



**Interdisciplinary Centre for Energy Research  
Indian Institute of Science  
Bangalore – 560 012  
India**



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Phone: 080-22932480

Ref. No.: IISc/ICER/Tender/2023/Domestic/FTIR Gas Analyzer

Date: 31<sup>st</sup> Oct. 2023

**Domestic tender notification for the procurement of an FTIR based exhaust gas analyzer**

(Last Date for Submission: 21<sup>st</sup> Nov. 2023)

This is a Request for Quote (RFQ) from domestic (India-based) manufacturers only for procurement of an FTIR based exhaust gas analyzer system at the Interdisciplinary Center for Energy Research (ICER), Indian Institute of Science, Bangalore. With respect to this tender, the rules laid out by the Government of India in order No. P45021/2/2017-pp-BE-II issued by the Public Procurement Section, Department or Promotion of Industry and Internal Trade, Ministry of Commerce, and Industry, dated 4<sup>th</sup> June 2020 will be followed. As per this order, the government has defined a ‘Class-I local supplier’ as “a supplier or service provider whose goods, services or work offered for procurement, has local content equal to or more than 50%”. A ‘Class-II local supplier’ is “a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%”. Only Class-I and Class-II local suppliers are eligible to participate in this open domestic tender. Any “Non-local supplier” i.e., “a supplier or service provider, whose goods, services or works offered for procurement, has local content less than 20%” is ineligible to participate in this tender. The tender should be submitted in two separate sealed envelopes: one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 5 PM on 21<sup>st</sup> Nov. 2023.

The bids should be addressed to:

The Chair,  
Interdisciplinary Center for Energy Research  
Indian Institute of Science  
Bangalore 560012, India.  
Kind attention: Dr. Pratikash Panda  
email: [pratikashp@iisc.ac.in](mailto:pratikashp@iisc.ac.in), [chair.icer@iisc.ac.in](mailto:chair.icer@iisc.ac.in)

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## Section 1: Bid Schedule

1.	Tender No	IISc/ICER/Tender/2023/Domestic/FTIR Gas Analyzer
2.	Tender date	
3.	Instrument	FTIR Gas Analyzer
4.	Tender type	i) Technical bid (Part A) ii) Commercial bid (Part B)
5.	Place of tender submission	The Chair, Interdisciplinary Center for Energy Research (ICER) Indian Institute of Science Bangalore 560012, India Kind attention: Dr. Pratikash Panda
6.	Last date and time of tender submission	21 <sup>st</sup> Nov. 2023, 5 PM
7.	For Further clarification	Dr. Pratikash Panda Department of Aerospace Engineering Indian Institute of Science Bangalore 560012, India. Ph: +91-80-2293-2480 email: pratikashp@iisc.ac.in

## Section 2: Eligibility Criteria

Prequalification criteria:

1. Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
2. The quotations should be on FOR-IISc Bangalore basis in INR only.
3. The Bidder's firm should have existence for a minimum of 3 years (Enclose Company Registration Certificate).
4. The Bidder should belong to either Class 1 or Class 2 supplier distinguished by their "local content" as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter.
  - a. Class 1 supplier: Goods and services should have local content of equal to or more than 50%.
  - b. Class 2 supplier: Goods and services should have local content of equal to or more than 20 % and less than 50%.
5. Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as Class-1 local suppliers/Class-2 local suppliers by claiming the services such as transportation, insurance, installation, commissioning, training, and other sales service support like AMC/CMC, etc., as local value addition.
6. The bidder must provide a supporting document specifically indicating the indigenous components of the quoted product and percentage value addition locally.
7. Purchase preference as defined by the recent edits to GFR (within the "margin of purchase preference") will be given to the Class-1 supplier.
8. MSMEs can seek an exemption to some qualification criteria. IISc follows GFR2017 for such details.
9. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per - Annexure 4.
10. The Bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect has to be given as per Annexure 3.

### Section 3: Technical Specification for the FTIR gas analyzer

Submit quote for one FTIR based gas analyzer with following specifications.

