SECTION - C

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS.

Technical Specifications for Supply, Installation & Commissioning, Demonstration and Final Acceptance at IPR of High Temperature Dilatometer from Room Temperature to 1500° C

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Supply, Installation & Commissioning of high temperature (RT – 1500°C) Dilatometer (Qty - 01)

General: Dilatometer is planned for the purpose of determination of Coefficient of Thermal Expansion (CTE), phase transitions, sintering kinetics of oxide based ceramic systems. Vendors must provide all the information essential for a technical comparison of the features. The equipment should be a stand-alone unit. Vendor should supply all the subunits / accessories that are essential for installation, commissioning, and operation of the dilatometer.

Vendors may note that IPR will provide the following utilities:

(a) 220V/440V, 3-ph/50Hz power,
(b) Ar/N_2/Air gas cylinders,
(c) Distilled water, if required

A. The basic system of Dilatometer should contain the following:			
	IPR Specification	**Offered Specifications (Vendor's Specification)**	**Remark**
1.	**Dilatometer Design** (a) Single Push rod and independent of sample length (b) Horizontal /Vertical design with motorized movement of push rod		
2.	**Sample Size, Sample Holder and shape** a.) Sample Size**: 25 mm or as appropriate that follows international standards.** (Vendor should specify the dimension of the samples to be tested in this instrument) b.) Sample holder: **High alumina/recrystallized alumina suitable for single push rod Operation** b.) Sample Shape: **Cylindrical** (please specify the Diameter/cross-section of the sample)		
3.	**Temperature:** (a) Temperature: **Room temperature to 1500 ° C** (b) Temperature controller: **Programmable** (c) Temperature resolution: **0.1 °C or better** (d) Heating rate/cooling rate: **0.1 to 50°C/min programmable or better** (e) Furnace construction: **SiC or as appropriate, possibility for any up gradation should be clearly specified.** (f) Temperature Sensor: **Thermocouple** (Type and number of thermocouple, and its location should be given)		
4.	**Atmosphere:** (a) Gas flow distribution system: Instrument should equip with Mass flow controller (MFC) with 3 gases. MFC should operate with flow rate between 5 ml/min to 200 ml. /min. with resolution 1 ml/min (N_2). (b) Provision for inert, oxidizing and vacuum environment (c) The system should be compatible to vacuum (with attainable vacuum **1 x 10^{-2} mbar or better)**		
5.	**Displacement Sensor / Measurements:** (a) Displacement measurement range: **±2mm or better** (b) Displacement (ΔL) resolution: 1 nm or better		

	(c) Adjustable Contact Load: 0.1 N to 1N or better		
6.	**Reference for calibration:** One number of standard sapphire as a reference sample to be provided along with the basic system (certificate of this reference sample for entire temperature range should be given)		
7.	**Software measurement capabilities:** a) On-line control & data acquisition facility b) Compatible window based software c) Graphic and data (ASCII format) export, d) Linear thermal expansion e) Volume thermal expansion f) Coefficient of thermal expansion g) Phase transition h) Softening i) Density measurement: Change in density j) Sintering kinetics: Measurement of rate of sintering k) Automatic sample length detection		
8.	Calibration certificates from internationally recognized authorities for the displacement measurement should be provided prior to the shipment of the system. After the verification of the calibration certificate, IPR may issue the clearance certificate for the shipment of the system.		
9.	**Installation, demonstration, training & acceptance at IPR:** (a) The instrument shall be installed and commissioned by vendor at IPR. (b) After installation the instrument shall be tested for its performance, accuracy, resolution as mentioned in above specifications with standard sapphire material for different heating rate for our assessment (c) Verifying the hardware and software capabilities of the dilatometer as per the technical specifications. (d) Vendor should supply all the necessary documents e.g. manual, drawings, test certificates, calibration certificates etc. These documents should be in English language. (e) IPR personal must be trained in all hardware and software aspects of the dilatometer at IPR site. Training should also include sample preparation, operation, trouble shooting, maintenance, interpretation of data analysis etc.		

User's List

Bidder shall provide users list detail (address, contact no. and email ID etc.) to whom they have supplied such systems in India.

AUTHORIZED SINGATORY

OFFICIAL SEAL

DATE :-