

Pre-Qualification Requirement (PQR)

Scope of Work: Outline Agreement for Boiler tube Metallurgical Testing
PR NO- 2000081122

4.1 TECHNICAL REQUIREMENT:

1. It is essential for the bidders to have minimum 5 years of experience in **Inspection and Material Testing for Boiler tubes** by using various NDT methods, such as Fracture Appearance Transition Temperature Testing, Acoustic Emissions, Fibroscopy, Eddy Current Testing, Ultrasonic (Normal Probe, Shear Probe, Time Of Flight, & Phased Array), Radiography, Magnetic Particle Inspection, Dye Penetrant Testing, Natural Frequency Testing, Insitu Vibration Analysis, Rebound Hardness Measurements, Insitu Replication, Positive Material Identification, Life Estimation Using Characterization Of Microstructure Evaluation and change of Hardness, Carbide Chemistry Evaluation Studies, Fracture Mechanics & Static Property Mechanical Tests, Finite Element Method Analysis and various advanced NDT tests of Boilers operating up to and above 120 Kg/cm² pressure.
 - (i) Attach last 03 years awarded PO Copies or supporting documents for Inspection and Material Testing of Boilers operating up to and above 120 Kg/cm² pressure.
2. The bidder must have The **Certificate of approval as Well-Known Remnant Life Assessment Organization under the Indian Boiler Regulation, 1950 for carrying out Remnant Life Assessment of Boiler operating up to and above 120 Kg/cm² pressure.**
 - (i) Attach certificate of approval as **Well-Known Remnant Life Assessment Organization from Central Boilers Board).**
 - (ii) Attach last 03 years awarded PO Copies for Remnant Life Assessment of Boiler operating up to and above 120 Kg/cm² pressure.
3. The bidder must have the Laboratory testing facility accredited by NABL as per international standard ISO/IEC-17025.
 - (i) Attach NABL accredited certificate of approval.
4. Bidder must have the equipments for carrying out In-situ metallography at site and its subsequent evaluation at laboratory.
 - (i) Attach list of equipments for In-situ metallography at site and its subsequent evaluation at laboratory.
5. Bidder must have the following Material testing equipments-
 - a) **NDT testing equipment**
 - ✓ Acoustic Eye™, Dolphin G3 system
 - ✓ Eddy current tester
 - ✓ Internal Oxide thickness Gauge
 - ✓ Ultrasonic Flaw Detector

- ✓ In-situ Metallography Kit
- ✓ Electro Magnetic Crack Detector (Yoke Type)
- ✓ Ultraviolet Black Light for WFMPI and FDP
- ✓ Dye Penetration Kit
- ✓ Ultrasonic Thickness Gauge
- ✓ High temperature probe.
- ✓ Coil type MPI Machine
- ✓ Portable Hardness tester Hardness tester UCI method with Diamond Inventor.

b) Metallurgical testing equipment

- ✓ Scanning Electron Microscope with EDS analyser
- ✓ Inverted Metallurgical Microscopes with digital camera.
- ✓ Low Magnification observation station with CCD attachment
- ✓ Metallurgical image processing workstation with Microstructure Characterizer (MiC) Software
- ✓ Stereo zoom microscope with standard accessories
- ✓ Portable Etching Cum Polishing machine model
- ✓ Metal Polishing with D. C. drive
- ✓ Portable Angle grinders & Polishing equipment's
- ✓ Low speed metallographic Cutting/ Sectioning machine
- ✓ Hot moulding machine
- ✓ Automatic Polishing Machine
- ✓ Heat treatment Furnace (up to 1100 C)

c) Mechanical testing equipment

- ✓ Rockwell hardness tester –HRA, HRB, HRC & superficial hardness testing scales HR15N, HR30N, HR45N, HR15T, HR30T, HR45T
- ✓ Brinell Hardness tester -Load range 31.25, 62.5, 187.5, 500 & 3000 kgf
- ✓ Vickers Hardness tester Load range 5 - 120 kgf
- ✓ 40 T Computerized Universal testing machines with electronic Extensometer
- ✓ Vicker's Micro hardness tester Load range: 10- 1000 gms
- ✓ Charpy Impact testing machine.
- ✓ Jominy End Quench Test setup for hardenability measurement.
- ✓ Profile Projector.
- ✓ Automatic programmable Heat treatment facility with chart recorder

d) Chemical analysis equipment

- ✓ Optical Emission Spectrometer
- ✓ Inductively coupled Plasma (ICP) & Atomic absorption Spectrometer.
- ✓ PMI (Portable XRF based spectrometer)
- ✓ Electronics Single Pan Balance (0.0001 gm Accuracy)
- ✓ Kjeldha's Apparatus for N2 determination
- ✓ Full Fledged Lab Glassware for Chemical Analysis
- ✓ LECO for Detecting Carbon and Sulfur

✓ Electrolytic Apparatus with Platinum electrodes for Cu and Pb determination

e) Corrosion testing equipment.

✓ Potentiostate/ Galvenostate for Electrochemical Analysis and Corrosion studies.

✓ Salt Spray Test apparatus

✓ Complete set up and Erlen Meyer Apparatus for IGC tests as per ASTM A – 262

✓ Complete set up for conducting pitting and crevice corrosion testing.

✓ Constant temperature bath range: 5- 80° C

✓ Constant Temperature bath Range: RT - 100° C

(i) Attach list of various Material testing equipments.

(ii) Attach list of customers serviced for Failure investigation and Remnant Lift Assessment services.