



INTERNATIONAL ADVANCED RESEARCH CENTRE FOR
POWDER METALLURGY AND NEW MATERIALS (ARCI),
Balapur P.O, R.R. District, Hyderabad – 500 005, Telangana, India
Tel: 040-244523326, Fax: 040-24442699
Web Site: www.arci.res.in, E-mail: stores@arci.res.in

Tender No. CF20150108/PO

Date 09.03.2018

TENDER DOCUMENT

TG/DTA/DSC COUPLED MASS SPECTROMETER: Supply, Installation, Commissioning and Demonstration

1.	Cost of Tender Document (Non- Refundable)	Rs 1000.00
2.	EMD (Earnest Money Deposit/Bid Security)	Rs 2,37,500.00
3.	Tender document published date	09.03.2018
4.	Bid documents can be downloaded from	www.arci.res.in www.eprocure.gov.in
5.	Clarification start date and end date	14.03.2018 to 23.03.2018
5.	Bid submission start and time	26.03.2018 09.00 AM
	Bid submission end date and time	09.04.2018 before 3.30 PM
6.	Bids opening date and time (for technical bids covers)	10.04.2018 at 3:00 PM



**INTERNATIONAL ADVANCED RESEARCH CENTRE FOR
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Balapur P.O, R.R. District, Hyderabad – 500 005, Telangana, India

Tel: 040-24452326, Fax: 040-24442699

Web Site: www.arci.res.in E-mail: stores@arci.res.in

Instructions to Bidder

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TENDER NOTICE

International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) is an Autonomous Research and Development Centre of Department of Science and Technology (DST), Government of India with main campus at Hyderabad and with operations in Chennai and Gurgaon.

ARCI would like to procure the following equipment. The Technical Specifications Schedule of Requirements and Allied Technical details are given in Part-1 of tender document.

Item: **TG/DTA/DSC COUPLED MASS SPECTROMETER: Supply, Installation, Commissioning and Demonstration**

Tender Enquiry No: (Case No.) CF20150108/PO dated 09.03.2018

- Last date and time of submission of Tender (Tender fee, EMD, Technical and Price Bid): 09.04.2018 before 3:30 PM
- Tender fee and EMD should be in the form of Demand Draft drawn in favour of **Director, International Advanced Research Centre, payable at Hyderabad.**
- The item to be delivered and installed at :
**CENTRE FOR AUTOMOTIVE ENERGY MATERIALS (CAEM),
ARCI-CHENNAI
IITM RESEARCH PARK, 7TH FLOOR, PHASE 1, SECTION B
6 KANAGAM ROAD,
TARAMANI, CHENNAI 600 113, TAMIL NADU, INDIA**

The tender document should consist of the following:

Two bid system should be followed for this tender. In this system the bidder must submit offer in three separate sealed envelopes i.e., one envelope each for technical bid, EMD and commercial bid. These envelopes should be securely sealed and stamped separately and clearly marked as “**Envelope No.1- Tender fee and EMD**”, “**Envelope No. 2- Technical Bid**” and “**Envelope No.3 – Commercial Bid**”. All the sealed envelopes should be placed in another larger envelope. The main envelope which will contain all the envelopes should be super-scribed with the tender enquiry no. **CF20150108/PO** date 09.03.2018 due on 09.04.2018 with name of the equipment /item and is to be submitted to the address given below so as to reach **on or 09.04.2018 before**

3.:30 PM.

The Bidder should ensure that the Prices are mentioned only in the Financial Bid and nowhere in the Technical Bid.

Validity of Bid

Quotation should have minimum validity of **120 days** from the date of opening

Address for submission of the Tender:

**CENTRE FOR AUTOMOTIVE ENERGY MATERIALS (CAEM),
ARCI-CHENNAI
IITM RESEARCH PARK, 7TH FLOOR, PHASE 1, SECTION B
6 KANAGAM ROAD,
TARAMANI, CHENNAI 600 113, TAMIL NADU, INDIA**

Last date for submission: 09.04.2018 before 3:30 PM

Tender should be submitted before last date stated above. The Tenders not accompanied by EMD and cost of tender document in the form of Demand Draft favoring Director, ARCI, payable at Hyderabad are liable for rejection.

