

Indent No: 20162908

Universal Length Measuring Machine (PQR & Technical Specifications)**A. Pre-Qualification Requirements**

- a. Only those vendors should quote who or their principals have supplied and commissioned at least one Universal Length Measuring Machine in India, in the last 10 years (Prior to the date of opening of tender), having the following minimum specifications as given below:

- | | |
|---------------------|--|
| i. Measuring Range: | 3000 mm minimum |
| ii. Resolution | 0.1 microns minimum |
| iii. Accuracy | $(0.8 \pm L/1000)$ microns minimum, where L is in mm |
| iv. Repeatability | 0.20 microns minimum |

The machine(s) should be working satisfactorily as on the date of opening of tender, and a certificate in this regard from at least one user on his official letterhead is required. The name, organization, designation and the e-mail id & phone number of the contact person are also required.

- b. The vendor or their principal should have a well-equipped service center in India (preferably in the Northern region) staffed by personnel trained at the manufacturers works. The details of the service center, along with training qualifications of the personnel who will carry out the installation/servicing at BHEL Haridwar shall be submitted.
- c. Vendor should be original equipment manufacturer (OEM) or their authorized dealer/ distributor. In case the party is dealer/distributor valid authorization certificate from OEM is required.

B. Technical Requirements

1. The Universal Length Measuring Machine is required for the calibration of different precision dimensional measuring instruments such as Inside/Outside Micrometre's, Thread/Ring/Taper Plug Gauges, Ring Gauges etc.

The dimensional range of the items to be calibrated are:

- | | |
|---------------------------------|---------------|
| a. Inside & Outside Micrometres | Up to 3000 mm |
| b. Plain/Thread Plug gauges | Up to 350 mm |
| c. Plain/Thread Ring Gauges | Up to 350 mm |
| d. Plain Taper Gauges | Up to 400 mm |
| e. Taper Thread Plug Gauges | Up to 400 mm |
| f. Taper Thread Ring Gauges | Up to 400 mm |

Vendor to confirm that all of the above items can be calibrated with the machine. Vendor to further confirm that all the accessories/auxiliaries (jigs and Fixtures etc.) required for calibration of above mentioned instruments/ equipment shall also be supplied.

2. The minimum technical requirement of the machine is as given below. Vendor to provide the actual data for the machine offered for each parameter mentioned.

a. X Axis:

- | | |
|-----------------------|--|
| i. Measuring Range: | 3000 mm minimum |
| ii. Resolution | 0.1 microns minimum |
| iii. Accuracy | $(0.8 \pm L/1000)$ microns minimum, where L is in mm |
| iv. Repeatability | 0.20 microns minimum |
| v. Measuring Unit: | mm |
| vi. Measuring System: | Laser based interferometry system
or Optical encoder based system |

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- b. Z Axis
- i. Measuring Range 80 mm minimum
 - ii. Resolution 1 micron minimum
 - iii. Repeatability 2 microns minimum
 - iv. Measuring Unit mm
 - v. Measuring System Internal encoder measurement System for vertical axis
- c. Y axis travel 25 mm minimum
- d. The m/c shall have a universal work table of minimum 160x160 mm having 5 axis movement, and, load capacity of minimum 25 kgs.
Vendor to provide the following for the work table:
- i) Dimension
 - ii) Height adjustment
 - iii) Transverse Adjustment (Y Axis)
 - iv) Tilt (around Y Axis)
 - v) Floating Range (around X Axis)
 - vi) Swivelling Range (around Z Axis)
- e. Computer
- i. The equipment shall be computer controlled with provision for manual override. The computer shall be of reputed make with the latest configuration having at least:
 1. Processor Intel Core i7
 2. RAM 2 GB
 3. HDD 512 GB
 4. Operating System Windows 7 or later
 5. Display 19" LCD FLAT Screen Colour Monitor
 6. Printer Laser
 7. Ports USB 2.0, USB 3.0, LAN
 - ii. Software for the basic operation and the calibration of each of the items listed in Clause B.1 to be provided. The software shall be able to apply corrections in the displayed and recorded readings for compensating the errors due to encoder scale & temperature.
 - iii. The software shall be able to capture, analyse (with reference to the relevant Indian Standard) display and store the data. It should also be possible to print a customisable report.
- f. All movements e.g. that of measuring slide/measuring headstock, headstock & tailstock quill, positioning of tailstock quill, and movement of work table are expected to be manual.
- g. Working temperature 10°C to 30°C
- h. Relative humidity 20% to 80%
- i. The machine shall work off 230V±10%, 50 Hz±3% power supply.
- j. The measurement system shall have the capability to measure the ambient temperature and apply the correction for environmental error. Vendor to provide details of error correction features.
- k. Vendor should clarify if the machine is table mounted or Foundation based. In either case the detailed constructional features of the table/ foundation to be given by the vendor. If foundation is required at site, then vendor should provide Dimensional drawing of table / Foundation drawing before **90 days or earlier** from the date of P.O delivery including approximate weight of the equipment and also inform if there are any specific erection requirements.
- l. If BHEL so requires, the vendor shall arrange for a demonstration of the complete capabilities of the machine at any location in India.
- m. Party may also quote for Annual Maintenance Contract charges for period after expiry of the warrantee. AMC charges shall not be considered for price comparison purpose.

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C. General Terms & Conditions

1. The offer shall :
 - a. Address each and every point of the above specification. The offer should be accompanied by presentation & video images on CD as well as hard copy explaining the technical features/literature with photographs, drawings and explanation of all technical features inbuilt into the Computer controlled system. A simple leaflet is not acceptable.
 - b. Detail out the standard scope of supply, covering the fixtures, hardware, software and calibration standards supplied with the M/c.
 - c. Detail out and quote for all the hardware/ fixtures/ software needed (over & above the standard scope of supply) for the calibration of each of the items mentioned against Clause B.1
 - d. Detail out & quote for all items needed for the installation, commissioning & operation of the machine including granite plate, machine table etc.
 - e. All the software should be licensed and supplied in CD's along with a backup copy.
 - f. Vendor to confirm that the application software will be upgraded for the next 10 years without any price implication for BHEL.
2. The equipment shall be erected & commissioned in our laboratory by the vendors' representative.
3. Subsequent to commissioning the machine shall be calibrated by a NPL/NABL accredited laboratory and a certificate of compliance generated. The same is in the scope of the vendor. E&C of the machine will be treated as complete only after compliance of this clause.
4. After erection & commissioning the vendor shall impart minimum 3 days' training to the laboratory staff covering the complete operation of the machine and first line maintenance. During training the vendor shall demonstrate calibration of all the items listed in Clause B.1, and, the ability of the equipment to meet the complete technical specification.
5. The machined shall be warranted for satisfactory performance for 24 months from date of commissioning. Any breakdown period exceeding 15 days will be added to the warrantee period. Spares required, if any, will have to be arranged by the vendor without any cost to BHEL.
6. Along with the machine, the vendor shall supply 3 sets of complete operation & maintenance manual along with complete circuit diagram of the main equipment and all its accessories.
7. Pre-dispatch inspection shall be at the discretion of BHEL. The vendor shall inform BHEL with copies of calibration certificate as & when the machine is ready for shipment. Vendor should give PDI call at least 30 days prior to P.O delivery date.
8. Rigid sea worthy packing required for all items of complete machine, if sourced from abroad. Any damage or loss in transit on account of improper packing shall be the sole responsibility of vendor.

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