



INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
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Ref: CIE/RAVG/FIST-II  
04.03.2013

Tender No.: CIE/RAVG/007/2013

N.E. Nagaraj  
Special Officer (Project Purchase)  
IC&SR, I.I.T. Madras

Due Date: 25.03.2013, 3:30pm

Dear Sirs,

On behalf of the Indian Institute of Technology Madras, offers are invited for the supply of "Two 1 MN Capacity Servo hydraulic Testing Systems and a 200 lpm Hydraulic Power Pack" conforming to the specifications given in Annexure.

**I) 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) **Prebid Meeting:** 15<sup>th</sup> March, 2013 in BSB 105, Department of Civil Engineering, IIT Madras, Chennai, at 3.p.m.
- (iii) **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 "Special Officer, Project Purchase" IC & SR Building 2<sup>nd</sup> floor, I.I.T. Madras, Chennai – 600 036.
- (iv) **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 the technical committee which will decide the suitability of the bid as per our specifications and requirements. The financial offer/bid will be opened only for the offer/bids which technically meet all our requirements as per the specification.

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- (iv) **Prices:-** The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges. 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 CIP or CIF 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.
- (vi) **Terms of Delivery:-** The item should be supplied to our destination in case of local supply. In case of import supply, the item should be shipped only to Chennai Airport. The Installation/Commissioning should be completed as specified in our important conditions.

Yours faithfully,



N.E. Nagaraj  
Special Officer (Project Purchase)  
IC&SR, I.I.T. Madras.



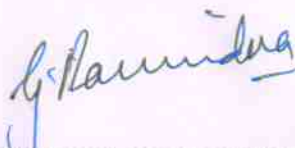
## SCHEDULE

### II) Important Conditions of the tender

1. The due date for the submission of the tender is **25.03.2013, 11.00 am.**
2. The offer/bids should be submitted in two bid systems (i.e.) Technical bid and Financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item-wise price for the items mentioned in the technical bid. The Technical bid and the Financial bid should be put in separate covers and sealed. Both the sealed covers should be put into a bigger cover. The limited tender for supply of **“Two 1 MN Capacity Servo hydraulic Testing Systems and a 200 lpm Hydraulic Power Pack”** should be written on the left side of the outer cover.
3. (i) EMD:- Two percent (2%) of the tender value quoted by the company. 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. The EMD will not be paid any interest and EMD shall be converted as a security deposit of the successful bidder and the same will be returned after the completion of the warranty period.  
  
(ii) **The Successful bidder should submit Performance Security an amount of 5% of the value of the contract. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from commercial bank will be an acceptable.**  
  
(iii) The Performance Security should be valid for the period of 12 months from the date of Installation.  
  
(iv) The EMD (Bid Security) will be refunded to the Successful bidder on receipt of Performance Security.

4. If an Indian agent is involved, the following documents must be enclosed:
  - i) 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.
  - ii) Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
  - iii) 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 reputation 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. **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.
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 <sup>domestic</sup> indigenous purchase. However 90% Payment against Delivery and 10% after installation <sup>can be</sup> is agreed to wherever the installation is involved. In case of import supplies the payment will be made only through Letter of Credit, and 90% payment will be released against delivery and 10% after installation wherever the installation is being done.
12. **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 Institution of IIT Madras.
13. **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.
14. **Late offer:-** The offers received after the due date and time will not be considered.
15. **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.
16. **Disputes and Jurisdiction:-** Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.
17. **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.

Dr. RAVINDRA GETTU  
Professor  
Dept. of Civil Engineering  
Indian Institute of Technology Madras  
Chennai - 600 036

**Tender for the Purchase of two 1 MN capacity servohydraulic testing systems and a 200 lpm hydraulic power pack**

Prebid meeting: 15th March 2013, 3 pm, Meeting room BSB 106, Department of Civil Engineering, IIT Madras, Chennai 600036

