
	INDIAN INSTITUTE OF TECHNOLOGY MADRAS Chennai 600 036 Telephone: [044] 2257 9798/9760 FAX: [044] 22570545/8366 E-mail: arpp@iitm.ac.in	
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V. Sathyanarayanan
Senior Manager (Project Purchase)

Ref: ME/RAPR/001/2018
Date: 19.09.2018

Open Tender No: ME/RAPR/001/2018

Due Date: 11th October 2018, 3pm

Pre-Bid meeting on 27th September 2018, 3PM at Department of Mechanical Engineering, IIT-Madras.

Pre-Qualification: Suitable bidder must satisfy the pre-qualification requirement. The technical bids of those qualified in the pre-qualification condition will only be opened. For more information refer the Pre-qualification document.

Technical Bid opening meeting on 11th October 2018, 4 PM at Department of Mechanical Engineering, IIT-Madras.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of "THERMO-MECHANICAL FATIGUE (TMF) TESTING SYSTEM" conforming to the specifications given in Annexure I.

Vendor who can supply, service the test system as a whole unit alone need to respond to the tender.

Instructions to the Bidder


- I. **Preparation of Bids:** - The tenders should be submitted under three-bid system (i.e.) Pre-Qualification bid, Technical bid and Financial bid.
- II. **Delivery of the tender:** - The tender shall be sent to the addresses mentioned below, either by post or by courier so as to reach our office before the due date and time specified in our schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule.
The tender box is kept in the office of the:

**Senior Manager,
Project Purchase,
IC & SR Building 2nd floor,
I.I.T. Madras,
Chennai - 600 036.**

In case of foreign vendors, the technical and the financial bids may be sent as separate files (with password protection) along with other required documents to smipur-icsr@iitm.ac.in Both the bids must have the tender reference number mentioned clearly. Password should sent atleast 1 day before tender opening date.

- III. Opening of the tender:** - The offer/bids will be opened by a committee duly constituted for this purpose. Pre-qualification document will be opened first and will be examined by a technical committee which will decide the suitability of the bids as per our specifications and requirements. **The technical bids of those qualified in the pre-qualification condition will only be opened.** With respect to opening the financial bid, only technically qualified bidders will be called.
- IV. Prices:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to **Department of Mechanical Engineering**. The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. IIT Madras is eligible for concessional GST and relevant certificate will be issued.
- In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.
- V. Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in rupees after receipt of the equipment and its satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in the tender document even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate the percentage of payment and it should be included in the basic price quoted originally (if any)..
- VI. Terms of Delivery:** - The item should be supplied to the **Department of Mechanical Engineering, IIT Madras** as per the Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.
- VII. Technical Bid Opening:** The technical bid will be opened on 11th October 2018, 4 PM at the **Department of Mechanical Engineering, IIT-Madras** and the financial bids of those tenders who are technically qualified will be opened at a later date under intimation to them.
- VIII. IIT Madras reserves the full right to accept / reject any tender at any stage without assigning any reason.**

Yours sincerely,


V. Sathyanarayanan
Senior Manager (Project Purchase)
IC&SR Building, I.I.T. Madras,
Chennai - 600 036

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **11.10.2018, 3 pm.**

The offers / bids should be submitted in three bids systems (i.e.) Pre-qualification bid, Technical bid and financial bid. Pre-qualification bid should consist of all supporting documents. For more information refer Pre-qualification document. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Open Tender for supply of **“THERMO-MECHANICAL FATIGUE (TMF) TESTING SYSTEM”** should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: - The EMD in the form of account payee DD for 2% value of the item in favor of Registrar IIT Madras should be enclosed in the cover containing financial bid.** Any offer not accompanied with the EMD shall be rejected summarily as non-responsive. (However, in case the Bid security is more than a threshold (Rupee five lakh) and in case of foreign bidders in GTE tenders it may also be allowed in the form of a bank guarantee (in equivalent Foreign Exchange amount, in case of GTE) issued/confirmed from any of the scheduled commercial bank in India in an acceptable form, and so on, safe guarding the purchaser's interest in all respects.)

