



**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](http://www.arci.res.in), eMail: stores@arci.res.in

**Tender No. SC20190086/PO**

**Date: 01.08.2019**

**TENDER DOCUMENT**

**SUPPLY, INSTALLATION AND COMMISSIONING OF  
HIGH TEMPERATURE CYCLIC CORROSION TEST  
FACILITY**

1.	EMD ( Earnest Money Deposit/Bid Security)	<b>INR 2,47,500/-</b>
2.	Tender document published date	<b>01.08.2019</b>
3.	Bid documents can be downloaded from	<a href="http://www.arci.res.in">www.arci.res.in</a> <a href="http://www.eprocure.gov.in">www.eprocure.gov.in</a>
4.	Clarification start date and end date	<b>01.08.2019 to 08.08.2019</b>
5.	Bid submission start date and time	<b>09.08.2019 at 09.00 AM</b>
6.	Bid submission end date and time	<b>30.08.2019 upto 03.30 PM</b>
7.	Bids opening date and time (for Technical bids covers)	<b>05.09.2019 at 02.30 PM</b>



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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](http://www.arci.res.in) eMail: 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: **SUPPLY, INSTALLATION AND COMMISSIONING OF HIGH TEMPERATURE CYCLIC CORROSION TEST FACILITY.**

Tender Enquiry No: (Case No.) **SC20190086/PO dated 01.08.2019**

- Last date and time of submission of Tender (EMD, Technical and Price Bid): **30.08.2019** before 3:30 PM.
- EMD should be in the form of Demand Draft drawn in favour of **Director, International Advanced Research Centre, payable at Hyderabad.**
- **Estimated value: INR 2,47,500/-**
- The item to be delivered and installed at:

**International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.**

- **Estimated Delivery period: 08 Weeks.**

#### **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 for each for EMD, Technical Bid and Commercial Bid. These envelopes should be securely sealed and stamped separately and clearly marked as “**Envelope No.1- 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. **SC20190086/PO** date **01.08.2019** due on **30.08.2019** with name of the equipment /item and is to be submitted to the address given below so as to reach **on or before 30.08.2019 by 03:30 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:**

**International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.**

### **Last date for submission: 30.08.2019 at 03:30 PM**

Tender should be submitted before last date stated above. The Tenders not accompanied by EMD in the form of Demand Draft in favour of 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: **gsivakumar@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: **05.09.2019 AT 14.30 HRS**

**PLACE: - International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, 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 CPP 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
- 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 CPP Portal and no separate Press Notification will be issued. Bidders are advised to visit our website and CPP 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 05 or more similar units in India or abroad in the last 3 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 10 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 work)**.
- D. Infrastructure required for the above demo will be arranged by ARCI.
- E. The manufacturer/supplier should comply with the Safety and Compliance Standards as specified in **Annexure I (Scope of Work)**.

#### **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 5 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.

##### **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 years 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 delivery.

**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 (EMD) 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 INR. 2,47,500.00** (Two Lakh Forty Seven Thousand Five Hundred only in INR or equivalent foreign currency)

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

**Documents required for availing exemption of EMD amount for NSIC/MSEs:**

- a. MSMEs, which are specified by the Ministry of Micro, Small and Medium Enterprises under MSMED Act 2006 and Public Procurement Policy,2012 as Manufacturing/service Enterprises should have registered with NSIC under its Single Point Registration Scheme(SPRS).
- b. The Certificate with monetary limit indicated should be valid on the scheduled date/Extended date of submission of the tender. Certificates without monetary limit will not be considered.
- c. The items of product/services mentioned under NSIC certificate should be the same or similar to the tendered items.
- d. The monetary limit stipulated in the certificate of MSMEs/NSIC should be equal or more than the value of work in hand awarded under MSME benefits during the financial year plus estimated cost of the Tender for availing EMD exemptions.
- e. If monetary limit is less than the value of work in hand awarded under MSME/NSIC benefits during the financial year plus estimated cost of this tender, they should obtain “ Competency Certificate “ from NSIC for participating in this tender as well as to avail MSME benefits.

**It is mandatory for the supplier to submit valid NSIC registration certificate having the duration of the validity of the certificate, so as to apply for the exemption from submitting EMD. Non-compliance of the same, bid will be disqualified.**

## 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:**

##### **1. 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:

A) Signed Commercial Invoice - Original + 5 Copies

B) Airway Bill/Bill of lading - Original + 5 Copies.

C) Packing List -Original + 5 Copies

D) 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.

E) 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:

A) Commercial Invoice for 10% order value.

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

C) 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.

D) 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.

## **2. 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 10% 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 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 \_\_\_\_\_:

Country of origin \_\_\_\_\_

Sl. No.	ARCI item code	Name of the Goods	Unit of measurement	Quantity	Price	Discount	Taxes if any	Price in currency
							Total in foreign Currency	
	Packing and forwarding Charges							
Ex work prices								
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.*

**NOTE: For imports, ARCI is entitled for concessional Customs duty as per Notification No.51/96-Custom (as notified by GST council). Hence rates to be quoted accordingly.**

## PRICE SCHEDULE FOR DOMESTIC SUPPLIERS

Sl No.	ARCI item code	Name of the Goods / Services / Works	HSN / SAC codes	UOM	Quantity	Unit Price	Discount	C G S T	SGS T	IGS T	Total Tax amount	Total amount (including tax)
1												
Total price (FOR ARCI, Hyderabad)												
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.*

**NOTE:**

- I. **ARCI is a public funded research institution, concessional GST rate @ 5% may please be quoted for the supply of goods with reference to GST Notification no. 45/2017 dated 14.11.2017. ARCI will provide certificate for the same.**
- II. **For imports, ARCI is entitled for concessional Customs duty as per Notification No.51/96-Custom (as notified by GST council). Hence rates to be quoted accordingly.**

**Other information:**

- a) Installation and commission charges, if any to be added as a line item in the format given above.
- b) Prices of accessories, spares and consumables must be added as a line item as per the format given above
- c) Optional items, if any, and their prices should be mentioned separately

[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 SUPPLY**

Design, fabrication, installation, commissioning, demonstration and training of High temperature Cyclic Corrosion Testing with the approximate specification as follows,

**KEY FEATURES**

- The high temperature corrosion test rig will be used for assessing the hot corrosion behaviour of various materials/coatings that are exposed to elevated temperatures and corrosive environments in typical applications such as coal/gas based thermal power plants, gas turbines, automotive components.
- The high temperature test facility should be designed to simulate the corrosion at elevated temperatures upto about 1200 deg C under precisely controlled gaseous environment of one or mixed flue gases, corrosive salts, air and water vapour.
- The test rig should be designed with corrosion resistant inner construction, heating elements and flanges.
- The test rig should be robust in the operating range of 600 to 1200 Deg C continuously maintained for long duration in the order of 1000 hours
- The hot zone shall be operated under gas environment comprising of one or combination of the following gases: SO<sub>2</sub>, CO, CO<sub>2</sub>, Water vapour, HCl, Flue gas of specific composition along with a separate Nitrogen purging

**Technical Specifications:**

Maximum working temperature: 1200 Deg C

Normal operating temperature range: 600 to 1200 Deg C

High Temperature accuracy: +/- 5 Deg C or better

Furnace type: Horizontal Tube of appropriate material & thickness with Kanthal APM heating element, designed for long duration operations of more than 1000 hours in the temperature range of 600 to 1200 Deg C. The furnace should have sufficient control zones to have uniform heating zone throughout the heated length

Tube/Inner construction material: High temperature resistant, Inert and non-corrosive to the processing gases and environment (The details of Materials and design should be provided in the technical description)

Minimum working Inner tube diameter: 150 mm

Heated Length: 900-1000 mm; appropriate working length should be designed for gaseous environments and should also have the tube supports to support the tube at the ends

Required quantities of compatible thermocouple (to measure along the tube length and zone for uniformity & safety) along with sufficient compensating cables and connection plugs should be supplied.

The gas system should be provided in the furnace with leak-free Swagelok, which should be controlled individually using manually operated mass flow controllers with a range of zero to 10 litres per minute. Three individual pipe inlets for injecting Mix gases CO - CO<sub>2</sub> - H<sub>2</sub>O, Sulphur Dioxide SO<sub>2</sub>, Hydrogen Chloride HCl and a separate line for Nitrogen Purge with Swagelok connections

The furnace shall be compact and lightweight that can be mounted on a movable platform, and should be thermally lined with high quality ceramic fibre blanket to minimise the heat losses. Appropriate radiation shields shall be fitted at both ends of the work tube.

Control system: Suitable high precision temperature controllers, temperature sensors, over-temperature controller, associated power control equipment should be incorporated and shall be housed within an integral control box. The instrumentation control system can be a computer controlled for programming automatic and manual operations

Power: 3 Phase, Approx. 10 kW

Suitable gas sensors and leak detectors for flammable and poisonous gas along with a warning alarms and auto shutdown safety mechanisms after a preset time settings shall be provided

#### Other Details

The Corrosion test facility should be completely automated enough to avoid human intervention during the long term operations of over 1000 hours

The Corrosion test facility should have provisions to store atleast 10 or more process settings with Save/Recall/Delete options

The high temperature corrosion test facility should have impervious insulation to maintain the inner atmosphere & avert any interaction with external atmosphere

The high temperature corrosion test facility should comply with all safety features to protect the operating personnel as well as the overall system while in operation for possible damages and injury. Safety parameters such as over temperature (both hot zone and outer surface of the furnace), gas pressure, pneumatic pressure, thermocouple failure, pressure relief valve (both automatic and manual) in case of excessive build-up of pressure In the hot zone, control panel safety interlocks such as Short circuit, protection, over temperature control, lack of cooling water, under voltage protection, gas cabinet depression detection, variation in set point and actual points, safe disposal of processing gases or corrosion products through scrubbers or bubblers

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The overall equipment handling, technical guidance, experimental demonstration and necessary training on regular operation & maintenance shall be given at ARCI

The furnace should be designed and built to best engineering practice, should comply fully with the relevant safety directives, and should carry the CE mark.

