
- 3.13 Bidders are requested to provide valid e-mail ID and phone number for further communication.
- 3.14 Bank A/C in the Exact Name of Bidder/Firm/Supplier with Name, A/C No., IFSC code must be furnished with technical bid.

Yours sincerely,

Assistant Registrar (Purchase)  
National Institute of Technology  
Agartala – 799 046, Tripura



● **Technical Specifications** for an integrated set up under Conversion analysis of the syngas production from single-use absorbent waste materials and its applicability for power generation in industries/hospitals through RCCI combustion comprises of

- > Data acquisition system with piezo sensors and piezo powering unit
- > Electronic Control Unit for engine test rig
- > Emission Analyser
- > Single Cylinder four stroke Diesel Engine test setup with eddy current dynamometer

**The equipment should consist of the following:**

1. Engine: single-cylinder, four-stroke, water-cooled design, with a displacement range of 500-1000 cc and a self-start arrangement.
2. Modified to RCCI Engine [(Waste to Energy (WTE): Gas Produced from Waste/Bio-waste; green /grey Hydrogen/ Acetylene gas/Methane engine)] up to 7.5 Ps to 10Ps or better. Include an exhaust gas recirculation (EGR) assembly with EGR rate measurement and a control system for NOx control.
3. The engine's programmable open ECM system should support RCCI hydrogen operation, dual fuel methane/acetylene/alcohol operation, and low-temperature combustion (LTC) mode with dedicated RCCI engine operation
4. The test rig should have a dedicated urea/methanol injection system into the exhaust, with adjustable quantity variation.
5. RCCI engine should be capable of operating in dual fuel and LTC modes for constant torque applications
6. Engine in the test rig should be capable to run on different fuels, including but not limited to diesel, biodiesel, alcohol, hydrogen, Waste to Energy (WTE): gas produced from waste/bio-waste, Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG) and Acetylene gas. Overall, the test rig is to be configured to run on RCCI modes of operation with Open ECU systems, urea injection system. All the necessary injections systems for injecting liquid and gaseous fuel along with all necessary safety features (particularly for hydrogen gas) must be integrated in the test rig.
7. The engine should be coupled with an eddy current dynamometer capable of handling a loading capacity 10-20% higher than the engine's power output.
8. The necessary gas injection system, including manifold/port and gas cylinders, should be provided. The gas cylinder should have a capacity of 65-70 liters or more, filled with 10 kg or more of gas, with a working pressure of 335-350 bar or more and a delivery pressure of 100-150 PSI or more. The system should also include a regulator, refill valve, stand, trolley for easy transportation, delivery and tank pressure gauges, and dry and wet flame arrestors.
9. Manifold/port/TBI liquid injection system: A second fuel tank with a liquid injection system is required. It should include a low-pressure pump, wiring harness, ECU, and a second fuel (liquid) injection system with high-impedance saturated injectors. The system should be capable, through software control, of providing peak and hold current. Additionally, a burette with a stand and fuel flow measurement capability should be included.





10. The setup should provide both manual/computerized measurement systems for studying RCCI engine performance, including parameters such as brake power, indicated power, frictional power, BMEP (Brake Mean Effective Pressure), IMEP (Indicated Mean Effective Pressure), brake thermal efficiency, indicated thermal efficiency, mechanical efficiency, volumetric efficiency, specific fuel consumption, air/fuel ratio, heat balance, and combustion analysis.
11. Combustion studies like P- $\theta$ , P-V Plots, Log PV, combustion noise or rate of pressure rise, combustion mass fraction burnt, mean combustion gas temperature, fuel line injection pressure, ignition delay, combustion duration, cycle variations (up to 100 combustion cycles), plots and tabulated data. An engine performance and combustion analysis software, such as LabVIEW or an equivalent software, should be provided for data analysis.