The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD. EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME) or registered with the Central Purchase Organization or with IIT Madras as on the date of submission of bids.

When no local agent, the foreign vendor can submit demand draft equal to 2% or wire transfer the amount to our account as detailed in the attachment (Annexure II) and enclose the proof with the financial bid.

3. **Performance Security: -** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank in India. **The performance security should be furnished within 21 days from the delivery of the purchase order.**

Performance Security in the form of Bank Guarantee:- In case the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India. The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

4. **Indian agent:** If an Indian agent is involved, the following documents must be enclosed:
Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - ✓ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
5. The offer/bids should be sent only for a machine that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
6. Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
7. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
8. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.
9. **Delivery Schedule:** - The tenderer should indicate clearly the time required for delivery of the item (subjected to the approval of executive committee of this purchase –IIT Madras). In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
If there is delay, the penalty will be @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than stipulated time, the PO would be cancelled and liquidated damages will be enforced.
10. **Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
11. **Payment:-** No Advance payment will be made for Indigenous purchase. However 90% Payment against Delivery and 10% after installation are agreed to wherever the installation is involved. In case of import supplies the payment will be made only through 100% Letter of Credit i.e. (90% payment will be released against shipping documents and 10% after successful installation wherever the installation is being done).
12. **Advance Payment:** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.
13. **On-site Installation:** - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras.
14. **Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Normally the warranty should be for three years from the date of

commissioning of the equipment. After the warranty of three years, the bidder should be willing to maintain the equipment for further period at an AMC rate which should be specified in the bid by the bidder. Also the manufacturer should give an undertaking to support the equipment for 5years from the date of supply. Also no equipment which is not currently in production should be quoted. Any extended warranty offered for the same has to be mentioned separately (For more details please refer our Technical Specifications).

15. **Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.

16. **Acceptance and Rejection:** - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

17. **Please quote the optional items or additional items separately**

18. **Disputes and Jurisdiction:**

Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate on arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.

- a. **The Applicable Law:** This Purchase Order shall be construed, Interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
- b. Any legal disputes arising out of any breach of contact pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

20. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

Technical Specifications for thermo-mechanical fatigue test system.

SUPPLY, INSTALLATION, COMMISSIONING AND TRAINING OF THERMO-MECHANICAL FATIGUE (TMF) TESTING SYSTEM

It is proposed to procure an axial-thermal mechanical fatigue test system capable of conducting high temperature low-cycle, high-cycle fatigue experiments on engineering materials, with in-phase, out-of-phase thermal and mechanical loading, complete with hardware, software and instrumentation to the following broad specifications.

Please include all components necessary for complete axial TMF test system such as high stiffness load frame; hydraulic actuators; hydraulic service manifold; hydraulic power unit; digital control electronics and software; computer based control and data acquisition system; transducers for load, strain, and displacement measurement; heating and cooling system with control electronics for thermal fatigue cycling.

All safety features for test system operation, operator safety as well as test specimen safety should be clearly indicated.

Optional: Inclusion of Torsional capabilities to the Axial Thermo-Mechanical Test System to allow Axial-Torsional Thermo-Mechanical Fatigue Testing. This might include actuator, associated servo-valves, controls, software and transducers. **This is based on budget availability.**

Basic System	<p>Servo-hydraulic test system having an axial load capacity of +/- 100 kN (dynamic capacity with at least 10% over rating for static capacity) with temperature control to rise temperatures up to 1200 deg C from ambient conditions at a controlled rate and to cool the specimens at a controlled rate. Detailed specifications listed below.</p>
	<p>Test system should be capable of conducting axial fatigue tests as per applicable ASTM or equivalent test standards both at room temperature as well as at elevated temperature over the mechanical loading frequency range of 0.001 Hz to 50 Hz (nominal) using standard servo-valves (either single servo-valve or dual servo-valves with user/automatic selection of flow between the valves).</p> <ul style="list-style-type: none"> • Include the Frequency-amplitude characteristics of hydraulic system along with load rating.
	<p>Test system should permit the user to conduct axial thermo-mechanical tests (both in-phase mechanical, thermal loading and out-of-phase mechanical, thermal loading) and user programmed wave form for mechanical loading.</p> <p>The test system should permit conduct of short duration creep test as well as stress relaxation tests of short duration to study the material viscous response at elevated temperatures.</p>
	<p>Heating Method: Inductive heating of test specimen (Preferable) with temperature rise rate of about 10 deg/s (or higher) with suitable cooling arrangements (air/water) to cool the test specimen at a rate of 5-10 deg/s.</p> <p>Temperature measurement through appropriate measurement technique to ensure</p>