**Specifications for 1 MN axial dynamic capacity compression/flexure/tension testing system**

- Four-column servo hydraulic load frame with cross-head mounted actuator with system stiffness of at least  $1.5 \times 10^9$  N/m
- Hydraulic lifts and clamps for accommodating tests on short and long specimens.
- System must have emergency stop button
- Test space should be at least 700 mm wide, 400 mm deep and 2.8 m high (including load cell but not including specimen fixtures)
- T-slotted base with minimum dimensions of 900 mm x 900 mm (in plan), and 250 mm depth
- Double ended, double acting actuator with dynamic capacity of +/-1.2 MN in compression and tension
- Actuator stroke of at least +/-125 mm, with internal LVDT
- Load cell must be mountable on end of actuator piston or on load frame base
- Load cell must be at least 1.2 MN fatigue rated with at least 150% static overload capacity
- System calibration accuracy including cables and electronics must be 1% or better
- All adapters for load cells and grips to be supplied
- System must be capable of tests with +/- 0.1 mm displacement at 10 Hz under fully reversed fatigue loading at +/-1 MN with maximum hydraulic power supply of 200 LPM. Supplier must submit performance data with quotation.
- System must be compatible to use with a common hydraulic power pack (200 LPM) shared with one or two other systems
- System must have independent hydraulic service manifold with on/off low and high pressure control; The ability to set variable low pressure from about 1 to 20 MPa is required.
- Servohydraulic system must have software selectable low flow manifold setting for quasi static testing and specimen installation
- Servohydraulic system should also permit stable quasi-static testing such the application of a constant load of 100 kN
- Hydraulic grips for tension tests of circular rods and flat specimens with a capacity of +/-1 MN, capable of fully reversed fatigue loading. Wedges should be provided for specimens 10-40mm.
- Must have stand-alone hydraulic grip control and supply
- 2 (two) fatigue rated load cells of +/-1.2 MN and +/-100 kN capacity
- Compression platen for 150 mm diameter specimens
- PC with software for control, test definition and data acquisition using Windows 8
- Control system with loop closure rate of at least 2 kHz and four channels of control including load and stroke
- Controller shall support Proportional, Integral, Derivative, and Feed-forward (PIDF) control.
- Controller shall support Channel Limited Channel control with the second feedback signal providing means for limiting the actuator.

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- Controller shall support Dual Mode control with two feedback signals to provide better control stability.
  - Controller shall provide for changes in stiffness on non-linear specimens.
  - Controller must allow for any and all inputs to be assigned to any control channel by the user without requiring re-arranging controller hardware.
  - Controller must allow for any and all output channels and input channels to be distributed in any manner desired by the user via software, without requiring any controller hardware to be re-arranged.
  - Control software shall have ability to automatically recognize added controller hardware.
  - Controller supports options to create and edit files to specify custom and/or arbitrary waveforms.
  - Controller shall have optional handset to provide remote operation to enable convenient installation and replacement of test specimens in the test station. Handset should have: exclusive Control to prevent initiation of actuator movement from any other source; precise control of actuator movement; dedicated Run/Stop/Hold keys; and ability to start, pause, and stop the test application program
  - Controller must have minimum 3 DIO and 2 +/-10 V analog outputs in base configuration
  - Controller must be expandable to at least two independent test stations with common hydraulic power pack
  - Controller must have option to condition and acquire data up to 1000 kHz for at least 8 specimen strain gages
  - Controller must support either 2 or 3 stage valve drivers
  - Controller Software must provide ability to see the status of test systems from anywhere at any time through an easy-to-use web or mobile interface.
  - UPS to be supplied with system to guard against power loss
  - Test software to provide standard templates for running monotonic (tensile, compression, bend) and cyclic tests (fatigue)
  - Software to have freely configurable run time view (show an unlimited number of variables, meters, charts and tables). Show the test flow while the test is proceeding, indicate active vs. finished actions.
  - All test templates that support testing against standards can be modified by the user using the graphic interface (no requirement to change source code). All variable definitions and calculations as well as the test flow/sequence and logic are visible and can be changed by the user.
  - Software must support data acquisition modes according to time, peak/valley, level crossing, cyclic / logarithmic
  - Software to allow function generation up to 100 Hz on all channels including Sine, square, triangle, ramp, hold, profile and custom waveforms
  - Software test design to support parallel branches for test execution and logical operators (if/then, while)
  - Software to provide limit sensing, sequencing triggers, and interface to digital I/O
  - Software must support test report generation while the test is. Must be possible for user to create custom reports in Microsoft Excel that the test software can use to automatically generate report results.
  - Software provides ability to generate custom and standard reports from existing test data, as a process independent from testing.
  - System should be usable under local conditions, and must be installed and commissioned with no additional costs
  - System should be supplied within 8 months of order