**The equipment should be capable for the empirical investigation of the following**

- RCCI LTC with Open ECU Mapping
- Single fuel, secondary fuel, multi-fuel engine characteristics study
- Staged injection and secondary fuel tables for parallel injection
- Control of second fuel injection duration and timing
- MAPT (Manifold Absolute Pressure Temperature), CLT (Coolant Temperature), RPM, Lube oil temperature and user configurable sensor display and calibration
- Closed-loop lambda control (wideband and narrowband) displayed in AFR (Air-Fuel Ratio), O<sub>2</sub> (Oxygen), and Lambda units
- Testing at different EGR conditions
- Urea Injection into exhaust and its impact on emissions
- Advanced diagnostic functions for engine analysis and troubleshooting





## Major Components Details and Deliverable

COMPONENTS	DETAILS
Engine and Dynamometer	1 cylinder, 4 stroke, 500-1000 CC capacity, Power: 7 PS to 10Ps or better with capability to run on multi-fuels such as gas produced from waste, Methane, Hydrogen, Acetylene gas, LPG and diesel, biodiesel, alcohol and programmable open ECU. Also, fitted with Bidirectional Eddy current type water cooled with loading unit of capacity 20% higher than engine capacity, 5000 rpm or better
RCCI LTC	RCCI gas produced from waste/ Hydrogen/ Acetylene/ Methane, Alcohol PFI manifold and EGR assembly.
Pressure Reducing Valve (PRV)	PRV to reduce the cylinder pressure of 150 bar (for all the gases mentioned earlier) to the injector pressure of 1.5-2.5 bar or more.
Gas cylinder	Any one cylinders with 10-60 Ltrs capacity and its operational demo preferable gas from waste, H <sub>2</sub> / Acetylene one is must.
Urea Injection	Urea/Water Injection into exhaust system independently operate and vary qty
EGR	Must be of high-grade stainless steel (resistant to corrosion)
Injectors	High impedance saturate H <sub>2</sub> /Methane gas injectors 2 No. or more Also, additional peak and hold current up to 8A, software configurable high impedance solenoid injector 2 or more
Combustion pressure sensor	Should be able to measure the RCCI H <sub>2</sub> combustion pressure up-to 5000 to 15000 PSI continuous or intermittent. It should be fitted with low noise cable.
Crank angle sensor	Minimum resolution: 1°, To be able to operate at a minimum of 6000 RPM or more with TDC pulse.
ECU	Solenoid injector driver with programmable ECU software and calibration support.
<b>ECU AND SOFTWARE</b>	
Open ECU System with cover Wiring harness sensors	Packaged having required input and output pins separate for gas and liquid fuel injections. Open ECU system should have the following features: As per the actual need for ECU synchronization with the engine, Crank angle sensor, throttle position sensor, Manifold Absolute Pressure (MAP) sensor, engine lube oil temperature sensor, Port fuel injection throttle body assembly with sensors, and other requirements.
Software tool for EMS ECU	The output display window should include – crank angle, Start of Ignition (SOI), Duration of Injection (DOI), engine speed, load, engine lube oil temperature, Air-fuel ratio, equivalence air-fuel ratio, Throttle Position Sensor (TPS), MAP, 3D plots, Coolant Temperature (CLT) Sensor, real time plot, etc. Advanced Diagnostic feature, User defined variable, strategy and programming.
Communication cable	Communication with ECU and engine.



<b>Data acquisition device</b>	Suitable data acquisition device, preferably multifunction DAQ device such as USB-6210, 16-bit, 250kS/s.
<b>Five Gas Analyzer</b>	<p>Higher Standard five gas analyzer (HC, CO, NO<sub>x</sub>, O<sub>2</sub>, CO<sub>2</sub>) type industry standard</p> <p>Display: LCD, Interface: USB</p> <p>Measurement Data</p> <p>CO: 0-15% vol with 0.001% resolution</p> <p>HC: 0-20000 ppm (1 ppm resolution for up to 2000 rpm and 10 ppm resolution for 2000 ppm to 20000 ppm)</p> <p>NO<sub>x</sub>: 0-5000 ppm vol. (1 ppm vol. resolution)</p> <p>CO<sub>2</sub>: 0-20% vol. (0.1% vol. resolution)</p> <p>O<sub>2</sub>: 0-25% vol (0.01% vol.)</p> <p>Must suitable for lab purpose continuous load and free acceleration type</p> <p>ARAI /MORTH approved</p> <p>Authorized Datasheet of OEM of gas five gas analyzer component is must</p>