#### **T1. Mandatory specifications:**

<b>A. FTIR specifications</b>		
<b>S.N.</b>	<b>Parameter</b>	<b>Specification</b>
1.	Operation of instrument	220-240 V / 50/60 Hz
2.	Wave number measurement range	At least 4000 to 400 $\text{cm}^{-1}$ with KBr beam splitter.
3.	Signal to noise ratio	$\geq 50,000: 1$ , peak to peak for 1 min and 4 $\text{cm}^{-1}$ resolution or better
4.	Optical system	Single / Double beam
5.	Wavenumber precision	0.008 $\text{cm}^{-1}$ at 2000 $\text{cm}^{-1}$ .
6.	Wavenumber Resolution	0.5 $\text{cm}^{-1}$ or better
7.	Optics	Sealed and desiccated optics Temperature controlled and moisture / humidity resistant KBr or ZnSe optics. Preferably ZnSe window capable of withstanding 300 °C.
8.	Light	high intensity long life ceramic source or better
9.	Interferometer	Standard interferometers preferably Michelson Interferometer (sealed & desiccated).
10.	Detector	MCT Detector or better.  i) The detector should be capable of withstanding temperature up to 300 °C. with scan range of 4000-400 $\text{cm}^{-1}$ and capable of a fast scanning rate of up to 100 scans/s with a SNR of 10,000:1 or better at resolution of 16 $\text{cm}^{-1}$ or better.
11.	Atmospheric compensation	Effect of atmospheric water, CO <sub>2</sub> to be minimized on sample spectra without the need for reference or calibration spectra. AVI to allow production of standard data referenced to fundamental band position.

12.	Gas cell	Temperature-controlled jacket, up to 300°C. With Viton seals and ZnSe window. The path length should be sufficient for the detection of gases with specified range of concentration in <b>Table C</b>
<b>B. System specifications</b>		
1.	Data acquisition software	Should be provided with the instrument
2.	Software	<ul style="list-style-type: none"> <li>• Should have self-diagnostic after initialization.</li> <li>• Provision for creation of library.</li> <li>• Provision for search functions like spectral search, peak search, text search.</li> <li>• Time-base software for continuous and online monitoring of effluent gasses.</li> </ul>
3.	Operating temperature	Room Temperature to 300 °C
4.	Warranty	At least 2 years for complete system.
5.	Upgradability	System should be upgradable for future needs with additional slots for mounting other detectors.
<b>Additional Requirements</b>		
7.	<ol style="list-style-type: none"> <li>I. Must be capable of direct analysis of hot and wet effluent streams without the need for sample pre-treatment.</li> <li>II. FTIR system to utilize high reflectivity, gold coated reflecting optics incorporating low angle off-axis design for optimal throughput.</li> <li>III. Multicomponent quantification algorithm and advanced chemometrics for statistical accuracy.</li> <li>IV. The FTIR gas analyser must be compatible with an existing GC/MS and thermal analyser system available at ICER, IISc Bangalore for hyphenation studies in order to continuously monitor the spectrographic and chromatographic analysis of exhaust gases.</li> </ol>	

**Table C: Required detection range for some of the species of interest.** (The vendor needs to include the measurement range of the quoted FTIR gas analyzer in the technical quote)

Major Gases	Measurement Range
CO <sub>2</sub>	0-100 % (by vol.) resolution in ppm (Min detection limit 0.1 ppm)
CO	0-10000 ppm (Min detection limit 0.1 ppm)
H <sub>2</sub> O	0-50 % (Resolution in ppm)
NO	0-2500 ppm (Min detection limit 1 ppm)
NO <sub>2</sub>	0-1000 ppm (Min detection limit 1 ppm)
SO <sub>2</sub>	0 – 3000 ppm (Min detection limit 1 ppm)

Minor Gases	Measurement Range
SO <sub>3</sub>	0-200 ppm
H <sub>2</sub> S	0 – 200 ppm
HCN	0 – 200 ppm
NH <sub>3</sub>	0 – 200 ppm
COS	0 – 200 ppm
HCl	0 – 200 ppm
N <sub>2</sub> O	0 – 200 ppm
Volatile Organic Compounds (CH <sub>4</sub> etc.)	0 – 200 ppm

