



**Govind Ballabh Pant Engineering College Pauri Garhwal, G.B. Pant Institute  
of Engineering & Technology, Ghurdauri, Pauri Garhwal, Uttarakhand**

**INVITATION LETTER**

**Package Code: TEQIP-III/2019/UK/gbec/49**

**Current Date: 08-Aug-2019**

**Package Name: Hydraulic Fatigue Testing Machine**

**Method: Shopping Goods**

**Sub: INVITATION LETTER FOR Hydraulic Fatigue Testing Machine**

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

<b>Sr. No</b>	<b>Item Name</b>	<b>Quantity</b>	<b>Place of Delivery</b>	<b>Installation Requirement (if any)</b>
1	Fatigue Testing Machine	1	GBPIET , Pauri	

2. Government of India has received a credit from the International Development Association (IDA) towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. **Quotation**

- 3.1 The contract shall be for the full quantity as described above.
- 3.2 Corrections, if any, shall be made by crossing out, initialling, dating and re writing.
- 3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit Price.
- 3.4 Applicable taxes shall be quoted separately for all items.
- 3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
- 3.6 The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Quotation shall remain valid for a period not less than **45**days after the last date of quotation submission.
6. Evaluation of Quotations: The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which
  - 6.1 are properly signed; and
  - 6.2 Confirm to the terms and conditions, and specifications.
7. The Quotations would be evaluated for all items together.
8. Award of contract The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.
  - 8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of Contract.
  - 8.2 *The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be Incorporated in the purchase order.*
9. Payment shall be made in Indian Rupees as follows:

Payment Description	Expected Delivery Period (in Days)	Payment Percentage
Satisfactory Delivery & Installation	30	100

10. Liquidated Damages will be applied as per the below:  
 Liquidated Damages Per Day Min %:N/A  
 Liquidated Damages Max %:N/A
11. All supplied items are under warranty of **12** months from the date of successful acceptance of items and AMC/Others is **NA**.
12. You are requested to provide your offer latest by **15:30** hours on **29-Aug-2019**.
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any) **YES**

15. Testing/Installation Clause (if any) **YES**
16. Performance Security shall be applicable: **10%**
17. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
18. Sealed quotation to be submitted/ delivered at the address mentioned below, **Govind Ballabh Pant Engineering College Pauri Garhwal,G.B. Pant Institute of Engineering & Technology, Ghurdauri, Pauri Garhwal, Uttarakhand**
19. We look forward to receiving your quotation and thank you for your interest in this project.

A handwritten signature in blue ink that reads "Sandeep". The signature is written in a cursive, slightly slanted style.

(Sandeep Kumar)  
Nodal Officer , Procurement

**DETAILED TECHNICAL SPECIFICATION****Package- 25kN Servo Hydraulic Fatigue Testing Machine**

S. No	Name of items	Specification of items
1.	Load Frame	1.1. Frame rated for at least 25kN in tension / Compression. 1.2. Minimum stiffness better than 50kN/mm, precision aligned load frame with fixed lower platen and adjustable upper crosshead. 1.3. The minimum column clearance required is 400mm and the maximum vertical daylight is 700mm. 1.4. System should be rated for indefinite operations
2.	Fatigue rated actuator assembly & 25 KN dynamic capacity load cell	2.1. Linear dynamic/static capacity: $\pm 25$ kN 2.2. Minimum Stroke length: $\pm 25$ mm with resolution of $0.1\mu\text{m}$ 2.3. Shall include anti-rotation assembly 2.4. Servo valves of suitable rating and accumulators of suitable capacity. <b>For 25 KN Dynamic Capacity Load Cell</b> 2.5. Overload capacity: 150% of read capacity or higher 2.6. Non-linearity: $\pm 0.3\%$ of full scale or better 2.7. Accuracy: ISO7500-1 Class 0.5 or better 2.8. Resolution: 0.02% of Full Scale Reading or better.
3.	Hydraulic power pack	3.1. Hydraulic power pack of sufficient capacity to run the system continuously has to be provided. 3.2. Proper size of accumulators has to be incorporated to avoid jerks/pressure transients in the event of power failure. 3.3. All safety provisions, pressure indicators, temperature indicators, relays have to be incorporated. 3.4. Hydraulic oil of sufficient quantity for the first time filling for the use of hydraulic power pack has to be provided. 3.5. Maximum working noise of 65 dB 3.6. Power pack shall be compact 3.7. System should be self-cooled. 3.8. Requires no site preparation

4.	Digital servo controller	<p>4.1. 1 channel of digital p-encoder input, expandable to 2 channels</p> <p>4.2. Up to 8 channels of conditioned analog inputs with suitable signal conditioners</p> <p>4.2.1. 1 channel of load cell input</p> <p>4.2.2. 1 channel of strain-bridge for [extensometer input (LCF) or extensometer input (Tensile Test) or crack-opening displacement gage]</p> <p>4.2.3. 4 Spare Channels</p> <p>4.3. 1 channel of digital servo-control with loop update frequency of at least 5 kHz</p> <p>4.4. Synchronized data acquisition into host computer at 5 kHz from up to:</p> <p>4.4.1. 2 channels of 32-bit digital encoder readouts</p> <p>4.4.2. 8 channels of 24-bit analog feedback readouts</p> <p>4.4.3. 1 channel of Set Point</p> <p>4.4.4. 1 channels servo-output for monitoring purposes</p> <p>4.4.5. 8-bits of digital I/O status for pump interface and test status.</p> <p>4.5. User settable software safety limit interlocks on upper and lower limit readout on each of 2+8 feedback channels with individual option of Stop/Hold/Trip</p> <p>4.6. Servo control of actuator with user settable/programmable:</p> <p>4.7. Mode control (Load, Stroke, Strain)</p> <p>4.8. Real-time automatic adaptive servo-gain adjustment to account for system stiffness variation as a function of specimen stiffness</p> <p>4.9. Static ramping of Load / displacement/ strain with independently settable ramp rate.</p> <p>4.10. Cyclic loading with ramp/sine waveform and user settable mean, amplitude and phase at frequency of up to 50 Hz and restricted as per the actuator performance curve, with better than 2% accuracy in loading through adaptive control.</p> <p>4.11. Provision for multi-step static and cyclic loading, with provision to switch control mode(s) as required.</p> <p>4.12. User settable error limit on servo-control with option of Stop/Trip</p> <p>4.13. Host computer (HP/Lenovo/Toshiba/Dell make only)</p> <p><b>a.</b> Computer with monitor: 24" Wide Screen Monitor with LED Back Light</p> <p><b>b.</b> System block: Intel(R) Core(TM) i7 8<sup>th</sup> Gen Processor</p> <p><b>c.</b> RAM: Min. 8GB Non-ECC DDR3 1600MHz SDRAM</p>
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		<p>Memory</p> <ul style="list-style-type: none"> <li><b>d.</b> Hard drive: Min. 1TB 7200 RPM 3.5" 512e/4k SATA Hard Drive</li> <li><b>e.</b> Opti Drive: 8X Max Slimline DVD+/-RW</li> <li><b>f.</b> USB Optical Mouse</li> <li><b>g.</b> USB Entry Keyboard</li> <li><b>h.</b> Software: Microsoft Windows 7 Professional operating environment and MS-Office basic edition with Windows 7 or higher version of operating system</li> </ul> <p>(Both host computer and application software should provide expansion of system capability including integrated control and data acquisition from other external devices including furnace)</p> <p>4.14. Additional, easy to use Tablet/Smartphone with WiFi interface to host computer to permit easy stroke positioning by operator during specimen mount/dismount through local access to readouts and device control/status. Tablet mounting with power supply to be provided at convenient location on the machine frame.</p> <p>4.15. One Hardwired E-Stops, located on the frame for easy access.</p> <p>4.16. UPS to guarantee safe shut down and unloading in the event of power failure</p>
5.	Grips and accessories for room temperature applications	<p><b>5.1. Universal (Main) Grips:</b> ±25kN Manually Operated Grips MOC: All grips, attachments for various tests shall be made with EN24.</p> <p><b>5.2 Hydraulic wedge grips for static and fatigue tests</b></p> <ul style="list-style-type: none"> <li><b>a.</b> Wedges for flat specimen of thickness 0 to 4.8 mm and width 35 mm</li> <li><b>b.</b> Wedges for flat specimen of thickness 4.8 to 10 mm and width 35 mm</li> <li><b>c.</b> Wedges for round specimen of diameter 3 to 5 mm</li> <li><b>d.</b> Wedges for round specimen of diameter 6 to 9 mm</li> </ul>
6.	Low cycle fatigue (LCF) test package	<p><b>6.1. Threaded Cups</b> A set of customized cups that directly integrated with the Universal Grip pull rod to test round specimens with threaded ends of size M8, M10 and M12.</p> <p><b>6.2. Axial Extensometer for LCF Applications</b></p> <ul style="list-style-type: none"> <li>6.2.1. Gage length: 12.5±0.01 mm</li> <li>6.2.2. Measuring range: 0.5/-0.5 mm</li> <li>6.2.3. Accuracy: ± 0.5% of read out value as per ASTM E83</li> <li>6.2.4. Linearity: ≤0.15% of full scale measuring range</li> </ul>