### Specifications for 1 MN axial capacity dynamic tension testing system

- Four-column load frame with cross-head mounted actuator with system stiffness of at least  $1.5 \times 10^9$  N/m
- Hydraulic lifts and clamps for accommodating tests on short and long specimens.
- System must have emergency stop button
- Test space should be at least 700 mm wide, 400 mm deep and 2.8 m high (including load cell but not including fixtures)
- Double ended, double acting actuator with dynamic capacity of +/-1.2 MN in compression and tension,
- Actuator stroke of at least +/-125 mm, with internal LVDT
- Load cell must be mountable on end of actuator piston or on load frame base
- Load cell must be at least 1.2MN fatigue rated with at least 150% static overload capacity
- System calibration accuracy including cables and electronics must be 1% or better
- All adapters for load cells and grips to be supplied
- System must be capable of tests with +/- 1 mm displacement at 5 Hz under full fully reversed fatigue loading at +/-1MN with maximum hydraulic power supply of 200LPM
- System must be compatible to use with a common hydraulic power pack (200 LPM) shared with one or two other systems
- System must have independent hydraulic service manifold with on/off low and high pressure control; The ability to set variable low pressure from 1 MPa to 20 MPa is required.
- Servohydraulic system must have software selectable low flow manifold setting for quasi static testing and specimen installation
- Servohydraulic system should also permit stable quasi-static testing such the application of a constant load of 100 kN
- 2 (two) fatigue rated load cells of +/-1 MN and +/-100 kN capacity
- PC with software for control, test definition and data acquisition using Windows 7
- Control system with loop closure rate of at least 2 kHz and four channels of control including load and stroke
- Controller shall support Proportional, Integral, Derivative, and Feed-forward (PIDF) control.
- Controller shall support Channel Limited Channel control with the second feedback signal providing means for limiting the actuator.
- Controller shall support Dual Mode control with two feedback signals to provide better control stability.
- Controller shall provide option for changes in stiffness on non-linear specimens.
- Controller must allow for any and all inputs to be assigned to any control channel by the user without requiring re-arranging controller hardware.
- Controller must allow for any and all output channels and input channels to distributed in any manner desired by the user via software, without requiring any controller hardware to be re-arranged.
- Control software shall have ability to automatically recognize added controller hardware.
- Controller supports options to create and edit files to specify custom and/or arbitrary waveforms.
- Controller shall have optional handset to provide remote operation to enable convenient installation and replacement of test specimens in the test station. Handset should have: exclusive Control to prevent initiation of actuator movement from any other source; precise control of actuator movement; dedicated Run/Stop/Hold keys; dedicated Manual Command key and LED; ability to auto-offset selected transducer signals; and ability to start, pause, and stop the test application program



- Controller must have minimum 3 DIO and 2 +/-10V analog outputs in base configuration
- Controller must be expandable to at least two independent test stations with common hydraulic power pack
- Controller must have option to condition and acquire data up to 1000 kHz for at least 8 specimen strain gages
- Controller must support either 2 or 3 stage valve drivers
- Controller Software must provide ability to see the status of test systems from anywhere at any time through an easy-to-use web or mobile interface.
- UPS to be supplied with system to guard against power loss
- Test software to provide standard templates for running monotonic (tensile, compression, bend) and cyclic tests (fatigue)
- Software to have freely configurable run time view (show an unlimited number of variables, meters, charts and tables). Show the test flow while the test is proceeding, indicate active vs. finished actions.
- All test templates that support testing against standards can be modified by the user using the graphic interface (no requirement to change source code). All variable definitions and calculations as well as the test flow/sequence and logic are visible and can be changed by the user.
- Software must support data acquisition modes according to time, peak/valley, level crossing, cyclic / logarithmic
- Software to allow function generation up to 100 Hz on all channels including Sine, square, triangle, ramp, hold, profile and custom waveforms
- Software test design to support parallel branches for test execution and logical operators (if/then, while)
- Software to provide limit sensing, sequencing triggers, and interface to digital I/O
- Software must support test report generation while the test is. Must be possible for user to create custom reports in Microsoft Excel that the test software can use to automatically generate report results.
- Software provides ability to generate custom and standard reports from existing test data, as a process independent from testing.
- System should be usable under local conditions, and must be installed and commissioned with no additional costs
- System should be supplied within 8 months of order

#### Specifications for 200 lpm hydraulic power pack

- Pump for supplying oil at 200-230 bar pressure with a capacity of 200 litres per minute
- 70 dB noise compensated or better
- Water cooled with SST heat exchanger
- At least 3 micron filtration.
- To be used with servohydraulic mechanical testing machines
- Pump to support 2 or more test systems
- Pump must be capable of integrating with multiple test stations for pump on/off/interlock control
- Pump interlock triggered by low oil level or over temp; must have indicators and ability to communicate status to test controllers
- Pump should have operator display panel with pump status, alarms and limits

- Pump must provide facility for future capacity expansion in same chassis, using same pump control module up to at least 400 lpm. Cost should be indicated for expansion with a module of 100 lpm capacity.
- System should be usable under local conditions, and must be installed and commissioned with no additional costs
- System should be supplied within 8 months of order

#### **Technical Proposal**

Only bids from vendors who have installed testing systems that are comparable in terms of working principles, capacity and scope, and have well established maintenance and repair services in India will be considered.

The technical proposal should contain the following, and should be placed in a separate envelope (should not contain any financial information):

Background of the company and the service offered in India for installation, maintenance and repair.

Specifications of the proposed equipment indicating clearly if the specifications prescribed in the tender are met or not (Provide a summary table).

Details of comparable equipment installed by the vendor in India, with contact details for possible verification and inspection.

#### **Financial Proposal**

The financial proposal should be placed in a separate envelope.

The financial offer should be valid for at least 90 days.

The cost should include a 12 month warranty.

Vendor must be willing to supply just one or two of the equipments in this tender in case the Institute so desires.

Vendor must be willing to supply the equipment separately and under separate purchase orders to fulfill the policies, needs and funding availability of the Institute.