	<p>specimen uniform heating of gage section to within +/- 2 deg C. Method of temperature measurement and control should be specified. It is desirable to have more than one zone of heating for the specimen.</p> <p>The placement of induction coil through its mounting clamps should permit uniform temperature in the test section of the specimen. The controller for heating system along with quick engagement and release of heating coils before and after the test should be provided.</p> <p>In case of alternate heating methods, such as radiant bulbs or any other, please specify the heating and cooling characteristics.</p> <p>Protection for electric shock to the operator through the use of electrically insulating material is required from the view point of safety of operations.</p> <p>Suitable alignment fixture for ensuring axial alignment and angular alignment within the prescribed limits of ASTM standards during tension-compression cyclic loading.</p> <p>Extensometer for measurement of total strain during high temperature testing with options of contact type extensometer as well as non-contact type extensometer.</p> <p>Procedure for thermal strain compensation and calibration to be provided. Expected to be ASTM E83 standard compliant.</p>
<p>Load Frame</p>	<p>Free standing, self reacting type with no need for special grouting. Expected load frame stiffness: 450 kN/mm.</p> <p>Dynamic load rating of load frame should equal or exceed the actuator capacity and should be fatigue rated load frame.</p> <p>Should have a moveable cross-head (with twin, single acting telescopic hydraulic cylinders attached to upper cross head) with load cell mounted on upper cross-head and servo-hydraulic actuator mounted on lower cross-head. The servo-actuator should have good hydrostatic/labyrinth bearing to ensure good alignment during stroking.</p> <p>The servo-actuator should permit good alignment as per ASTM / equivalent standards and can be either stand-alone or integral to the cross-head of the test load frame to achieve the load train alignment. Typical travel of upper cross-head is greater than 1 m and spacing between two columns is greater than 500 mm. Effective working distance between the two cross-heads should be between 100-1000 mm, based on upper cross-head movement. The upper cross-head should be clamped/de-clamped by hydraulics for ease of operation.</p> <p>Interlocks to prevent full actuator force being applied during de-clamped cross-head condition to be ensured.</p>
<p>Servo-actuator</p>	<p>Servo-actuator having +/- 100 kN dynamic capacity and min. 110% static capacity, linear actuator with a stroke length of +/- 50 or 75 mm with hydraulic manifold for accommodating servo-valve(s), filter elements, accumulators on pressure and return lines, integral LVDT for displacement measurement.</p> <p>Typical high performance, industry standard servo-valves expected with system are: ~ 36 lpm (medium flow rate) and ~6 lpm (Lo flow rate), preferably multi-stage servo-valve for enhanced servo-performance. These should be easy to mount on the servo-actuator manifold.</p> <p>Provision to shut-off one of the two valves (electrically / mechanically) for conducting</p>