**Required Accessories:**

1.	Online sampling capability	<p>System should be capable of monitoring gases continuously without lag (suitable flow control system should be included). Following additional components are required and the vendor needs to provide end to end customization to realize online gas sampling:</p> <ul style="list-style-type: none"> <li>• A probe (ceramic) to collect the sample exhaust gas should be quoted separately and must be included in the final bid.</li> <li>• High temperature gas transfer line from the exhaust plume to be connected to the FTIR analyser to provide online sampling capability.</li> <li>• Gases from the products of combustion may contain soot and ash particles, a separate in-line filter (particle trap) to be provided along with transfer lines.</li> </ul>
2.	Fast scanning module	The unit should be capable of measuring up to 100 scans/sec at a resolution of up to 16 cm <sup>-1</sup>
3.	Computer system	<p>Compatible Computer with latest operating system, Monitor + accessories – with latest RAM, suitable software and Windows 10 or later versions installed. Compatible software for multiple users with updated library.</p> <p>Remote access capability.</p>

## Section 4: Terms and Conditions

1. All documentations in the tender should be in English.
2. Tender should be submitted in two envelopes (two bid system).
  - a) Technical Bid (Part-A) – Technical bid consisting of all technical details and checklist for conformance to technical specifications. The proposal should contain a compliance table. The compliance table should include all the items of the technical specifications in the same order and format. The first additional column should describe product specifications. The next column should indicate compliance in a “Yes” or “No” response.
  - b) Commercial Bid (Part-B) – Indicating item-wise price for the items mentioned in the technical bid, as per the format of quotation provided in tender, and other commercial terms and conditions.
3. The technical bid and price bid should each be placed in separate sealed covers, superscribing on both the envelopes the tender no. and the due date. Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscribed with the Tender No, Tender Description & Due Date.
4. The SEALED COVER superscribing tender number and due date & should reach the office of the Chair, Interdisciplinary Center of Energy Research (ICER), Indian Institute of Science Bangalore 560012, India. Kind attention: Dr. Pratikash Panda, on or before the due date mentioned in the tender notice. In case the due date happens to be a holiday, the tender will be accepted and opened on the next working day. If the quotation cover is not sealed, it will be rejected.
5. The covering letter should clearly state that whether the vendor is a Class-I or Class-II local supplier. Failing this the bid will be automatically rejected. The letter should be supported by a supporting document from the original equipment manufacturer (OEM).
6. The Bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect should be provided.
7. The lead-time for the delivery of the equipment should be clearly mentioned in the technical and commercial bids and should not exceed 4 months from the date of issue of PO.
8. **The vendor must provide a compliance statement in a tabular form concerning each technical specification in the tender document duly supported by the manufacturer’s literature and published papers. The vendor should quote a configuration that can measure the desired range of gas concentrations specified in Table C. Any other claim will not be accepted and may lead to the rejection of the bid.**
9. Wherever requested, data must be supplied along with technical compliance documents. Technical bids without supporting data will be deemed as technically non-compliant.
10. The institute reserves the right to verify the accuracy and seek clarification of submitted specifications after opening the technical bids. Based on such clarification, if specifications are found to be unsuitable, the technical committee reserves the right to disqualify vendors. Any discrepancy between the promised and verified specifications will be deemed as technical non-compliance.
11. The technical bid should also contain warranty details and terms. Further, any periodic maintenance requirements for regular operation should be specified in detail, along with the extent of coverage under warranty for such maintenance activity.
12. The bidder will provide the prerequisite installation requirement of the equipment along with the technical bid. The vendor is responsible for the installation of the system at the institute, along with the training of end-users.
13. In the commercial bid, the price should be inclusive of all discounts. The price quotation should