### Technical Specifications of Gas Injector Open ECU

It should be capable of

- SI as well as CI Engine mode run: 1 Cylinders, 4 Stroke
- Multi-Fuels Port Injection Alcohol, H<sub>2</sub>, LPG, CNG, WCBG, and Producer Gas
- Fuel Control with fuel table
- Adjustable injection timing control
- Adjustable ignition control, Built in igniters 2-4 cylinder internal and external supportable ignition driver
- Staged Injection (parallel injection).
- Secondary fuel table (Map Switching/Switch injection control)
- Closed loop target lambda (AFR) control
- LTF STF Control
- Analog inputs 7-10 or more qty user configurable
- Digital output 8 -10 or more qty user configurable
- PWM/On-Off/Advanced Control, Idle Air Control
- Advanced diagnostic features
- User config. sensors and actuators
- Barometric Pressure, Acceleration, Deceleration, Battery, Air Temp, Coolant Temp and Starting compensations, IAC
- PC Based Tuning Software, Ethernet Connectivity (Wi-Fi Capable)
- Up to 20 Hours of Data Logging, Extensive Failsafe Functions



● **Operating voltage: 6V-22 V DC**

- Typical operating temperature range (depends on loading): (-20°F to 165 °F) (30°C to 75°C)
- Supply Specifications Max Total External Current Draw: 1.0 A (for external sensors)

**Input / Output**

- 6 Dedicated Inputs (Crank, Cam, IAT, ECT, MAP, TPS)
- 6 Analog Sensor Inputs (0-5 Volt) – Up to 2 Temperature Inputs
- 4 Switched Inputs – Up to 2 Frequency Inputs
- 10 Configurable On/Off Outputs – 8 PWM Outputs
- Dedicated Tachometer Driver
- Idle Air Control
- Individual Cylinder Trims
- Dual Sensor Closed Loop O2 Control with Adaptive Learning
- Sequential or Semi-Sequential Injection
- 2 Saturated Injector Drivers
- Coil-On-Plug or Wasted Spark Ignition
- 2 Coil Drivers with Built-In Igniters

**Injector Driver Specifications:**

- Type of Driver: Saturated or Peak and Hold low side driver (software selectable)
- Number of Drivers: 2-8
- Driver Protection: Internally current limited to 10.0 amps per driver
- Maximum Current (before shutdown): 10.0 amps
- Peak Current Maximum: 8.0 amps, Hold Current Maximum: 3.0 amps

**Ignition Coil Driver Specifications**

- Type of Driver: Inductive ignition driver
- Number of Drivers: Up to 2-4 direct coil drivers (no external igniter required, can drive inductive coil directly)
- Up to 8 smart coil or external igniters
- Driver Protection: Internally current limited to 10.0 amps per driver
- Max Current (before shutdown): 10.0 amps

**Digital Output Specifications**

- Number of Drivers: Up to 10
- Type of Driver: Low side driver, on/off (all Digital Outputs)
- Pulse Width Modulated (Digital Outputs 1-8)
- Driver Protection: Internally current limited to 3.0 amps per driver or 15.0 amps total for all drivers





- Drivers Max Current (before shutdown): 3.0 amps per driver or 15.0 amps across all drivers
- Dedicated Tach Output Specifications Duty Cycle: 30% 'on' (Vbat) and 70% 'off' (0v)
- Voltage: V bat

### Digital Input Specifications

- Active Voltage High: Greater than 3.25 volts
- Active Voltage Low: Less than 2.0 volts
- Frequency Input Range (Digital Inputs 1-4): 0-6000 Hz, Frequency must be greater than 0.5 Hz to register something other than 0 Hz.
- Max Continuous Voltage Input: 22V
- Digital inputs activated with 5-22 volts are pulled low internally
- Digital inputs activated with GND are pulled high internally
- Trigger/Sync Input Specifications: When Configured as Hall Effect Sensor
- Max Input Voltage: Up to Vbat o Input Voltage Threshold to Trigger: Greater than 4.0 volts high side, less than 400 mV low side: When Configured as Variable Reluctance Sensor
- Max Input Voltage: 100 volts o Min Input Voltage to trigger: +/- 250 mV (0 to peak)
- Sensor and User Data Filter Characteristics Filter Type: Single-Pole, low-pass digital filter with configurable break frequencies
- Filter Break Frequencies based