	<p>LCF experiments with low-flow rate servo-valve. The actuator should operate in low/high pressure modes; for safety of operations, during test set-up, the actuator movement in position control should be slower than 10 mm/sec.</p> <p>OPTIONAL: Axial-Torsional Actuator with +/- 100 kN dynamic capacity axial actuator and +/- 1000 N-m torsional actuator for conducting axial-torsional TMF tests can be quoted. Please include suitable load cell, extensometer, controller, software for this case.</p>
<p>Hydraulic power-pack</p>	<p>Of suitable capacity (~ 37-44 lpm) operating typically at 3000 psi (207 bar), complete with manifold, accumulators, heat exchanger, variable displacement/frequency drive pump, suitable heat exchanger, secondary air-oil/chilled water-oil cooling system with controls and interface with main equipment controls to enable remote start/stop operation of the power-pack. The hydraulic power-pack should come with adequate length (each of 10 m minimum length) of pressure, return and drain hoses of good rating and similar length of control cables for connecting the test controller with hydraulic power-pack. The controls should be wired for protection against low oil level, oil pressure, oil temperature, filter contamination indication. The power-pack should be preferably silent while in operation (~ 65 dBA) and should not require additional acoustic treatment to the room where it is housed. Hour meter for power-pack to be included.</p> <p>Should permit stand-alone cooling of power-pack oil in case of excess oil temperature. The supplier to specify the oil grade and quality and pre-fill the power-pack to its full capacity at the time of supply.</p> <p>Heat exchanger (plate / shell-and-tube) for oil-cooling media should be decided based on the water chemistry at site.</p> <p>OPTIONAL: The supplier can also study the feasibility of using the existing hydraulic power-pack available at customer site through a suitable sub-station / controls for remote switching of dual devices.</p>
<p>Grips and fixtures</p>	<p>To enable conduct of high temperature thermo-mechanical fatigue tests as well as standard high temperature fatigue and fracture mechanics tests. Easy to mount grips and fixtures to be provided. Grips and fixtures are to be cooled by air / water. The grips should not introduce any backlash during testing. The grips should permit gripping of round, flat specimens. Round specimens will have typical grip portion diameter of 20-30 mm, while flat specimens could have a maximum thickness of 15 mm. Temperature at the grip end during high temperature testing could be up to 70 deg C; hence, proper cooling arrangement for grips to be provided. These devices should be preferably self-aligning and actuated by hydraulic power. Design of specimens to permit rapid cooling by means of hollow sections is to be discussed with end user <i>a-priori</i>.</p> <p>In case of hydraulic collet grips, the grip pressure should be user adjustable to accommodate a variety of materials being tested. For testing at high temperatures, a suitable water cooling port is to be provided.</p> <ul style="list-style-type: none"> • Please include all sub-systems required for air/water cooling of grips and fixtures.

<p>High Temperature Extensometer</p>	<p>Suitable high temperature extensometer to conduct tests up to 1200 deg C. Typical gage length: 25 mm with suitable scaling blocks to either increase or decrease gage length (12.5 mm or 37.5 mm) with strain range (calculated for 25 mm gage length) of +/- 10 % or greater. The control electronics should permit use of extensometer at lower ranges through suitable gain stages.</p> <p>The contact edges to be made out of suitable high temperature material and should be held by suitable mechanism onto the specimen without any slip. Maximum force of contact should be indicated by the supplier.</p> <p>The extensometer sensors and instrumentation should be cooled by a suitable cooling mechanism and should have reasonable resonant frequency so that measurements during dynamic testing up to 2 Hz during TMF testing and up to 5 Hz for regular HCF testing are accurate.</p> <p>The extensometer should be calibrated and traceable to applicable NIST/ASTM standards. Should meet applicable ASTM standards (ASTM E-83) in terms of repeatability, resolution and should be a low drift device suited for long duration endurance testing.</p> <p>The extensometer should be auto-detected by the controller and shunt-calibrated for quick verification.</p>
<p>Load cell</p>	<p>+/- 100 kN dynamic capacity with adequate (150-200%) static overload rating, tension-compression strain gage type load cell with suitable overload and side-load protection for infinite life endurance testing. Load cell should be designed for operation during continuous high temperature testing without overheating of transducer.</p> <p>Should meet applicable ASTM standards (ASTM E 74) in terms of repeatability, resolution and should be a low drift device suited for long duration endurance testing. The load cell should be auto-detected by the controller and shunt-calibrated for quick verification.</p>
<p>Controller, signal conditioner and application software</p>	<p>Digital controller with multi-channel signal conditioning and control unit with seamless transfer from one control mode to another (for instance, from displacement to load control (or) load to strain control), additional signal conditioner channels for strain bridge, thermo-couple inputs and LVDT/accelerometer to be provided apart from the typical control modes of operation (displacement, load, strain).</p> <p>The controller should permit operation either in stand-alone mode with its own displays or be operated through suitable switching to computer interface. The controller should have provision to control the rate of heating/cooling of specimens and correct based on thermo-couple sensors attached to the specimen.</p> <p>Controller should have high loop update rate on controls (> 5 kHz) and high data acquisition rate (>5 kHz) across all channels. The controller should be PID type with auto-transducer sensing, electronic gain on transducer channels, and capable of auto-tuning in test control mode. A user friendly, Microsoft Windows® based 32 bit or 64 bit control software with provision for user test design should be provided along with the system. GUI for the test system should permit monitoring of multiple windows of test parameters, which can be configured by the user. The test controller should be preferably 32 bit or 64 bit system.</p> <p>The controller should permit dynamic control mode switching between any connected transducer with no glitch. It should permit adaptive control strategy to ensure peak-</p>

