

Annexure-1

Supply, Installation and commissioning of Optical tube measurement machine including software and accessories as per the technical specifications mentioned below.

I. Machine Specification:

Description	Specification
1. Machine type	Optical machine based on Photogrammetric principle exclusively for tube measurement
2. Construction	Box type
3. Measurement technology	High Resolution Camera Array
4. Quantity	1 set
5. Minimum tube diameter	Ø 6 or lesser
6. Maximum tube diameter	Ø 40 or higher
7. Maximum tube length in m	3 or Higher (by stitching)
8. Bending angle	From 1° or Lesser to 300° or higher
9. Measurement area (L x W x H)	Min. 1000 mm x 500 mm x 350 mm
10. Measurement time	30 sec. or lesser
11. Tube centerline profile accuracy	60 micro meter or better
12.No. of cameras	Min. 8 at different angles
13.Repeatability	50 micron or better
14. Computer System	As specified in Sl. No. III

II. General Specification:

1. System should be supplied along with Inspection Software & both hardware and software should be from Same OEM for smooth running.
2. The software must be user friendly and should be working in windows / Linux OS environments

3. The software supplied with the machine must be capable of inspecting all different configurations of pipe bends possible and generate a 3D model of the same.
4. Software should be capable to measure the LRA (Length, Radius, Angle) or XYZ coordinates of bending Tube
5. In the case of lines which are to be inspected sector wise, the software must be capable of accurately stitching the sectors.
6. The software must also be equipped for performing modifications on the 3D model as post processing.
7. The output of the software must be supplied in a format such as IGES / STEP in order to feed it to a tube bending machine
8. Repeatability of measurements must be ensured by the software
9. Software must also have provision of generating detailed reports of the operations carried for documentation purposes.
10. Software should be interfaced with the bending machine Herber - Sweden make 710 S model. The software shall create correction file to the bending machine without using any 3rd party Software. It shall also support the tube bending machines AMOB – Portugal make eMOB 52 CNC and Electro pneumatic and hydraulic - India make 50CNC9X2.
11. Software should be capable to do reverse engineering of bent tube.
12. The supplier must ensure that suitable modes of data transfer such as Ethernet connection or IP network connection and USB connection are enabled for the machine.
13. The supplier has to provide a suitable base trolley for the machine and movable work console for computer system with all required provisions.
14. Party should also supply the reference tube / master along with the basic equipment for carrying out periodic calibration.

III. Specifications of computer system:

1. The party has to also supply a computer system with the software installed and activated. The generic specifications required for the computer system are as follows. The party can supply a standard computer system in line with the specification mentioned or better.

S.No:	Description	Specifications
1.	Operating system	Licensed Windows 10, 64 bit
2.	RAM size	64 GB or better
3.	Memory storage capacity	1TB HDD & 256 GB SSD or better
4.	Hard disk technology	Hybrid drive / flash memory solid state
5.	Processor brand	Intel
6.	Processor type	Core i7 or better
7.	Graphics coprocessor	NVIDIA Quadro 4 GB or better
8.	Screen size	15.6 inches or better
9.	Display type	LED-Backlit
10.	Display resolution maximum	1920 x 1080 (Full HD)
11.	OtherAccessories	Keyboard, Mouse & Color Printer

IV. Pre Qualification Criteria:

1. The party should have supplied at least one similar machine in the last 10 years to any reputed industries / Govt. / Public sectors within India. The PO copy / work order along with commissioning report / Performance report shall be supplied to IPRC along with quote as evidence.
2. Party has to give physical demonstration of the system either at IPRC or at site within India to evaluate the technical aspects before price bid opening.
3. The offers without necessary evidence shall not be considered for evaluation.
4. If the item is quoted by a non-Indian party, it should have authorized sales and service providers in India. The service team should have a technical

support team capable of carrying out analysis and troubleshooting using the supplied machine and software. The address and contact details has to be provided along with the quote. If the technical support team is not available in India, the party shall not be considered for evaluation.

5. If the item is quoted by a dealer, the party has to also provide authorized dealer certificate from OEM. The quote without authorization certificate shall not be considered for the evaluation.

V. Other terms and conditions:

1. Electrical power supply: The input power supply shall be 230V, 50Hz, 1 Phase/440V, 50Hz, 3 Phase. In case the voltage is not matching, a suitable transformer is to be supplied along with the machine. UPS of suitable capacity for control system shall be provided.

2. Documentations:

The following documents shall be supplied along with the item.

- a) Operator manual for equipment and software
- b) Manual for post processing
- c) Preventive maintenance check list
- d) Trouble shooting charts and guidelines.

3. Dispatch clearance:

Dispatch clearance will be provided based on the pre-delivery inspection at party's site. During pre-delivery inspection, the party has to demonstrate and prove the machine performance by using the reference tube / Master. The party has to provide suitable calibration certificate for the reference tube / master & the optical cameras during the pre-delivery inspection.

4. Installation and commissioning:

- a) Party has to demonstrate machine specification as against indent specification, all the features of the machine and accessories.
- b) The template available at IPRC is to be inspected and gcode for tube bending is to be generated by the supplied software. The tube bending is to be carried out from the generated code using the CNC tube bending

machine available at IPRC. The actual tube after bending is again to be inspected.

- c) The party has to demonstrate the software correction procedure to fine tune the bending program with respect to the template measurement. The corrected program is to be once again verified by tube bending operation.
- d) Calibration of machine with reference tube / master is to be done at IPRC site

5. Machine installation requirements:

The party has to supply the following details for the installation.

- a) Detailed instruction regarding electrical requirements of the supply, system control voltage, ambient conditions, and any other necessary details should be supplied after P.O. placement for installation.
- b) Any special tools if any required for lifting / handling the machine at IPRC for installation shall be arranged by supplier for the installation.

6. Training:

Supplier should provide required training to our engineers and technicians at free of cost at IPRC site in the following areas.

- a) Machine operation
- b) Software features
- c) Post Processing
- d) Mechanical maintenance
- e) Interfacing the equipment with bending machine

7. Compliance report shall be submitted along with quotation. Without compliance report, the offer will not be validated.

8. Accessories & Spares: The party has to give the list of necessary accessories & spares. The party has to quote for spares & accessories separately in the appropriate provision in the EGPS.

9. Party has to provide the quote in the appropriate provision in the EGPS for the AMC of the machine (For two years) after the warranty period. The offers with the quote for AMC shall be considered for evaluation.
10. The machine shall be guaranteed warranty for minimum 12 months from the date of commissioning.
11. Party has to provide after sale service for at least 10 years. Supply of spares for is to be ensured by the party for at least 10 years.