**Other proposed details for tender document**

**Pre-Qualification Criteria**

- All pre-installation requirements are to be provided by the bidder.
- Bidder/OEM Must supply at least 3-5 or more Performance Satisfaction Certificate from reputed institute like IITs, NITs, Govt. Engg. Colleges, University or reputed engg along with Offer of same product
- Bidder should be the OEM or an Authorized distributor of OEM and shall submit a letter of from the OEM (MAF) for this specific tender only.

**Buyer Additional Terms and Conditions (ATC)**

- Bidder / OEM Must have supplied at least 3-5 similar test rigs with open ECU'S in last 3 years & must have supplied at least one system with exactly same specifications to any reputed Government Institute. Proof of the same demonstrating order value along with satisfactory installation certificates should be submitted.
- Test Results for the following must be submitted along with technical bid
  - Performance test results including AFR, SFC, Thermal efficiency & details of energy share for each fuel in & RCCI MODES using diesel with hydrogen injection or acetylene injection
  - Calculation and Calibrations sheet for fuel flow of RCCI fuels in LPM, kg/hr must be provided
- If required during the technical evaluation, a site visit or demonstration of all components/instruments quoted by the bidder should be arranged by the bidder at their own cost for technical inspection. An undertaking of the same should be attached and fulfilled.







राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला

**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023/5422-25 Date: 27/ 10 /2023

**ANNEXURE – B**

**PRICE BID**

As per BOQ





# राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला

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Date: / /2023

## **ANNEXURE - C**

### **Documents for Comprising the Bid**

Sr.No.	TENDER REQUIREMENT	COMPLIANCE	Document Submitted
1	Name of the Firm / Agency / Dealer / Supplier with full address including contact number and email id etc.	Yes / No	Yes / NA
2	Trade License issued by Government / Statutory Body or Company Registration on the item(s) related to this tender.	Yes / No	Yes / NA
3	GST Registration of the Supplier/Firm/Bidder.	Yes / No	Yes / NA
4	PAN Registration of the Supplier/Firm/Bidder	Yes / No	Yes / NA
5	Financial Solvency issued by Bank(as per RBI guidelines) (in case of estimated cost is Rs.25.00 lakhs and above).	Yes / No	Yes / NA
6	Up to date GST return / any other tax clearance certificate. (last filed GST return)	Yes / No	Yes / NA
7	Up to date Income Tax Return (Last filled ITR)	Yes / No	Yes / NA
8	"Bid Security Declaration form" on Company Letter Head (Scanned copy to be uploaded along with Technical bid).	Yes / No	Yes / NA
9	Service Support details (if applicable)	Yes / No	Yes / NA
10	Certification of holiday and non-black listing (Self Certification) (As per Annexure-H)	Yes / No	Yes / NA
11	Certification as per memorandum No. F.18/37/2020-PPD dated 8 <sup>th</sup> February 2021, Dept. of Expenditure, Ministry of Finance, Govt. of India (Self Certification)	Yes / No	Yes / NA
12	Proprietary Certificate from OEM to be uploaded along with the Technical Bid in case of Proprietary items	Yes / No	Yes / NA
13	Manufacturers Authorization Form (MAF) (if applicable)	Yes / No	Yes / NA
14	Certificate under MSME, NSIC, Make-in-India & Startup as per Govt. of India Norms (if applicable).	Yes / No	Yes / NA
15	Experience, if any, with govt. sector /Public Undertaking /Private sector (if applicable) (May be relaxed for MSME, NSIC & Startup as per Govt. of India Norm)	Yes / No	Yes / NA
16	Any other criteria related to this tender.	Yes / No	Yes / NA
17	Supplier/Firm/Bidder should accept all Terms & Conditions and specification of the items given in the Tender Document.	Yes / No	

(Signature of the bidder)





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No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Date: / /2023

## Annexure-D

### Bid Securing Declaration Form

Date:..... Tender Ref. No: ..... Tender ID: .....