The bid can be submitted in person or through post/courier. ARCI will not be responsible for transit delay for tenders submitted by Post / Courier etc.

All the tenders, in which any of the prescribed conditions are not fulfilled or incomplete in any respect are liable to be rejected.

Clarification on bid

Bidders can seek clarification as per the schedule start and end date through email IDs given below:

For technical clarifications: **sahanamb@arci.res.in**

For commercial clarifications: **stores@arci.res.in**

Opening of the tender

The offer/bid will be opened by a committee duly constituted for this purpose. The bidder if interested may participate on the tender opening date and time. The bidder should produce authorization letter from their company to participate in the tender opening. Only one representative will be allowed to participate in the tender opening. The schedule of tender opening is:

Technical Bid opening date and Time : 10.04.2018 at 3:00 PM (Tuesday)

PLACE :- CENTRE FOR AUTOMOTIVE ENERGY MATERIALS (CAEM),
ARCI-CHENNAI
IITM RESEARCH PARK, 7TH FLOOR, PHASE 1, SECTION B
6 KANAGAM ROAD,
TARAMANI, CHENNAI 600 113, TAMIL NADU, INDIA

The bidders who are technically qualified will be called separately for opening of price bids.

Award of Contract

Contract will be awarded to successful bidder and a copy of the award of the contract will be uploaded in CPPP portal after finalizing the tender.

Disqualification of the Tenders:

The tenders are liable for rejection in the following circumstances:

- If they are not in line with the terms and conditions of this tender notice.
- Conditional quotations
- Incomplete tenders
- Tenders without EMD and cost of tender document
- Tenders submitted through Fax or e-mail
- If two bid system is not followed

Director, ARCI reserves the right to accept or reject any or all tenders either in part or in full or to split the order without assigning any reasons there for.

IMPORTANT NOTE: Amendment, Corrigendum if any to this tender document, WILL BE HOSTED ONLY IN ARCI WEBSITE and CPPP portal and no separate Press Notification will be issued. Bidders are advised to visit our website and CPPP portal regularly to know such details.

Director, ARCI, Hyderabad

PART-1

TECHNICAL BID (Terms and Conditions)

I. Vendor qualification criteria:

- A. Original Equipment Manufacturer (OEM) or authorized representatives of OEM only can quote for this tender. Vendor should submit authorization letter valid on tender date from OEM along with the quotation.
- B. The OEM should have proven expertise in manufacture and supply of the item.
- C. The bidder should have supplied at least 10 or more similar units in India or abroad in the last 5 years.
- D. It is essential that the manufacturer shall provide the list of users of the equipment with contact particulars.
- E. OEM is required to submit a letter of commitment at the time of quote for supply of spares and also for efficient and prompt after sales service of the equipment for a minimum period of 5 years after the guarantee/warranty period under mutually agreed terms and conditions.
- F. Failure to meet any of the above vendor qualification criteria may lead to disqualification of tender at technical evaluation stage itself and vendor's quotation may not be considered for procurement.

II. Pre dispatch inspection

- A. The manufacturer/supplier of the unit shall demonstrate, if required, at their works during pre-dispatch inspection by ARCI personnel and shall satisfy all the technical specifications as described in the tender document.
- B. The manufacturer /supplier of the unit shall demonstrate the features as provided in **Annexure-I (Scope of supply work)**.
- C. All the consumables, raw materials, required for the above demonstration should be arranged by the tenderer.
- D. All the utilities and manpower required for the demonstration shall be arranged by the supplier only

III. Acceptance criteria:

- A. The manufacturer/supplier's trained engineer should carry out installation and commissioning of the unit at ARCI.
- B. The entire functionality of the equipment according to the specifications should be demonstrated at ARCI.
- C. The manufacturer /supplier of the unit shall demonstrate the features as specified in **Annexure I (Scope of Supply)**.
- D. Required infrastructure required for the above demo will be arranged by ARCI.

IV. Other aspects:

1. PATENT RIGHTS:

The Supplier shall indemnify ARCI against all third-party claims of infringement of patent, trademark or industrial design rights, copy rights arising from use of the Goods or any part thereof in India.

2. Training:

The manufacturer shall impart training in the operation and preventive/breakdown maintenance of the complete unit including sub-parts during installation to ARCI personnel for at least 4 no. of days at ARCI

3. Utilities/Infrastructure for installation:

- A. Supplier shall indicate all the required utilities/infrastructure such as power, water, gas, etc including power backup requirements.
- B. Supplier shall provide overall dimensions of the Unit along with floor area/height of the site or building, including foundation details if any, for accommodating the Unit.
- C. The operating environment for the Unit including temperature and humidity control, anti-vibration, EMI, EMC etc. should be indicated.
- D. If any charges extra are payable for Installation and Commissioning, the same should be included in the total cost of the stores as per the price schedule (BOQ).
- E. The equipment should be lifted to 8th floor through the Passenger lift. Keeping this constraint, the dimension of the packing should be restricted to the dimension of the Passenger lift (Lift dimension 0.9m width, 1.7m height, 2.0m depth)

4. Manuals, software and other drawings etc:

The following documents (in English) shall be provided along with the Unit in both hardcopy and softcopy forms:

- A. Operation and maintenance manuals, troubleshooting procedures, calibration methods, wiring and other schematic diagrams, list of components, spares and accessories.
- B. If there are any bought-out systems and components, manuals should be provided in hardcopy and softcopy forms for the same.
- C. Calibration certificates for sensors, instruments, gauges, display units etc. must be provided.
- D. Software upgrades pertaining to the supplied Unit should be provided free of cost as and when new versions are released by the OEM.
- E. Safety and security instruction manual should be provided.

5. After-sales service:

The supplier shall guarantee efficient and prompt after-sales service including the supply of the spares for a minimum period of 10 years after the guarantee/warranty period under mutually agreed terms and conditions.

6. Bought-out items:

All bought-out sub-systems and components if any should be of reputed make conforming to international standards. Make and details of all bought-out sub-systems and components shall be specified.

7. General Quote:

The breakup for accessories or sub system(s) /attachments apart from the basic system, if any, should be quoted separately.

8. Export License: The supplier should clearly indicate their ability/readiness to obtain the export license /clearance from the concerned authority for the supply of the unit as per the contract specifications to ARCI.

9. Technical compliance statement: The vendor should provide item wise details against each and every specification, Deviations if any are to be highlighted.

10. Guarantee/warranty:

The Unit shall be under warranty **for a period of three year from the date of acceptance.** During the warranty period, all software and hardware updates shall be provided free of cost. Items, if any, excluded from the warranty shall be explicitly mentioned by the supplier.

The Unit shall be guaranteed for satisfactory performance for 3 years from the date of installation, commissioning and acceptance at ARCI. The manufacturer shall replace premature failure of parts during the guarantee period at their cost and risk.

11. Delivery/ time schedule:

The offer shall be accompanied by a detailed delivery time schedule showing the individual time schedule required for submission of initial equipment layout drawings, foundation drawings along with load data, main equipment and sub-assembly drawings, shipment schedule of the equipment as well as the time for installation, commissioning and performance tests.

12. Packing:

The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit. In order to maintain safety of the equipment, we prefer to have wooden crating with adequate cushion inside for transportation of any goods. The Material has to be dispatched with International standard packing to withstand rigors, and to avoid any transit damages.

13. Packing Instructions:

Each package will be marked on three sides with proper paint/indelible ink, the following:

- i. Purchaser Name & Address
- ii. Item Nomenclature
- iii. Order/Contract No.
- iv. Country of Origin of Goods
- v. Packing list reference number

14. Insurance:

The Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery.

For delivery of goods at the purchaser's premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from "Warehouse to warehouse" (final destinations) on "All Risks" basis including war Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after dispatch **or upto installation and commissioning of stores whichever is later** . However, in case of orders placed on FOB/FCA basis, the purchaser shall arrange insurance.

15. General instructions:

- A. The Technical Bid must be submitted in an organized and structured manner. No brochures/leaflets etc. should be submitted in loose form. Please indicate page nos. on your quotation. **The price should not be mentioned anywhere in this document.**
- B. Tenders, which are submitted without following the Two-Bid Offer System, are liable to be rejected.

- C. The technical offer should be complete to indicate that all products and services asked for are quoted. Each page of the bid and cutting/corrections shall be duly signed and stamped by the bidder. Unsigned Tenders are liable to be rejected. Failure to comply with this requirement may result in the bid being rejected.
- D. The purpose of certain specific conditions is to get or procure best product/service etc. for ARCI. The opinion of Technical Committee shall be the guiding factor for technical short listing.
- E. Vendor should provide list of deliverables / bill of materials and services.

PART- 2

EARNEST MONEY DEPOSIT

Earnest Money Deposit in the form of Indian or foreign demand draft Drawn in favour of Director, **International Advanced Research Centre, Payable at Hyderabad.**

No interest is payable on EMD. The EMD will be returned to the bidders(s)/Agents whose offer is not accepted by ARCI within one month from the date of the placing of the final order(s) on the selected bidder(s). EMD of the successful bidder shall be converted into performance guarantee and shall be release on submission of bank guarantee.

EMD in the form of BG is not acceptable.

Amount of EMD Rs.2,37,500.00 (Rupees two lakhs thirty seven thousand five hundred only) in INR or equivalent foreign currency.

Bidder registered with Department of Micro, Small and Medium Enterprises as MSEs and having valid NSIC registration are exempted for payment of tender fee and EMD subject to submission of documentary evidences .Copies of registration certificate and other supporting documents should be submitted in cover no. 1.

Supplier must quote their GSTIN no. for tender fee and EMD.

PART-3

PRICE BID

I. Terms and Conditions:

- a) Envelope 3 should contain price schedule (as per the table) complete in all respects with proper seal and signature of authorized person.
- b) Tender with any condition, including conditional rebate, are liable to be rejected.
- c) Cost of all the items should be mentioned clearly and individually in the Commercial Offer (Part- III) only.
- d) AMC scope with associated costs including number of visits has to be quoted separately.
- e) The Bidders are requested to quote for **Research Institutional Prices** for Machine/ Equipment and, since ARCI is eligible for the same. The quoting party should ensure that the quoted prices are the minimum and that have not quoted the same item on lesser rates than those being offered to ARCI to any other customer.
- f) Printed conditions of the vendor submitted with the tender will not be binding on ARCI.
- g) The commercial bids of only the technically qualified bidders shall be considered for further processing.
- h) The price quoted shall be considered firm and no price escalation will be permitted during the currency of contract. The quotation should be in standard currency on Ex works/FOB/FOR basis. Freight, insurance, Agency commission (if any) and commissioning charges, if not included, may be quoted separately in Commercial Bid.
- i) Commercial Bid (prices quoted) should not be enclosed in the technical bid envelope. If the price quote is submitted with technical bid the tender are liable to be rejected.
- j) The Director ARCI reserves the right to accept the offer in full or in parts or reject summarily or partly thereof.

II. Payment terms:

- a) For import:

An irrevocable Letter of Credit [L/C] for 100% of the order value will be established by the purchaser in favour of the supplier, through purchaser's bank in India once the following condition is met:

Receipt of order acknowledgement and acceptance of the order.

THE ACTUAL PAYMENT TO SUPPLIER WILL HOWEVER BE RELEASED IN TWO STAGES IN THE FOLLOWING MANNER:

Payment for 90% of the order value will be made upon shipment of the equipment and negotiation of the following shipping documents through L/C:

- 1) Signed Commercial Invoice - Original + 5 Copies
- 2) Airway Bill/Bill of lading - Original + 5 Copies.

3) Packing List -Original + 5 Copies

4) Certificate of conformity from the supplier that stores/equipment has been tested by the supplier and the same meet the technical specification - Original + 3 Copies.

5) Supplier's Certificate to the effect that the contents in each package are not less than those entered in the Invoice and the Packing List - Original + 3 Copies.

Balance 10% of the order value will be released through L/C upon submission of the following documents:

1) Commercial Invoice for 10% order value.

2) Final Acceptance Certificate [FAC] issued by the purchaser/authorized representative in original against satisfactory installation and commissioning of the equipment at ARCI Site.

3) Bank Guarantee Equivalent to 10% of total order value covering warranty period of the equipment issued or counter guaranteed by an Indian Bank clearly mentioning the relation with OEM if submitted by Indian Agent.

4) If the above-mentioned performance bank guarantee is not provided, 10% of the order value (i.e. second stage payment) will be released only after the expiry of the warranty period from the date of FAC.

1) Domestic purchase:

Payment Terms

Subject to deduction of taxes at source, if any,

90% of the goods cost + 100% taxes will be paid after receipt of the goods at our site subject to inspection & acceptance of the goods/works/commissioning by ARCI authorities.

Balance 10% will be paid against submission of Performance Bank Guarantee (i.e. 10% of the total order value excluding taxes etc.) from a Nationalized /Scheduled Bank valid till the expiry of the warranty period OR after completion of warranty period from the date of successful commissioning of equipment at ARCI.

III. Final acceptance certificate (FAC)

On installation, the working of the equipment should be demonstrated so as to comply with all the technical specifications. In this connection, it is to be noted that the installation report is not to be treated as the Final acceptance certificate (FAC)

The FAC will be issued by the PURCHASER only on demonstration of the technical specifications. The warranty shall commence only from the date of the issuance of the FAC. The FAC shall be issued by the PURCHASER at a date not later than 30 (thirty) days from the date of installation provided the equipment functions as per the specifications.

IV. Liquidated damages (LD)

As time is the essence of the contract, delivery period mentioned in the Purchase Order should be strictly adhered to. Otherwise, LD clause will be applicable /enforced. If the supplier fails to Supply, Install and Commission the equipment as per specifications mentioned in the order within the due date, ARCI may levy a penalty for such delay by way of liquidated damages, at 0.5% per week of delay or part thereof, and in aggregate not exceeding 5% of the order value. Such LD will be deducted from any amount due or which may become due to the supplier.

V. Order acceptance

The successful bidder, on award of contract / order, must send the contract / order acceptance in writing, within 15 days of award of contract / order failing which the EMD will be forfeited.

VI. Award of contract:

ARCI reserves the right at the time of award of Contract to increase or decrease the quantity of items specified in the Schedule of Requirements without any change in price or other terms and conditions.

VII. Corrupt or Fraudulent Practices:

ARCI requires that the bidders who wish to bid for this project have highest standards of ethics. ARCI will reject a bid if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices while competing for this contract. ARCI may declare a vendor ineligible, either indefinitely or for a stated duration, to be awarded a contract if it at any time determines that the vendor has engaged in corrupt and fraudulent practices during the execution of contract.

VIII. Interpretation of the clauses in the Tender Document / Contract Document:

In case of any ambiguity / dispute in the interpretation of any of the clauses in this Tender Document, Director, ARCI's interpretation of the clauses shall be final and binding on all parties.

The equipment must be supported by a Service personnel trained by the principal vendors

The vendor will have to arrange for all the testing equipment & tools required for installation, testing & maintenance etc. Installation and integration of all supplied hardware and software shall be done by the vendor. The vendor shall install and configure all required hardware and software. The bidder must install and configure user application / software, and demonstrate its running in parallel as part of the system acceptance. The application software will be provided by the Institute.

IX. Indemnity:

The vendor shall indemnify, protect and save ARCI against all claims, losses, costs, damages, expenses, action suits and other proceeding, resulting from infringement of any law pertaining to patent, trademarks, copyrights etc. or such other statutory infringements in respect of all the equipment's supplied by him.

X. Arbitration

For Domestic Supplier

In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to arbitrator appointed by Director ARCI. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.

The venue of the arbitration shall be the place from where the purchase order/contract is issued.

Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree.

For Imports

In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.

PRICE SCHEDULE FOR FOREIGN SUPPLIERS

Currency:

Sl. No.	Name of the equipment	County of Origin	Quantity	Price in foreign currency
1.	Main equipment			
2.	Accessories			
3.	Spares and consumables			
Packing and forwarding Charges				
Ex-works Price				
Discount if any				
Net Ex-works Price				
FOB Charges				
FOB Price				
Charges for freight and insurance				
Total price (CIF/CIP)				
AMOUNT IN WORDS				

Note: The Bidder may please fill in this form or the same may be typewritten on the Letter Head of the Bidder exactly as per the above format and submit the same as per the instructions given in the tender document.

ARCI is exempted from paying Customs duty as per Notification No.51/96-Cus (as amended from to time). Hence rates to be quoted accordingly.

Other information:

- a) Any installation and commission charges
- b) Any other optional item and their prices should be mentioned separately
- c) AMC Charges

[SIGNATURE OF BIDDER]
NAME AND ADDRESS OF BIDDER

PRICE SCHEDULE FOR DOMESTIC SUPPLIERS

Sl No.	Name of the equipment	Quantity	Unit/Price	Total Amount(Rs)
1	Main equipment			
2	Accessories			
3.	Spares and consumables			
Discount if any				
Net Price				
Taxes (GST with HSN/SAC codes) if any				
Total price (FOR – ARCI)				
AMOUNT IN WORD:				

Note: The Bidder may please fill in this form or the same may be typewritten on the Letter Head of the Bidder exactly as per the above format and submit the same as per the instructions given in the tender document.

ARCI is a public funded research institution, concessional GST rate may please be quoted with reference to GST Notification no. 45/2017 dated 14.11.2017. ARCI will provide certificate for the same.

Other information:

- a) Installation and commission charges, if any
- b) Optional items and their prices should be mentioned separately
- c) AMC Charges

[SIGNATURE OF BIDDER]
NAME AND ADDRESS OF BIDDER

Declaration by the Vendor

It is hereby declared that I/We the undersigned, have read and examined all the terms and conditions etc. of the tender document for which I/We have signed and submitted the tender under proper authorization. It is also certified that all the terms and conditions of the tender document are fully acceptable to me/us and I/We will abide by the conditions of the tender. We have not given any printed conditions beyond the scope of this tender. This is also certified that I/We/our principal manufacturing firm has no objection in signing the purchase contract if the opportunity for the supply of the items against this tender is given to me/us.

Date:

Signature:

Name:

Address:

Designation:

On behalf of:

SCOPE OF WORK

Simultaneous Thermal Analysis System (TGA-DSC) (Simultaneous Thermogravimetry and Differential Scanning Calorimetry (TG-DSC)) Coupled with mass spectrometer and accessories

1. Main Equipment: Simultaneous Thermal Analysis System (TGA DSC) (Simultaneous Thermogravimetry and Differential Scanning Calorimetry (TG DSC)) Coupled with mass spectrometer and accessories
2. Measurement Modes: Simultaneous DSC TGA, DTA TGA and TGA measurements mode in the same System. Measurement mode should be based on heat flux sensor design for true DSC
3. Furnace with temperature range: From ambient up to 1600 degree C
4. Heating rate: 0.1 degree C per min to 20 degree C per min up to 1600 degree C
5. Preferred Cooling rate: 5 degree C per min minimum
6. Temperature resolution + or - 0.1degree C or better, with suitable temperature sensor from ambient to 1600 degree C Temperature accuracy < + or - 0.5 degree C
7. Programmable Temperature controller: microprocessor (With 32 bits or better). Should accommodate at least 20 programs to heat, cool, and isothermal hold to facilitate different linear rates of heating cooling between one or two isothermal steps of different duration
8. Calibration: The system should have facility to calibrate with certified pure metal standard for the full temperature range up to 1600 degree C. Calibration kit with minimum 5 traceable standards for temperature, enthalpy calibration and weight calibration.
9. Appropriate furnace cooling system
10. Pressure: vacuum of 10⁻² mbar along with adequate vacuum pump and in built vacuum gauges (Range: digital in % of vacuum) should also be provided to measure the pressure.
11. Atmospheric condition: dynamic with air, oxygen, inert gas (Nitrogen, Argon) and vacuum
12. Mass flow controllers with automatic switching and setting of gas flow rates thru Software.