- include the cost of installation and training of potential users if any.
14. The quotations should be on FOR-IISc Bangalore basis in INR only. GST must be not more than 18%
  15. Any statutory increase in the taxes after the bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore, subject to the claim being supported by documentary evidence. However, if any decrease takes place, the advantage will have to be passed on to IISc, Bangalore. Any information furnished by the bidder found to be incorrect, either immediately or later, would render the bidder liable to be debarred from the bidding process.
  16. The vendor should have an office with qualified technical service personnel based in India and should assure a response time of less than five business days.
  17. The vendor must submit a list of all Indian customers (only Government of India organizations) where similar systems have been installed. References from this list can be used to disqualify vendors with a poor track record of service, build quality, system performance, or poor availability of spares. Additionally, IISc shall have the absolute right to take the opinion of other departments/institutes for their opinion/experience about the bidder's services/sales. Based on such input, IISc may decide about the rejection of a bid of such bidder(s).
  18. The vendor should include at least three testimonials from existing users of a similar FTIR based analyzer system indicating the performance of the FTIR system and maintenance satisfaction.
  19. Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the rights:
    - a) To accept OR reject the lowest tender or any other tender or all the tenders.
    - b) To accept any tender in full or in part.
    - c) To reject the tender, offer not confirming the tender terms.
  20. The indenter reserves the right to relax any or all of the above conditions without assigning any reason.

**Annexure 1:**

Details of the Bidder: The bidder must provide the following mandatory information & attach supporting documents wherever mentioned:

Sr. No.	Type	Details
1.	Name of the Bidder	
2.	Nature of Bidder (Attach attested copy of Certificate of Incorporation/ Partnership Deed)	
3.	Registration No/ Trade License, (attach attested copy)	
4.	Registered Office Address	
5.	Address for communication	
6.	Contact person- Name and Designation	
7.	Telephone No	
8.	Email ID	
9.	Website	
10.	PAN No. (attach copy)	
11.	GST No. (attach copy)	

(Signature of the Bidder)

Name:

Designation, Seal

Date:

**Annexure 2:**

Declaration regarding experience

To,

The Chair,  
Interdisciplinary Center for Energy (ICER)  
Indian Institute of Science  
Bangalore 560012, India.  
Kind attention: Dr. Pratikash Panda

Ref: Tender No:

Dated:

Sub: Supply and installation of an FTIR based exhaust gas analyzer

I have carefully gone through the Terms & Conditions contained in the above referred tender. I hereby declare that my company / firm has ---- years of experience in supplying and installing FTIR based exhaust gas analyzer. My company personnel are trained and have the expertise to provide post-sale services and routine maintenance. All the necessary support will be provided on the bidded equipment as per the request of the principal investigator.

(Signature of the Bidder)

Name:

Designation, Seal

Date:

**Annexure 3:**

Declaration of track record

To,  
The Chair,  
Interdisciplinary Center for Energy (ICER)  
Indian Institute of Science  
Bangalore 560012, India.  
Kind attention: Dr. Pratikash Panda

Ref: Tender No:

Dated:

Sub: Supply and installation of FTIR Gas Analyzer

Sir,

I have carefully gone through the Terms & Conditions contained in the above referred tender.

I hereby declare that my company / firm is not currently debarred / blacklisted by any Government / Semi-Government organizations / institutions in India or abroad. I further certify that I am competent officer in my company / firm to make this declaration.

OR

I declare the following:

Sr. No.	Country in which the company is debarred/ blacklisted / having pending case	Blacklisted / debarred by Government / Semi Government Organizations or Institutions / having pending case	Reason	Time Period

(Note: In case the company / firm was blacklisted previously, please provide the details regarding period for which the company / firm was blacklisted and the reason/s for the same).

(Signature of the Bidder)

Name:

Designation, Seal

Date:

**Annexure 4:**

Declaration of acceptance of terms and conditions

To,  
The Chair,  
Interdisciplinary Center for Energy (ICER)  
Indian Institute of Science  
Bangalore 560012, India.  
Kind attention: Dr. Pratikash Panda

Ref: Tender No:

Dated:

Sub: Supply and installation of FTIR Gas Analyzer

Sir,

I have carefully gone through the Terms & Conditions contained in the above referred tender document. I declare that all the provisions of this tender document are acceptable to my company. I further certify that I am an authorized signatory of my company and am, therefore, competent to make this declaration.