To (insert complete name and address of the purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of one year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

a) have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or

b) having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or reuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown)

in the capacity of (insert legal capacity of person signing the Bid Securing Declaration)

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of (insert complete name of Bidder)

Dated on \_\_\_\_\_ day of \_\_\_\_\_ (insert date of signing)

Corporate Seal (where appropriate)

(Note: In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid)





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**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Date: / /2023

## Annexure-E

(Compliance to be submitted in the bidder's letterhead)  
(as applicable)

Sub: Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020 and OM No. F.18/37/2020-PPD dated 8th February, 2021 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017.

Item Name:	
Enquiry No.:	

We M/s. ....(name of the bidder company) have read the clauses pertaining to the Department of Expenditure's (DoE) Public Procurement Division Order (Public procurement no 1,2 & 3 vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020) regarding restrictions on procurement from a bidder of a country that shares a land border with India.

We hereby certify that **we are not from such a country** and eligible to be considered for this tender.

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead to commercial rejection of their bids by NIT-Agartala)

For and behalf of .....(Name of the bidder)

(Signature, date & seal of an authorized representative of the bidder)





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No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Date: / /2023

## **Annexure-F**

(Compliance to be submitted in the bidder's letterhead)  
(as applicable)

Sub: Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020 and OM No. F.18/37/2020-PPD dated 8th February, 2021 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017.

Item Name:	
Enquiry No.:	

We M/s. .... (name of the bidder company) have read the clauses pertaining to the Department of Expenditure's (DoE) Public Procurement Division Order (Public procurement no 1,2 & 3 vide ref. F.No.6/18/2019-PPD dated 23.07.2020 & 24.7.2020) regarding restrictions on procurement from a bidder of a country that shares a land border with India.

**We are from such a country** which shares a land border with India & have been registered with the Competent Authority as specified in the above-said order. We hereby certify that we fulfill all requirements in this regard and are eligible to be considered.

Evidence of valid registration by the Competent Authority is attached.

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead to commercial rejection of their bids by NIT-Agartala)

For and behalf of .....(Name of the bidder)

(Signature, date & seal of an authorized representative of the bidder)





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AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Date: / /2023

## Annexure -G

### **Self-Certification on the letterhead of the company**

In line with Government Public Procurement Order No. P-45021/2/2017-BE-II dt. 15.06.2017, P-45021/2/2017-PP (BE-II) dated 28.05.2018, P-45021/2/2017-PP (BE-II) dated 29.05.2019 and P-45021/2/2017-PP (BE-II) dated 16.09.2020,

we hereby certify that ..... (Supplier name) are local supplier meeting requirement of minimum local content..... % defined in as above orders for the material against Enquiry / Tender No ..... dated.....

Details of the location at which local value addition will be made are as follows:

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

We also understand false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permitted under law.

Date:  
Place:

Signature:  
Name and Designation:  
Mobile no:  
Office Telephone No:  
Email ID: Office Seal





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**National Institute of Technology Agartala**  
AGARTALA - 799 046 (TRIPURA)

No.F.NITA.11(29-ME)/Startup SRG/SERB-PROJECT(L2)/P.Singh/2023

Date: / /2023

## Annexure -H

### NON BLACKLISTING SELF CERTIFICATE

[To be submitted on letterhead]

I/We hereby certify that the ----- [Name of the company / firm] has not been blacklisted/debarred by any Central / State Government / Public Undertaking / University / Institute on any account in last three years.

I/We also certify that firm will provide material as per the specification given by NIT Agartala and also abide all the terms and conditions stipulated in the bid document.

I/We also certify that the information given in bid is true and correct in all aspects and in any case at a later date it is found that any details provided are false and incorrect, contract given to the concerned firm or participation may be summarily terminated at any stage, the firm will be blacklisted and NIT Agartala may impose any action as per the rules.

Date :  
Place :

Name :

Business Address :

Signature of Service Provider:

Seal of the Service Provider: