

## **SPECIFICATION FOR SUPPLY, INSTALLATION, COMMISSIONING AND TRAINING OF UNIVERSAL LENGTH MEASURING MACHINE**

### **1. SCOPE OF SUPPLY**

- 1.1 Scope includes supply of universal single axis length measuring machine with necessary accessories and software.
- 1.2 A pre-delivery inspection of the equipment at supplier's site will be carried out.
- 1.3 The equipment has to be supplied and installed at our site with performance test and accuracy demonstration.
- 1.4 An extensive training on basic operation, application software and basic maintenance has to be provided by the party during final commissioning of the equipment.

### **2. MEASUREMENT CAPABILITY**

- 2.1 The equipment should be capable of high precision length measurement.
- 2.2 The equipment shall have manual axis movements
- 2.3 The equipment shall have computer and customized software for axis display and data analysis
- 2.4 The equipment should have the capability for calibrating the following types of gauges and measuring instruments
  - 2.4.1 Thread plug & ring gauges according to thread standard like ISO (metric), DIN, ANSI, ASME, BS, JIS etc.,
  - 2.4.2 Plain plug and ring gauges
  - 2.4.3 Setting rings
  - 2.4.4 Snap gauges
  - 2.4.5 Dial indicators
  - 2.4.6 Slip gauges and Gauge blocks
  - 2.4.7 Micrometers (inside/outside)
  - 2.4.8 Taper and Taper thread gauges
- 2.5 The equipment should have on-line temperature sensors to compensate the errors due to temperature fluctuations on the machine, scales and jobs.

### **3. MEASUREMENT CAPACITY OF THE EQUIPMENT**

- 3.1 Maximum measurable length : 0 - 600 mm (external)
- 3.2 X-axis, resolution :  $\leq 0.01 \mu\text{m}$
- 3.3 Z-axis, resolution :  $\leq 0.1 \mu\text{m}$
- 3.4 Maximum weight of the component to be measured : 25 Kg
- 3.5 Minimum size of thread ring to be measured : M3

### **4. ACCURACY (UNCERTAINTY) OF THE EQUIPMENT**

The accuracy specified below is "Maximum Permissible Error (MPE)" which is the extreme value of an error permitted for the equipment and all the measurements are guaranteed to be below this value. The accuracy is specified in slabs of length to be measured. Party shall provide the standard which is used for specifying the accuracy.

4.1 Length measuring error (X-axis), MPE :

0 - 100 mm : 0.15 µm or better

100 - 200 mm : 0.2 µm or better

200 - 400 mm : 0.3 µm or better

400 - 600 mm : 0.4 µm or better

4.2 Repeatability of the measurement :  $\leq 0.05 \mu\text{m}$

The above specified values to be demonstrated at the following environmental conditions

Temperature =  $20^{\circ} \text{C} \pm 1^{\circ}$

Relative humidity =  $50\% \pm 5\%$

4.3 Party shall provide the necessary documents / calibration certificates for same / similar machine installations in India

## 5. APPLICATION SOFTWARE

5.1 The software shall have the following features

5.1.1 Calibrating the various types of gauges and measuring instruments mentioned in 2.4

5.1.2 Inspection of precision parts like bearing races etc., using various software modules

5.2 Automatic generation of nominal values like major diameter, minor diameter, effective diameter etc., in the case of thread gauges and their tolerances after entering specification based on shaft or hole basis system

5.3 Temperature monitoring and compensation system using two or more temperature sensors

5.4 Computer aided data recording, processing, logging and transfer shall be available

5.5 All the software should be complied to international standard for its codes, functioning and computational accuracy

5.6 Gauge management and database shall be available

5.7 Back-up copy of software in CD / DVD shall be given

## 6. ACCESSORIES

6.1 Necessary accessories required for basic operation of the machine to be supplied along with the machine

6.2 All essential accessories required for the calibration of gauges mentioned in 2.4 to be quoted

6.3 All types of work holding and clamping accessories to be quoted

6.4 Calibration certificate of accessories and reference standards to be supplied

6.5 All necessary accessories and probes for inspection of precision parts like bearing race to be quoted

6.6 Other accessories like table support, adjustable centre support, tilting table, floating table, work holding clamps etc., to be quoted

