INDIAN INSTITUTE OF TECHNOLOGY MADRAS
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V. Sathyanarayanan
Senior Manager (Project Purchase)

Ref: **MEE/SUSH//038/2017**
Date: 11.09.2017

Open Tender No: MEE/SUSH/038/2017

Due Date: 03.10.2017, at 2.00 pm

Technical Bid opening meeting on 03.10.2017 at 3.30 p.m.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of

"HIGH PRECISION FORMING, MICROFORMING AND MECHANICAL TESTING MECHINE" - (MEE/SUSH//038/2017)

conforming to the specifications given in Annexure.

A Vendor who can supply and integrate the above three equipment alone need to respond to the tender please.

Instructions to the Bidder

(i) **Preparation of Bids:** - The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.

(ii) **Delivery of the tender:** - The tender shall be sent to the below-mentioned addresses 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.

(iii) **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and it will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. In respect of opening of financial bid, those bidders who are technically qualified only will be called for.

(iv) **Prices:** - The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges to various Departments/Centres/Institutions. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of tax & duties should be clearly indicated.

The price should be quoted without custom duty and excise duty, since I.I.T. Madras is exempt from payment of excise duty, and the custom duty will be paid at concessional rate against duty exemption certificate.

In case of import supply, 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 on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender 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 about the percentage of payment and it should be included in the originally quoted basic price, if any.

(vi) **Terms of Delivery**: - The item should be supplied to the Departments of Mechanical Engineering as per 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 03.10.2017 at 3.30 p.m at the Conference room, Department of Machanical 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 stage without assigning any reason.

Yours sincerely,

V. Selvanarayanan
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 **03.10.2017, 2.00 pm.**

The offers / bids should be submitted in two bids systems (i.e.) Technical bid and Financial bid. 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 **"HIGH PRECISION FORMING, MICROFORMING AND MECHANICAL TESTING MECHINE"** should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: - EMD should be at 2% (two percent) of the tender value quoted by the bidder**. The EMD should be included in the Financial bid which will not be opened for Technical evaluation. Enclosing the EMD in the Technical bid will automatically disqualify the tenderer. EMD should be in the form of DD in favour of "The Registrar, Indian Institute of Technology Madras" and payable at Chennai. The tender without EMD would be considered as UNRESPONSIVE and REJECTED. Photo/FAX copies of the Demand Draft/Banker's pay orders will not be accepted. No interest will be paid for the EMD and the EMD (Bid Security) will be refunded to the successful bidder on receipt of Performance Security.

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 of India will be an acceptable.

Only after submission of Performance Security, Purchase Order/Work Order will be released / L.C will be opened.

Performance Security in the form of Bank Guarantee:- Incase 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. 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.
   - ✓ The enlistment of the Indian agent with Director General of Supplies & Disposals under the Compulsory Registration Scheme of Ministry of Finance.

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. Documentary proof for the claimed position and repetition accuracies must be obtained from the principals and submitted along with the relevant pages of the standards.

8. Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.

9. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.

10. **Delivery Schedule**:- The tenderer should indicate clearly the time required for delivery of the item. 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.

11. **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.

12. **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).

13. **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.

14. **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.

15. **Warranty/Guarantee**: - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (for more details please refer our Technical Specifications).

16. **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.

17. **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.

18. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

19. **Disputes and Jurisdiction**: -

a. **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.

b. **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.

20. All Amendments, time extension, clarifications etc., will be uploaded on the website only http://tenders.iitm.ac.in 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

Annexure -I

TECHNICAL SPECIFICATION OF HIGH PRECISION FORMING, MICROFORMING AND MECHANICAL TESTING MACHINE

Key Features:

- A custom designed high precision servo hydraulic machine with capabilities of (i) micro/meso-forming, (ii) static testing, (iii) dynamic testing
- The machine should be capable of micro/meso forming and static cum dynamic testing of wide variety of metals and alloys such as aluminum, copper, steel, magnesium, composites and high strength metals (Ti, Ni) either in the standard or sub-size configuration.
- The system must have an ultrahigh precision drive system **(0.2 μm position resolution or finer)** for micro-position displacement control, high accuracy load measurement system **(up to 24 kN (or higher), with resolution of 2 N (or finer) and accuracy of ±0.1% (or better))** and 32-bit data acquisition (or better) and conditioning facilities.
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1. Primary requirements (micro/meso-forming):

Operations	Micro to meso-forming of materials both in bulk and sheet forming operations
Materials to be experimented	Wide variety of metals and alloys such as aluminum, copper, steel, magnesium, composites and high strength metals (Ti, Ni) either in the standard or sub-size configuration
Specimen Geometry	• Forming of ultra-thin sheets with thickness ranging from 0.01 mm to 1 mm. • Substandard and standard samples for micro-forming and macro forming as per machine capability
Temperature of testing	In future, all the tests will be carried out at temperatures ranging from subzero to 1200°C. The machine should be capable of this and it should have heat dissipation mechanism (fan) to prevent thermal damage to load cells.
Load cell	• Range: 250 N (or lower) to 24 kN or higher • Accuracy of 0.5% of read out value. • Resolution of 2N or better.
Actuator:	• Type: Servo-hydraulic • Total stroke length: 50 mm (+25 mm/-25mm) or longer • Stroke resolution: ~ 0.1 μm • Encoder accuracy < 0.1% of set speed • Dynamic loading frequency: 50 Hz or higher (Performance curve has to be provided) • Crosshead velocity (static loading): 0.01 to 1500 mm/min or better
Data acquisition and control	• 5 kHz. Simultaneous on load, extension or better. • 32-bit data acquisition channel or better. • Digital signal conditioning, noise removal for load and extension. • 5 kHz loop update on cyclic deformation or better. • 32 Bit resolution or better.