		<p>6.2.5. Excitation: 5 to 10 VDC</p> <p>6.2.6. Sensitivity: 2 to 4 mv/V</p> <p>6.2.7. Full bridge, 350 ohms strain gauged design (The extensometers should be designed for testing wide range of materials. The dual flexural design extensometer should be supplied with standard quick attach kit, for easy mounting on the specimen mechanical over travel limits in both directions.)</p> <p><b>6.3. Low Cycle Fatigue Testing Software (As per ASTM E606)</b></p> <p>The user interface should contain specimen description, loading parameters, pump controls, test run/stop, graph display, numeric readouts of multiple relevant test parameters. Tests should be either possible in stroke or strain control. Tests should be either possible in stress control, total strain control and plastic strain control. Online display of loading modulus, unloading modulus, K', n' yield stress, plastic strain, max-min stress and strain are required.</p> <p>6.3.1. Limit settings on stroke and strain</p> <p>6.3.2. Auto data acquisition settings.</p> <p>6.3.3. Online graphs of stress vs strain and transients.</p> <p>6.3.4. Offline post processing program to analyze the results in MS Excel.</p> <p>6.3.5. Option to save the test profiles.</p> <p>6.3.6. Option to remove residual strain.</p> <p>6.3.7. Option to add strain to gage length.</p> <p>6.3.8. Option to terminate the test at specified modulus drop, stress drop and/or increase in strain.</p>
7.	Tensile, compression package	<p><b>7.1. Wedge Grips (As per E8M)</b></p> <p>A set of customized collets that directly integrated with the Universal Grip pull rods to test flat specimens from 0.5 mm to 5 mm in thick and 25 mm wide.</p> <p><b>7.2. Compression Platens (As per E9M)</b></p> <p>A set of customized platens that directly integrated with the Universal Grip pull rods to test specimens that can be accommodated within the 60 mm diameter of the platen.</p> <p><b>7.3. Axial Extensometer for Tensile Test Applications</b></p> <p>7.3.1. Gauge length: 12.5±0.01 mm with suitable adapter for 25 mm</p> <p>7.3.2. Measuring range: +6.25/-3.1 mm</p> <p>7.3.3. Accuracy: ± 0.5% of read out value as per ASTM E83</p> <p>7.3.4. Linearity: ≤0.15% of full scale measuring range</p> <p>7.3.5. Excitation: 5 to 10 VDC</p> <p>7.3.6. Sensitivity: 2 to 4 mv/V</p>

		<p>7.3.7. Full bridge, 350 ohms strain gauged design The extensometer should be supplied with standard quick attach kit</p> <p><b>7.4. Tensile and Compression Testing Software (As per ASTM E8M and ASTM E9M)</b> Software to perform Tensile and Compression test. The user interface should contain specimen description, loading parameters, pump controls, test run/stop, graph display, numeric readouts of multiple relevant test parameters.</p> <p>7.4.1. Tests should be possible in stroke or strain control. 7.4.2. Online graphs of stress vs. strain and load vs. displacement. 7.4.3. Option to save the test profiles. 7.4.4. Auto data acquisition settings 7.4.5. Option to view multiple test graphs in one plot. 7.4.6. Option to run test in dual rate. 7.4.7. Option to remove the extensometer and continue the test in stroke. 7.4.8. Option to stop the test after specified percentage load drop. 7.4.9. Limit settings on stroke, strain and load channels. 7.4.10. Offline post processing program to analyse the results in MS Excel.</p>
8.	Fracture mechanics test package	<p><b>8.1. Clevis Grips (ASTM E647)</b> A set of clevis grips that directly integrated with the Universal Grip pull rods to test specimens with pin holes. These set of clevis grips should be suitable for 1/4C(T) specimen</p> <p><b>8.2. COD gauge</b> 8.2.1. Gauge length: 5±0.01 mm 8.2.2. Measuring range: +3/-1 mm 8.2.3. COD Gage for fracture mechanics studies, in compliance with ASTM 8.2.4. E647 &amp; E1820 8.2.5. High accuracy, full strain gauged bridge construction 8.2.6. Accuracy ± 0.5% of readout value as per ASTM E 83 8.2.7. Sharp grooves as per ASTM E 83 for improved stability 8.2.8. Excitation: 5 to 10 VDC 8.2.9. Sensitivity: 2 to 4 mv/V 8.2.10. Linearity: ≤0.15% of full scale measuring range</p> <p><b>8.3. Fracture Toughness Software for K<sub>IC</sub>, J<sub>IC</sub> and CTOD Testing (As per ASTM E1820 and E399)</b> The user interface should contain specimen description, loading</p>