## **7. COMPUTER SYSTEM**

- 7.1 Operating system shall be latest Windows based in English language
- 7.2 PC with latest configuration and multimedia capability with 24" TFT Monitor
- 7.3 High speed colour printer shall be supplied for report generation purpose

## **8. WARRANTY**

- 8.1 Comprehensive warranty for machine, technical support, spares, service and calibration should be provided for minimum of 3 years, after installation and commissioning, for defect free operation and specified accuracies. Any defect observed during warranty period shall have to be repaired / replaced at free of cost.
- 8.2 All the software updates during the warranty period shall be supplied and installed on real time basis at free of cost.
- 8.3 Preventive and calibration visit to be done in every end of year during warranty period
- 8.4 Service support must be available at our site (IISU)
- 8.5 The non comprehensive AMC offer with price list of major spare parts for another 3 years to be provided which will be considered for assessment of the quotation.

## **9. PRE-DELIVERY INSPECTION & TRAINING AT SUPPLIER'S SITE**

- 9.1 Pre-delivery inspection prior to dispatch, performance test and accuracy demonstration of the machine shall be carried out in presence of our persons.
- 9.2 The methodology of performance test and accuracy demonstration shall be submitted along with the quotation.
- 9.3 The calibration certificates of the machine, accessories and reference standards shall be made available to us during pre-delivery inspection
- 9.4 Training shall be given to our persons for the following
  - 9.4.1 Operation of the machine and usage of software in all aspect of measurement and data analysis
  - 9.4.2 Maintenance and trouble shooting

## **10. INSTALLATION, TRAINING AND COMMISSIONING**

The machine shall be installed at our site by the party. Performance test and accuracy demonstration of the machine shall be carried out with valid traceability certificates at our site in presence of our engineers. Extensive training shall be provided by the party after installation of the machine. The training shall cover

- 10.1 The basic operation of the machine
- 10.2 All types of single axis measurement
- 10.3 Calibration of the measuring instruments and gauges using the application software
- 10.4 Basic maintenance of the machine

- 10.5 Party shall carry all necessary accessories and tools for installation and demonstration

## **11. DOCUMENTATION**

All the data and results of testing and calibration of the machine at supplier's site as well as at our site shall be properly documented and supplied to us with complete traceability to international standards. User manual in English language should be provided.

## **12. INPUTS PROVIDED BY THE CUSTOMER (IISU)**

- 12.1 Class 1,00,000 clean area is maintained with  $20^{\circ} \pm 1^{\circ}$  C, 50 - 55% RH
- 12.2 Uninterrupted power supply, 220V  $\pm$  10V, 50Hz
- 12.3 Clean and dry compressed air

## **13. OTHER CONDITIONS AND REQUIREMENTS**

- 13.1 The details of bought out items used in the machine (make and specification) should be furnished. It should be ensured that spare parts for the bought out items are readily available through the supplier / authorised service agency
- 13.2 Availability of spare parts shall be ensured at least for the next 10 years and spare parts offer to be provided for trouble free operation of machine for a period of minimum 5 years.
- 13.3 Overall space requirement for installation and operation of machine, computer, printer etc., should be given
- 13.4 Party has give the annual maintenance contract offer for a minimum period of 3 years after warranty
- 13.5 Any other requirements for the machine installation and operation shall be mentioned in the offer.
- 13.6 Proper packaging and safe transportation of the machine shall be ensured
- 13.7 Party shall submit filled compliance matrix, (provided with the tender as Annexure-II) along with their offer.
- 13.8 Quotation must be from original precision metrology equipments manufacturers and machine offered must be from standard catalogued product.
- 13.9 Party shall submit their offer in two parts - Technical and Commercial