



**CSIR - NATIONAL METALLURGICAL LABORATORY**

(Council of Scientific & Industrial Research)

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ISO 9001:2008

No. NML-FG/AMP-SKM/26-19/Corr-I

Date: 18.10.2019

CORRIGENDUM - I

Sub: Tender for supply of Thermal Conductivity Measurement System

Ref: 1) Enquiry No. NML-FG/AMP-SKM/26-19 Dated 04.10.2019

2) CPPP Tender ID No. 2019\_CSIR\_480786\_1

With reference to the above procurement, It is informed that technical specification has been revised as per Annexure I. The bid may be submitted as per the revised technical specifications. All other terms and conditions will remain unaltered.

  
(N.K. Singh) 18.10.19  
Stores & Purchase Officer

## Annexure -1

1. **End use:** To measure the thermal conductivity of different samples for various research work on materials development

2. **Detailed Specification:**

**Thermal Conductivity Measurement System for characterization of metals, composites and ceramics in the form of solid and coatings**

**Parameters to be measured:**

Thermal conductivity, specific heat capacity, Thermal diffusivity

**Samples to be studied:**

Metal, composite, ceramics and coatings from room temperature to at least 1000 degree centigrade or higher.

Sample holder: The sample holder should be able to handle the samples of diameter in the range of 10-12.7 mm and 10 x 10 mm square.

**Sample Temperatures:**

All the above measurements need to be performed from Room Temperature (RT) to at least 1000 degree Centigrade or above. The sample should be able to be heated at different heating rates ( $5-50^{\circ}\text{C}/\text{minute}$ ) and can be fixed at the desired temperature within  $\pm 2$  degree centigrade. The furnace temperature should be programmable with automatic power supply and thyristor based PID controller, equivalent, or better to achieve the desired temperatures. The stability of the temperature must be within  $\pm 2$  degree centigrade at all temperatures.

**Furnace Environment:**

The measurement environment inside the furnace should have the provision for Vacuum ( $\sim 10^{-2}$  mbar), inert (Ar or Nitrogen) and Air.

The gas flow in the system should be maintained with the suitable mass flow controller.

**Thermal Conductivity Measurement range:**

The equipment should be able to measure the thermal conductivities in the range of 0.1 to 1800 W/m/K or better.

**Accuracy and Repeatability:**

The accuracy and repeatability of the measurements for each of the parameters (Thermal Conductivity, Diffusivity and Specific Heat) should be within 2 to 5% or better.

**Software & Operating Systems:**

All the required software (Licensed Version, only) should be supplied for smooth operation of the equipment. The system should be complete in itself including computer (latest version), software (latest version), printer, etc

**Calibration and Standard Sample:**

Standard samples with varying Thermal Conductivities (very low, middle and high) must be provided for calibration at temperatures ranging from RT to 1000°C or above.

Standard samples for Thermal Diffusivities and Specific Heats must be provided.

**Warranty:** 3 years from the date of successful installation and commissioning at CSIR-National Metallurgical Laboratory, Jamshedpur

**Training:** Complete training to 3-4 Scientists/Technical officers at CSIR-NML for total operation and routine maintenance of the equipment.

**Essential Spares and Consumables:**

All the essential Spares and consumables required for smooth running of the equipment for 5 years must be quoted. The main equipment plus the essential spare of the 5 years shall be compared for the selection of the comparative bid. The spare parts and consumable required for atleast 8 years must be available for further purchase as and when required and should not be turned down in the name of obsolescence of the model of the equipment etc.

Clear technical brochures to understand the details of the measurement mechanism/ theories and the equipment brochure should be provided.

**Proven Record of Supply of Similar Equipment in India:**

The vendor should provide the details (Name, e-mail, mobile & landline numbers and postal address) of supplying at least 2 similar equipment in reputed government institutes or organizations in India. The vendor should also provide the supply list of same equipment, if any, India and abroad.

**After Sales Service:**

The vendor should clearly indicate the availability of after sale service in India and quote for the non-comprehensive AMC rates for the equipment for 3 years after warranty period (yearly visit 2 preventive maintenance and 1 breakdown).

3. **Scope of supply & incidental services:** Supply of the equipment meeting specification as per the above section 2, installation & commissioning, training etc.
4. **Inspection and test required :** No inspection at the manufacturer or at the agent site shall be carried out. All has to be shown during the installation and commissioning at NML premise.
5. **Acceptable test:** Measurement of the thermal conductivity, thermal diffusivity, thermal specific heat capacity on different standard samples (low conductivity,

high conductivity and middle level conductivity samples) in the full range RT to 1000 degree C or above (as asked in the section 2 in the detailed specification) within the desired accuracy and repeatability.

**6. Qualification for the bid criterion:**

The vendor should meet technically as per the section 2

The vendor should provide the details (Name, e-mail, mobile & landline numbers and postal address) of supplying at least 5 similar thermal conductivity equipment in reputed government institutes or organizations in India. The vendor should also provide the supply list of same equipment, if any, India and abroad.