	<p>valley compensation, amplitude-phase compensation as well as null-pacing. Controller should permit tapping of high level signal (+/- 10 V dc) for data acquisition by other devices (BNC/USB or equivalent sockets). Controller should permit input of external high level signals (+/- 10 V dc) for conducting tests as well as for data acquisition. User programmability of random waveform in the format of peak/valley should be provided. Provision for external input of random waveform through high level analog signal input would be added advantage.</p> <p>Specimen temperature to be measured using a thermo-couple or IR thermometer as sensing device and the feedback should trigger waveform generation.</p> <p>The controller should be provided with cables of adequate length to interface with controller, test machine and hydraulic power-pack.</p> <p>Provision to tap high level output signals from signal conditioner module for data logging in external systems such as NI® cards.</p> <p>The test controller should be designed for operation in tropical conditions such as existing at Chennai (Madras), India.</p> <hr/> <p>Computer interface and application software to be provided for the test controls for conducting conventional mechanical properties evaluation (monotonic, cyclic, random loading) and thermo-mechanical fatigue tests (with user programmability for thermal, mechanical loading).</p> <p>The test system software should have supervisory/multi-level controls to ensure tamper-proof operation of system by basic operators. Software protection with password to alter test system configuration, calibration is required.</p> <p>Continuous status alert about test system usage through email, text messages if available would be added advantage.</p> <p>Dedicated TMF test software that is in accordance with ASTM E2368-04 or equivalent is required. The TMF software should permit thermal strain calculation with options for temperature correction of stress and gage length.</p> <p>The test software should be loaded on a desk-top/laptop system of adequate processor, HDD storage capacity and should be portable across systems. The vendor to provide stand-alone system software set for re-installation of test system software in case of computer system crash/change-over.</p> <p>The supplier should provide support for test controller and test software upgrade (where applicable) for a period of 5 years after the initial warranty period.</p>
<p>System Protection – Power failure</p>	<p>Should there be a power failure, the protection system should ensure power to the system’s controller and connected computer to ensure test stop in a controlled manner, and allow the specimen to cool down and save test data. It is desirable that the test system is transferred to load control and maintain zero load on the specimen. Restart should be smooth recognizing the previous condition of testing.</p>