13. Gas flow rate range should be 10 to 200 ml per min or more for each purge gas in sample chamber, controlled by mass flow meter using digital mass flow controllers. Mass flow controller should be calibrated. Flow rate should be programmable in the software and deliverable as a saved signal in the data file
14. Balance load capacity for TG: 1 g or more TG: Resolution 0.1 to 1 micro gram real resolution for complete measurement range
15. Baseline Linearity + or - 1 micro gram for complete temperature range
16. Balance drift <10 micro gram per hour or better throughout the entire temp range
17. Thermostat for balance (Water or Air cooled) Temperature accuracy +or - 0.01 degree C
Stability of balance temp. at 22degree C +or - 0.1degree C
18. Sensor type: DTA, DSC, DSC Cp quick change
19. DSC : Resolution : < 0.4 micro V per mW
20. High sensitivity DSC Cp (heat capacity) sensor: < 3%
21. A suitable interface between Quadrupole Mass Spectrometer and thermogravimetric analyzer to be provided for analyzing the gases coming from the sample
22. Controlling the TG DTA and MS units together through a single Workstation shall be provided. Plotting Editing Exporting the data in ASCII form and as a curve shall be possible with a user friendly software.
23. EGA Needed with the system: Quadrupole Mass Spectrometer with suitable detector and following specification
 1. Mass range (amu): 1 to 300 amu or better
 2. Mass resolution : < 0.5 amu
 3. Sensitivity: < 100 ppb (gas dependent)
 4. Ionization source: Electron Ionization
 5. Transfer line temperature: 300 degree C or more
 6. Transfer line: of the order of 1meter, flexible 2 numbers or skimmer arrangement.
 7. Software: synchronized data acquisition along with TGA
 8. Provision for multiple ion detection

9. Shall have suitable safety interlock to protect the quadrupole analyzer and detector in case of accidental over pressurization.
10. Necessary pumping system for mass spectrometer to be provided. It should encompass a turbo molecular pump (10^{-6} mbar) to pump the mass spectrometer Chamber backed by a suitable roughing backing pump (10^{-3} mbar), along with isolation valve and vacuum measurement gauges

Software:

MS Windows based thermal analysis software for data collection and treatments for routine evaluations such as glass transition, peak area, peak temperature and mass loss. PEAK TEMPERATURE, STEP CALC. with appropriate calibration routines, horizontal or tangential regression lines, tables, 2nd & higher derivative, blank curve subtraction, normalization, signal deconvolution, X scaling with respect to time, temperature, sample temperature; result documentation settings using single step, multi step or multi limit, auto limit; choice of different baselines for interpretation (line, tangential, integral) etc.

Software corrections for thermal resistance and time constant factors to be available.

Data and graphic export to MS office, origin, etc (.csv, .txt, and .dat format).

Software shall have to be compatible for installation in multiple computers and repeated installation have to be allowed. Provision to save data automatically till the temperature of operation in case of power tripping and facility for multitasking.

Main Accessories:

- (i) Reference standard for calibration for low temperature and high temperature up to 1600 degree C): Calibration sample kit with 8 substances 400 mg each (Indium, Tin, Bismuth, Zinc, Aluminum, Silver, Gold, Nickel) for DSC DTA calibration of enthalpy and temperature
- (ii) Set of standard samples for calibration measurements (Cp or sensitivity enthalpy), with purity certificate.
- (iii) Sample preparation set for high temperature range, appropriate for STA
- (iv) Mass flow controller for accurate gas flow ranging from 0 to 200 ml min

- (v) Sample crucible from Al₂O₃ 99.7, 0.3 ml (or nearest capacity) set of 100 pieces with appropriate lids (mandatory)
- (vi) Matched pair of sample cups for DSC in sets of 5 pairs made of Pt with lids for 100 micro liter or nearest sample capacity (mandatory)
- (i) Additionally Required : Alumina, platinum crucible and lids of various size have to be quoted as optional items in sets of 5
- (ii) Reference standard for calibration (01 set for low temp. and 01 set for high temp.)
- (iii) High end Desktop PC with MS Windows 7 OS
- (iv) Common tools and essential spares (such as each type of O rings, ferrule, nuts, bolts, ranges, PTFE SS gas tube between system and cylinders etc.) necessary for servicing or trouble shooting have to be supplied for a period of three years operation.
- (v) Double stage SS regulators, connectors, has to be supplied by the supplier of the instrument and those have to be connected and integrated with the main unit. Capacity of the regulator and gas flow meter should comply with the desired gas flow rate as stated in the specification
- (vi) Sensor stand 01 no.
- (vii) Tool kit for TG DSC crucibles for reshaping of crucible and crucible lids

Optional: low temperature option down to - -170 degree C

Note:

1. The complete job involves supply, installation, commissioning and training of the equipment and all accessories as above.
2. Minimum 5 number of supply and installation of simultaneous thermal analysis couple with mass spectrometer should have been carried out in India for considering the bid.
3. All machine manuals and software to be supplied with media hardcopy.
4. Bidder should submit (a) all original product brochures and technical literature with detailed machine specifications
5. Training at customer site for 4 to 5 days to be provided.
6. The Instrument should be supplied along with Branded Latest PC with configuration which should be compatible with the instrument
7. Service Support Factory trained Engineers, specify the no. of Engineers with base location, Response time, Availability of Parts Consumables Warranty AMC costs with no. of visits needs to be provided
8. Warranty: Three years Comprehensive Warranty from the date of installation on the complete system, including all the subsystems. In case of breakdown during the warranty period, a competent service engineer of the supplier should make as many visits as necessary to rectify the problem and replace the faulty parts. But it should be repaired within 72 working hours from the

date and time of complaint lodged by the user. The supplier should provide all spares required for making the instrument operational

9. Spares: The supplier of the instrument must confirm in writing that the spares for the entire instrument will be available for a period of at least ten years after the installation of the instrument.
10. User list with contacts: Vendor should provide us a list of installations in India with all contact details and model details and modules available, so that ARCI can approach the contact person for any feedback.
11. Quote must have a compliance report on all the above points.

Evaluation and Acceptance Criteria:

The supplier shall demonstrate satisfactorily the functioning of the equipment with respect to the following technical specifications during factory acceptance test as well on site test.

1. Maximum furnace temperature 1600 C.
2. Resolution of TG balance:
3. Data acquisition, storage and analysis shall be demonstrated
4. TGA mode: Temperature calibration using melting point standards such as Ag and Au shall be demonstrated.
5. TG DTA: temperature calibration up to 1600 C
6. TG DSC: temperature calibration up to 1600 C shall be demonstrated.
7. TG EGA (QMS): TG DSC EGA (QMS): TG DTA EGA (QMS): Calibration and demonstration of decomposition of Calcium Oxalate monohydrate, ($\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$) three steps (loss of water, loss of carbon monoxide and loss of carbon dioxide). Correspondingly, the trend data from the mass spectrometer to determine the amount of evolved gases for low mass to charge (m per e) ratio species such as water and carbon dioxide shall be demonstrated.
8. The sensitivity of QMS should be demonstrated for residual gas
9. The Kinetics of decomposition of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ up to the formation of Cu_2O and CaO respectively in inert environment by carrying out TG DTA runs at the heating rates of 5, 10 and 20 K min. and analyzing the evolved gases should be carried out to ascertain the capabilities and performance of the system.
10. Blank run up to 1600 degree C with heating/cooling rate of 5 degree/min

Supply, installation, commissioning, training and services must be done at

CENTRE FOR AUTOMOTIVE ENERGY MATERIALS (CAEM),
ARCI-CHENNAI
IITM RESEARCH PARK, 8TH FLOOR, PHASE 1, SECTION B
6 KANAGAM ROAD,
TARAMANI, CHENNAI 600 113, TAMIL NADU, INDIA

CHECKLIST

BIDDER HAS TO FILL IN THE CHECK LIST GIVEN BELOW

(State YES/NO for each item)

1.	If bidder is not a original equipment manufacturer, authorization letter attached.	
2.	Whether Earnest Money Deposit (EMD) and tender fee (envelope I) Submitted	
3.	Whether Technical Bid (envelope II) Submitted	
4.	Whether Commercial Bid (envelope III) Submitted	
5.	Whether the Tender Fee & EMD (envelope I), Technical Bid (envelope II) and Price Bid (envelope III) are submitted in separate covers and all the covers enclosed in a common envelope.	
6.	Whether declaration form signed and submitted	
7.	Validity of 120 days from the date of opening	
8.	Whether warranty clause mentioned	
9.	Does the instrument comply with all the specifications mentioned	
10.	Whether all pages of tender document signed and submitted	

NOTE: Please ensure all the relevant boxes are marked YES/NO against each column.

IMPORTANT NOTE: Tenderers must ensure that all the required documents indicated in the Tender documents are submitted without fail. Tenders received without supporting documents for the various requirements mentioned in the tender document are liable to be rejected at the initial stage itself.