The Supplier shall quote separately for the continuous supply of consumables, spares and accessories for the trouble-free operation for a period of 10 years

The Supplier shall evolve a standard operating procedure and shall be documented in English which is to be supplied along with the equipment for trouble-free operation. The documentation should contain Programming Manuals, all electrical, electronic circuits and PLC controls should be provided, operation and maintenance of all accessories employed within the overall corrosion test facility must be provided.

Supplier shall provide the trouble-shooting manuals and also provision for remote access of the equipment from the manufacturer's site, if necessary

The equipment shall be provided with a warranty of 3 years from the date of commissioning Supplier shall also quote for an Annual Maintenance Contract (AMC) for a period of 5 years after the warranty period.

The Supplier should provide support documents to show their Customer's list and should have supplied at least 3 systems of similar specifications in the last 5 years with excellent service records.

The Supplier is expected to depute Technical Expert to visit ARCI, as and when required for technical assistance. The costs will be as per mutually agreed terms and conditions.

Utilities to be provided by ARCI:

Electrical power supply:

Single Phase - 230 volts +/- 10%, Frequency - 50 Hz +/- 2%, 3 wire system or Three Phase - 415 volts +/- 10%, Frequency - 50 Hz +/- 2%

Water supply: Water 25 - 30 deg C, 1 bar pressure

Pneumatic supply: Filtered & regulated air will be supplied at 6 bar pressure

**Supply of the materials, demonstration, installation and services must be done at:**

**International Advanced Research Centre for Powder Metallurgy and New Materials, Balapur Post, Hyderabad – 500 005, Telangana, India.**

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**TECHNICAL COMPLIANCE STATEMENT****Design, fabrication, installation, commissioning, demonstration and training of High temperature Cyclic Corrosion Testing**

SPECIFICATIONS	Technical compliance as per ARCI's specification (Yes/No)	Remarks (If any)
The high temperature test facility designed to simulate the corrosion at elevated temperatures upto about 1200 deg C under precisely controlled gaseous environment of flue gases, corrosive salts, air and water vapour		
The test rig should be capable of operating in the range of 600 to 1200 Deg C continuously for atleast 1000 hours		
The hot zone shall be operated under gas environment comprising of one or combination of the following gases: SO <sub>2</sub> , CO, CO <sub>2</sub> , Water vapour, HCl, Flue gas, along with a separate Nitrogen purging		
Maximum working temperature: 1200 deg C; Normal operating temperature range: 600 to 1200 deg C with temperature accuracy: +/- 5 deg C or better		
Tube/Inner construction material made of high temperature resistant, Inert and non-corrosive towards processing gases and environment		
Minimum working area with 150 mm Inner tube diameter X 900-1000 mm Heated length		
Leak-free, MFC controlled gas input system to inject gases such as CO - CO <sub>2</sub> - H <sub>2</sub> O, SO <sub>2</sub> , HCl and Nitrogen Purge with Swagelok connections		
Suitable gas sensors and leak detectors for flammable and poisonous gas with warning alarms and auto shutdown safety mechanisms		
The system should comply with all safety features and parameters such as over temperature, gas pressure, thermocouple failure, pressure relief valve, under voltage protection, safe disposal of processing gases or corrosion products through scrubbers or bubblers		
The furnace should comply fully with relevant safety directives, and should carry the CE mark		

**Suppliers are required to provide this Technical Compliance Statement while submitting the Technical Bid (Cover 2).**

## CHECK LIST

**BIDDER HAS TO FILL IN THE CHECK LIST GIVEN BELOW**

**(Following documents are to be submitted online and manual as part of Technical Bid.  
Bidders are requested to state Yes / No against each column)**

Sl. No.	Description	Online Submission	Manual Submission
1.	If bidder is not an original equipment manufacturer, authorization letter attached.		
2.	Whether Earnest Money Deposit (EMD) Submitted		
3.	Whether Technical Bid Submitted		
4.	Whether Commercial Bid Submitted		
5.	PAN / GSTIN Number from concerned authorities		
6.	Details of Products and Components		
7.	Technical Compliance Statement (Annexure-II) submitted		
8.	Whether declaration form signed and Submitted (Scanned Copy by online and original by manual)		
9.	Whether warranty clause mentioned		
10.	This Checklist (Scanned Copy by online and original by manual)		
11.	Whether all pages of tender document signed and uploaded		

**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.