Specimen Design	The supplier should indicate the specimen design requirements (Hollow/Solid specimens for TMF testing) along with the technical documents. Final specimen design would be arrived based on discussions with end user and the heating coils need to be designed based on specimen geometry. It is proposed to use Circular (Solid/Hollow) specimens for LCF type of TMF tests and C(T) specimens/SEN(T) specimens for fatigue crack growth testing under TMF conditions.
General Terms and Conditions	The supplier should have supplied such similar thermo-mechanical fatigue test systems to reputed research labs, academic institutions worldwide and should furnish a list of customers to whom such equipment has been supplied. Testimony from the customers may be submitted along with the tender documents. The end user may also seek independent feedback from the clients about the performance of TMF system.
	Supplier should have a strong sales, service representation in India (preferably around Chennai) to cater to service requests. Please specify the typical service response period. Please indicate the AMC cost (labour only) for 3 year period payable on yearly basis.
	The equipment should come with minimum 1 year warranty (from the date of installation, successful commissioning, successful demonstration and acceptance of equipment by the Institute). Additional warranty for three years can be included in the offer.
	The supplier should indicate clearly site preparation requirements and requirement of electricity, water (normal, chilled water), air circulation systems, earth connections, etc.
Site Preparation Requirements	Pre-shipment trials using representative materials have be carried out in the presence of end user at supplier’s site. The supplier should provide training for machine operation to at least one representative before shipment at supplier site and to 5 or more users at customer site. Duration of training may be at least 1 week.
	The vendor should clearly specify the site preparation requirements, electrical power quality and quantity requirements, air-conditioning requirements along with bid.

Expected Format of Quotation:

1. Configuration – A: Stand-alone axial TMF system complete with power-pack and controls **(BASIC SYSTEM for which Tender is floated)**.
2. Configuration – B: Configuration A (minus) stand-alone power-pack but with suitable sub-station and controls for hydraulics to tap hydraulic line from existing power-pack.
3. Configuration – C: Configuration B + Axial-Torsional hydraulic capability for TMF system.
4. Configuration – D: Stand-alone Axial-Torsional TMF system complete with power-pack and controls **(HIGH-END STAND-ALONE SYSTEM)**.

Note:

1. The supplier should support his technical part of quotation with all technical data, drawings and catalogues for reviewing the proposal.
2. Performance curves of similar systems supplied to other vendors should be included in the technical part of quotation. Typically, these refer to:
 - Load cycle response at different frequencies,
 - Temperature rise-fall response,
 - Temperature uniformity graphs/data
 - Temperature stability data with time as well as with location of the TMF test specimen,
 - Stress vs. strain response during in-phase and out-of-phase TMF tests on axial specimens;
 - Load, strain signal stability response with active sensors connected to these channels along with LVDT response in actuator hydraulics ON condition for 3-6 hours.
3. The supplier should indicate the list of vendors to whom such similar systems have been supplied worldwide. Please indicate the name of the end-user who can be contacted over phone, email for clarifications.
4. **The supplier should be a reputed International Company, ISO 9000 series compliant, who undertakes total system supply and not an Integration vendor.**
5. Point-by-point compliance statement for each of the technical specification to be furnished by the supplier with a clear statement on COMPLIANCE / NON COMPLIANCE along with supporting documents for each of the 4 Configurations.
6. The supplier should present his technical credentials before a committee of experts and should be in a position to clarify the technical points.



CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036



B NAGARAJAN
JOINT REGISTRAR (IC & SR)

Project Accounts
July 22, 2016

TO WHOMSOEVER IT MAY CONCERN

In connection with project, **US currency may be transferred to CANARA BANK, IIT - MADRAS Branch** with the following details.

FOR TRANSFER OF CURRENCY US DOLLAR

Please Credit in USD

(THROUGH)

JP MORGAN CHASE, NEW YORK
SWIFT CODE: CHASUS33

For Credit to

USD ACCOUNT No: 001-1395969, of CANARA BANK INTERNATIONAL DIVISION
MUMBAI

For Further Credit to

ACCOUNT NO: **2722101001741** of IIT Chennai – Swift Code: **CNRBINBBIIT**
OF THE REGISTRAR, IIT, MADRAS


JOINT REGISTRAR (IC & SR) i/c.
संयुक्त कुलसचिव (आई.सी. एवं एस.आर.)
JOINT REGISTRAR (IC & SR)
आई.आई.टी. मद्रास
OF THE REGISTRAR, IIT, MADRAS

This is to certify that the particulars furnished are correct.
For Canara Bank

Senior Manager
Canara Bank - IIT Madras branch



एस.अरविंदन
S.ARAVINDAN
होदद, प्रबंधक Senior Manager
प.अ.सं. S.P.No.31649