	<p>parameters, pump controls, test run/stop, graph display, numeric readouts of multiple relevant test parameters.</p> <p>8.3.1. Tests can be done in stroke or COD control.</p> <p>8.3.2. Real time graphs of J vs. <math>\Delta a</math> and load vs. displacement.</p> <p>8.3.3. Option to save the test profiles.</p> <p>8.3.4. Auto data acquisition settings</p> <p>8.3.5. Auto scaling of graph.</p> <p>8.3.6. Option to see J and <math>\Delta a</math> value online.</p> <p>8.3.7. Option to select the previous data file and export the data.</p> <p>8.3.8. Data file storage in same settings file.</p> <p>8.3.9. Option to stop the test after specified percentage load drop.</p> <p>8.3.10. Offline post processing program to analyze the results in MS Excel</p> <p><b>8.4. Fatigue Crack Growth Testing Software (As per ASTM E647)</b></p> <p>Tests will be done in constant load control, K control, decreasing K control and combination of these with multiple steps.</p> <p>8.4.1. Option to program multiple steps with different loading conditions and different frequencies.</p> <p>8.4.2. Online graphs of <math>da/dN</math>, load vs. COD, crack length vs cycles, K vs cycles, etc.</p> <p>8.4.3. Online display of crack length, <math>K_{max}</math>, <math>K_{min}</math>, <math>\Delta K</math>, <math>P_{max}</math>, <math>P_{min}</math>, <math>\Delta P</math>, <math>da/dN</math> and more Option to stop the test at specified crack length, crack increment, <math>K_{max}</math>, cycles etc.</p> <p>8.4.4. Option to do variable amplitude test using spectrum files like Twist and Falstaff.</p> <p>8.4.5. Option to save the test profiles.</p> <p>8.4.6. Auto data acquisition settings.</p> <p>8.4.7. Auto scaling of graphs.</p> <p>8.4.8. Option to enter material properties and specimen dimensions.</p> <p>8.4.9. Option to measure crack length using remote LLD gage.</p> <p>8.4.10. Offline post processing program to analyze the results in MS Excel.</p> <p><b>8.5. Three Point Bend Fixture (As per ASTM E399)</b></p> <p>A set of customized fixtures that directly integrated with the Universal Grip pull rods to test specimens in flexure. It should be able to accommodate specimens within the span range of 30 to 150 mm with roller pins of 5 and 10 mm.</p>
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**Terms & Conditions for awarding purchase order:**