(Signature of the Bidder)

Name:

Designation, Seal

Date:

**Annexure 5:**

Details of items quoted:

- a. Company Name
- b. Product Name
- c. Part / Catalogue number
- d. Product description / main features
- e. Detailed technical specifications
- f. Remarks, if applicable

Instructions to bidders:

1. Bidder should provide technical specifications of the quoted product/s in detail.
2. Bidder should attach product brochures along with technical bid.
3. Bidder should include a covering letter clearly stating that whether they are a Class-I or Class-II local supplier. The letter should be supported by a supporting document from the original equipment manufacturer (OEM).
4. Bidders should clearly indicate compliance or non-compliance of the technical specifications provided in the tender document.

**Annexure 6: The bidder needs to follow the format below and provide the declaration of local content on the company letter head:**

## **Declaration of Local Content by Local supplier**

**Subject:** Public Procurement (Preference to Make In India)

References:

Preference to Make in India including counter offering will be as per the Public Procurement (Preference to Make in India), Order 2017 available in the following links <https://dipp.gov.in/public-procurements>

[http://dipp.nic.in/sites/default/files/publicProcurement\\_MakeinIndia\\_15June2017.pdf](http://dipp.nic.in/sites/default/files/publicProcurement_MakeinIndia_15June2017.pdf)

[http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017\\_28052018.pdf](http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017_28052018.pdf)

[https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019\\_0.pdf](https://dipp.gov.in/sites/default/files/PPP-MII%20Order%20dt%2029th%20May%2019_0.pdf)

<https://dipp.gov.in/sites/default/files/PPP%20MII%20Order%20dated%204th%20June%202020.pdf>

We hereby declare with reference to above subject and references that M/s

------(Tick whichever is applicable as below)

"Class-I local supplier" meeting the requirement of minimum local content equal to 50% (fifty percent) or more defined in the above government notification for the goods and services  
(or)

“Class-II local Supplier” meeting the requirement of local content 20% to less than 50% (fifty percent) defined in the above government notification for the goods and services

(or)

Non Local supplier (If not belonging to Class-I & Class-II)

Please mention the details against the following:

Enquiry no:----- dated:-----

Type of Supplier (Class-I/Class-II) .....

Product:-----

Project:.....

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

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We also understand that the 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 permissible under law.

Authorized Signature M/s -----

(Signature and seal)

Place:.....

Date:.....

## Section 5 – Commercial Bid

The commercial bid should be furnished with all requirements of the tender with supporting documents as mentioned under:

Items requested in the mandatory specification section

S.No	Description	Cat. Number	Quantity	Unit Price	Sub total
1.	Essential items noted in the technical specification				
2	... (details of essential items)				
3.	Warranty (years)				
4.	FOR-IISc Bangalore only				

Items requested in the optional specification section

S.No	Description	Cat. Number	Quantity	Unit Price	Sub total
1.	Optional items noted in the technical specification				
2	... (details of Optional items)				
3.	Warranty (years)				
4.	FOR-IISc Bangalore only				

## Section 6 - Checklist

The following items must be checked before the bid is submitted.

1. Sealed Envelope “A”: Technical Bid  
Technical bid (signed by the authorized signatory and sealed) with the below documents:
  - a. Annexure 1: Bidders details
  - b. Annexure 2: Declaration regarding experience
  - c. Annexure 3: Declaration of track record
  - d. Annexure 4: Declaration of acceptance of terms and conditions
  - e. Annexure 5: Details of item quoted.
  - f. Annexure 6: Declaration of local content by local supplier
  
2. Sealed Envelope “B”: Commercial Bid

Your quotation must be submitted in two separate sealed envelopes: Technical Bid (Envelope A) and Commercial Bid (Envelope B) super scribing on both the envelopes with Tender No. and due date. These envelopes should be put in a bigger cover which should also be sealed and duly super scribed with Tender No., Tender description & Due Date.