Working area	Sufficient area to accommodate press tools for micro/meso-forming operation. Working area should also be sufficient to hold furnace. • Column clearance: 400 mm or higher • Vertical daylight: 700 mm or higher
Software	• Should have features for Windows based graphical user interface • Forming flow curve acquisition and analysis capabilities.
Equipment utilization	Up to 24 hrs daily
Power Supply (Mains)	• 220 V AC in single or multiple phases.
Manuals	• Soft copy in .pdf format and 2 sets of hard copies.

2. Primary requirements (static and dynamic testing):

Capabilities	• Static testing (Tensile, Compression, Bending) (mandatory) • Dynamic testing (Fatigue: both low and high cycle range) (mandatory) (Dynamic loading frequency: 50 Hz or higher; Servo-hydraulic; Total stroke length: 50 mm (+25 mm/-25mm) or longer; Stroke resolution: ~ 0.1 μm) Capable of conducting Fatigue test for axial fatigue and bend fatigue modes. • Fracture Toughness test with fatigue crack propagation study (optional) • High temperature tensile, compression test (optional) • High temperature LCF (optional) • High temperature fracture toughness test (optional)
Detailed specifications of static and dynamic testing	
Low Cycle Fatigue and High Cycle Fatigue	Grippers: o Ability to test samples of various sizes and material types both in plate and rod form upto the capacity of the machine ➢ For flat specimens: Clevis grip arrangement/Wedge type grips or better ➢ For round specimen (threaded): M8, M10 or any other. Extensometer: o Easy to attach and detach, rugged extensometers to handle various materials o Measuring range: + 1 mm to – 1 mm or wider o Sample dimension: 12.5 mm (gauge length) o Accuracy: ± 0.5% of readout value as per standard o Type: 350 ohms full bridged potentiometer o Output Sensitivity: 2 to 5 mV/V or better o Data can be export to various formats (CSV, ASCI) including MS Excel format o Resolution: 0.001mm or finer Software: o GUI based software with fully integrated monitoring and control system o Designed as per ASTM standard

	○ Auto data acquisition settings
Tensile	Grippers: ○ Wedge type/Universal or better grippers with an ability to accommodate samples of various sizes and material types both in plate and rod form upto the capacity of the machine Extensometer: ○ Easy to attach and detach, rugged extensometers to handle various materials ○ Measuring range: upto + 6 mm or higher ○ Sample dimension: 12.5 mm (max. gauge length) ○ Accuracy: ± 0.5% of readout value ○ Type: 350 ohms full bridged potentiometer ○ Output Sensitivity: 2 to 5 mV/V Software: ○ GUI based software with fully integrated monitoring and control system ○ Designed as per ASTM standard ○ Auto data acquisition settings ○ Data can be export to various formats (CSV, ASCI) including MS Excel format
Compression	Platens: ○ Rugged, easy to attach and detach cylindrical platens of maximum diameter 60 mm Software: ○ GUI based software with fully integrated monitoring and control system ○ Designed as per ASTM-E9 standard ○ Auto data acquisition settings
Bending	Fixture: ○ 3-point bend test fixtures with span length range 40 (or lesser) to 150 mm (or more) ○ Roller of 5 mm width or higher.

3. Optional requirements:

Fracture Mechanics Test Accessories and software	• Clevis Grip • COD gauge • Fracture Toughness software • Fatigue crack growth testing software: COD testing/KIC/JIC
Furnace	• Box or Split Type Single zone furnace • Maximum heating temperature: 1200°C • Quartz viewing window • Chamber size: 250 mm × 400 mm • Coil type: FeCrAl heating element • PID based temperature controller • Additional thermocouples and integrated digital display
High temperature testing accessories	• HT Fracture Mechanics Clevis Grips • HT Compression platens • HT LCF Grips • HT Push/Pull rods

	• HT LCF Extensometer • HT COD gauge
Video Extensometer	• Compatible with ASTM D638 standards • Field of view: 500 mm • Tripod and illumination system
DIC or High-speed camera	• CMOS Camera (5 MP) • f/1.6 aperture lens • LED illumination system • 2D Strain Software Module • Mounting system
Personal Computer	• Intel i5 or latest • Microsoft windows 7 operating environment or better with MS Office tools • All cabling and supply.

Terms and conditions (applicable for both primary and optional requirements):

Note: Individual quotations should be made for primary (1, 2) and optional accessories (3)

Supplier capability	Supplier must provide the details of similar supplied equipment (same make) to the government/semi-government institutions where it is being used successfully.
Warranty period	Entire machine inclusively all systems/ accessories should be warranted for 12 months from the date of installation/commissioning against all the design, material or manufacturing defects. Supplier should make two free visits to IIT Chennai facility as customer support program during warranty period.
Training	• Supplier should provide necessary training to at least 5 persons designated by the customer and demonstrate the capability of the press at the customer site. • The specimens for training must be provided by the supplier.
Delivery condition	Equipment to be delivered in test ready, factory calibrated condition.
Compliance statement	Compliance statement needs to be provided by vendors clearly specifying COMPLY/NON-COMPLY with remarks of all of the points mentioned above.