1. Proof of technical competency with at least three same equipment supplied, installed, maintained, which are currently working elsewhere, shall be submitted along with the offer. **The equipment should be "off-the-shelf" rather than "Custom built". Bidder not meeting this criterion will be rejected.**
2. The bidder must provide the list of institutions/organizations where they have supplied the said machine along with the performance certificate of minimum three institutions/organizations (i.e. IIT/NIT/Govt. organizations/Renowned automobile companies).
3. Bidder must provide the detailed brochure/catalogue containing all the specifications of machine.
4. Bidder must highlight our required specifications in their brochure and bidder specifications must meet with our specifications. So that it can be verified/reviewed in technical evaluation.
5. Bidder must provide calibration certificate of load cell and other accessories (Extensometer and COD gauges) by NABL.
6. Bidder must provide testing video of same machine in CD/Pen-drive showing different tests/results and technical features of machine for technical evaluation.
7. Bidder must supply the compliance of each specification point in tabulated form for technical evaluation of bid. If any deviation is found in technical evaluation, the bid may be subjected to rejection on technical grounds.
8. Offers should be submitted by the original equipment manufacturers (OEM) of the equipment. In case an authorized supplier is submitting the offer, it must be accompanied by authorization certificate issued by OEM in the favour of authorized supplier stated that authorized supplier will be fully responsible for installation/commissioning/maintenance of machine. If the supplier fails in doing so, the OEM will be fully responsible.
9. Only offers from actual manufacturers with a minimum 10 years' experience of having supplied same equipment will be considered.
10. Instrument to be installed at customer premises in test ready and calibrated condition.
11. Must have three years' comprehensive guarantee/warranty including having contract for maintaining the machine in the guarantee/warranty period from the date of successful commissioning of machine.
12. The firm should be equipped with well-trained engineers to offer post warranty maintenance and service support.
13. Service Response time: within 48 hrs and authorized supplier/OEM should have single source local service support facility preferably in North India and should submit address and contact details.
14. Free installation and training for laboratory personnel and students before release of the payment.
15. The prices are quoted for F.O.R Ghurdauri at college campus.
16. The equipment **must be supplied within a period of three months** from the date of issuing of purchase order.
17. The payment must be release only after the successful installation/commissioning and successful completion of hands on training on machine at the department. This activity must be completed within one month of the reaching the machine at the college campus. During installation/training period company representatives/engineer must be physically present in the college campus.
18. The supplier must provide the details/documents/drawings of items required for commissioning the equipment to the college before dispatching the

	<p>machine/equipment.</p> <p><b>19.</b> The documents/instruction manual related the operation and maintenance of the machine must be supplied by the supplier before commissioning.</p> <p><b>Note:</b> This equipment is proposed to be used to evaluate aforementioned properties on various materials like aluminum alloys, steel at ambient temperature. Tests like tension, compression, and bend fatigue will be conducted to evaluate material properties and to assess the material behavior. The Material of Construction for the equipment shall able to withstand load requirement. It is mandatory to provide suitable <b>anti-corrosive coating</b> on the equipment wherever possible. It is to be noted that the properties evaluated will be highly sensitive to the parameters like test control, sensitivity, alignment of the pull rods with the axis of the machine, etc. Hence, <b>parties with adequate theoretical and practical knowledge and expertise in building such equipment</b> on the above subject are only requested to quote. Bidder is required to quote separately for optional items.</p>
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**Annexure I**

Sr. No	Item Name	Specifications
1	Fatigue Testing Machine	<p>Load Frame 1.1. Frame rated for at least 25kN in tension / Compression. 1.2. Minimum stiffness better than 50kN/mm, precision aligned load frame with fixed lower platen and adjustable upper crosshead. 1.3. The minimum column clearance required is 400mm and the maximum vertical daylight is 700mm. 1.4. System should be rated for indefinite operations Fatigue rated actuator assembly &amp; 25 kN dynamic capacity loadcell 2.1. Linear dynamic/static capacity: ±25kN 2.2. Minimum Stroke length: ± 25mm with resolution of 0.1µm 2.3. Shall include anti-rotation assembly 2.4. Servo valves of suitable rating and accumulators of suitable capacity. For 25 kN dynamic capacity loadcell 2.5 Overload capacity: 150% of read capacity or higher 2.6. Non-linearity: ±0.3% of full scale or better 2.7. Accuracy: ISO7500-1 Class 0.5 or better 2.8. Resolution: 0.02% of Full Scale Reading or better. Hydraulic power pack 3.1. Hydraulic power pack of sufficient capacity to run the system continuously has to be provided. 3.2. Proper size of accumulators has to be incorporated to avoid jerks/pressure transients in the event of power failure. 3.3. All safety provisions, pressure indicators, temperature indicators, relays have to be incorporated. 3.4. Hydraulic oil of sufficient quantity for the first time filling for the use of hydraulic power pack has to be provided. 3.5. Maximum working noise of 65 dB 3.6. Power pack shall be compact 3.7. System should be self-cooled. 3.8. Requires no site preparation Digital servo controller 4.1. 1 channel of digital p-encoder input, expandable to 2 channels 4.2. Up to 8 channels of conditioned analog inputs with suitable signal conditioners 4.2.1. 1 channel of load cell input 4.2.2. 1 channel of strain-bridge for [extensometer input (LCF) or extensometer input (Tensile Test) or crack-opening displacement gage] 4.2.3. 4 Spare Channels 4.3. 1 channel of digital servo-control with loop update frequency of at least 5 kHz 4.4. Synchronized data acquisition into host computer at 5 kHz from up to: 4.4.1. 2 channels of 32-bit digital encoder readouts 4.4.2. 8 channels of 24-bit</p>

analog feedback readouts 4.4.3. 1 channel of Set Point 4.4.4. 1 channels servo-output for monitoring purposes 4.4.5. 8-bits of digital I/O status for pump interface and test status. 4.5. User settable software safety limit interlocks on upper and lower limit readout on each of 2+8 feedback channels with individual option of Stop/Hold/Trip 4.6. Servo control of actuator with user settable/programmable: 4.7. Mode control (Load, Stroke, Strain) 4.8. Real-time automatic adaptive servo-gain adjustment to account for system stiffness variation as a function of specimen stiffness 4.9. Static ramping of Load / displacement/ strain with independently settable ramp rate. 4.10. Cyclic loading with ramp/sine waveform and user settable mean, amplitude and phase at frequency of up to 50 Hz and restricted as per the actuator performance curve, with better than 2% accuracy in loading through adaptive control. 4.11. Provision for multi-step static and cyclic loading, with provision to switch control mode(s) as required. 4.12. User settable error limit on servo-control with option of Stop/Trip 4.13. Host computer (HP/Lenovo/Toshiba/Dell make only) a. Computer with monitor: 24" Wide Screen Monitor with LED Back Light b. System block: Intel(R) Core(TM) i7 8th Gen Processor c. RAM: Min. 8GB Non-ECC DDR3 1600MHz SDRAM Memory d. Hard drive: Min. 1TB 7200 RPM 3.5" 512e/4k SATA Hard Drive e. Opti Drive: 8X Max Slimline DVD+/-RW f. USB Optical Mouse g. USB Entry Keyboard h. Software: Microsoft Windows 7 Professional operating environment and MS-Office basic edition with Windows 7 or higher version of operating system (Both host computer and application software should provide expansion of system capability including integrated control and data acquisition from other external devices including furnace) 4.14. Additional, easy to use Tablet/Smartphone with WiFi interface to host computer to permit easy stroke positioning by operator during specimen mount/dismount through local access to readouts and device control/status. Tablet mounting with power supply to be provided at convenient location on the machine frame. 4.15. One Hardwired E-Stops, located on the frame for easy access. 4.16. UPS to guarantee safe shut down and unloading in the event of power failure Grips and accessories for room temperature applications 5.1. Universal (Main) Grips:  $\pm 25\text{kN}$  Manually Operated Grips MOC: All grips, attachments for various tests shall be made with EN24. 5.2 Hydraulic wedge grips for static and fatigue tests a. Wedges for flat specimen of thickness 0 to 4.8 mm and width 35 mm b. Wedges for flat specimen of thickness 4.8 to 10 mm and width 35 mm c. Wedges for round specimen of diameter 3 to 5 mm d. Wedges for round specimen of diameter 6 to 9 mm Low cycle fatigue (LCF) test package 6.1. Threaded Cups A set of customized cups that directly integrated with the Universal Grip pull rod to test round specimens with threaded ends of size M8, M10 and M12. 6.2. Axial Extensometer for LCF Applications 6.2.1. Gage length:  $12.5 \pm 0.01$  mm 6.2.2. Measuring range: 0.5/-0.5 mm 6.2.3. Accuracy:  $\pm 0.5\%$  of read out value as per ASTM E83 6.2.4. Linearity:  $\leq 0.15\%$  of full scale measuring range 6.2.5. Excitation: 5 to 10 VDC 6.2.6. Sensitivity: 2 to 4 mv/V 6.2.7. Full bridge, 350 ohms strain gauged design (The extensometers should be designed for testing wide range of materials. The dual flexural design extensometer should be supplied with standard quick attach kit, for easy mounting on the specimen mechanical over travel limits in both directions.)

Sandeep

**FORMAT FOR QUOTATION SUBMISSION**  
(In letterhead of the supplier with seal)

Date: \_\_\_\_\_

To: \_\_\_\_\_  
\_\_\_\_\_

Sl. No.	Description of goods \ (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
<b>Total Cost</b>							

Gross Total Cost (A+B): Rs. \_\_\_\_\_

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. \_\_\_\_\_ (Amount in figures) (Rupees \_\_\_\_\_ amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of \_\_\_\_\_ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Contact No. \_\_\_\_\_