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Tender Title :		Supply Installation Commissioning and Training of Sorption Induced Strain Measurement System with Accessories			
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1	Technical Bid	Modified Technical Specification after Pre-Bid meeting	14-Jun-2024 05:52 PM	Modified1.pdf 	541.91

Modified specification after Pre-Bid meeting

Detailed specification and drawing of the “Sorption Induced Strain Measurement System with Accessories”

- Cylindrical high-pressure reference cell, made of stainless steel (SS316) (two Nos.), Internal Height: 8-10 inches, Internal Diameter: 6-8 inches, maximum working pressure up to 200kg/cm² with safety valve and rupture disc.
- Cylindrical high pressure sample cell made of stainless steel (SS316) (two Nos.) Internal Height: 8-10 inches, Internal Diameter: 6-8 inches, maximum working pressure up to 200kg/cm² with safety valve and rupture disc.
- The size of reference and sample cells should be of the same dimension
- High-pressure connection tubes, size 1/4 inch outer diameter and should sustain maximum working pressure up to 200kg/cm²
- Pressure transmitter/transducer for analog to digital signal conversion with digital display: 0 to 200kg/cm² (four Nos.) with accuracy of $\pm 0.05\%$.
- Booster pump to load the gas up to 200 kg/cm² (1 no)
- Very high precision valves: should sustain >200kg/cm² (Nine Nos.)
- Electrical jacket heating coil surrounding the reference and sample cells (each cell) with temperature controlling unit should heat the cell from room temperature to 100⁰C and able to maintain stable temperature (isothermal)
- Valve for gas sampling and vent valve: There should be a valve for outlet desorbed gas sample collection
- High pressure valves, fittings and quick connects etc., should be used having make of Swagelok/Parker/Hy-Lok/Fitok/Hip/HAM-LET/TESCOM
- System should be mounted on a single-panel structure
- Strain gauges along with mounting tools and kit to be installed on samples in sample cell and connected with data acquisition system
- Three different types of strain gauges (Nanometer range: 1-20 nm, micrometer range: 0-20 micrometer, millimeter range: 0-5 mm) should be provided.
- Temperature and pressure inside the sample cells and reference cells should be displayed and recorded through the data acquisition system.
- Recording and display of strain in three directions (xyz) and temperature and pressure of reference and sample cells
- Data acquisition system for online data recording, saving and display and analysis
- Lab view or suitable software with graphics pre-installed on computer and synchronized with data acquisition system for data logging
- Branded latest version computer for data acquisition system with antivirus and laser colour printer (A4 Size): Processor intel/AMD - i9, SSD-1 TB, RAM: 16 GB, LED Monitor (minimum 24 inch), licensed windows 11 and MS Office 2021, graphic card, antivirus (3 years validity)

- Vacuum pump: Oil based, single phase, flow rate >30 l/minute, Vacuum: -10 psi
- High pressure (SS) double stage regulators: inlet >200 kg/cm² and outlet up to 30 kg/cm² for CO₂, He, N₂, CH₄ and mixed gases like CO₂+N₂
- Branded 5 KVA online UPS with battery (minimum 30 Minutes backup with full load)
- Spares: ferrules, nuts and bolts, connectors and valve (10 Nos. each) and strain gauges for nanometer scale – 200 nos, strain gauges for micrometre scale – 100 nos, strain gauges for millimeter scale – 100 nos.
- Filled Gas Carbon Steel Cylinder of 47 litres capacity: pressure - 60 to 80kg/cm² with safety and refilling certificate with the following composition by volume (06 Nos.) with double stage regulator (SS 316 diaphragm) of reputed brand (06 Nos.) with Universal Cylinder opener key
 1. CO₂ - 95% Balanced with Nitrogen - 01No.
 2. CO₂ - 90% Balanced with Nitrogen - 01No.
 3. CO₂ - 85% Balanced with Nitrogen - 01No.
 4. CO₂ - 80% Balanced with Nitrogen - 01No.
 5. CO₂ - 70%, Argon-10% and Balanced with Nitrogen - 01No.
 6. CO₂ - 75% - Balanced with Nitrogen - 01No.
- Calibration Gases Cans, 1/2 litres capacity, pressure-20 kg/cm² minimum two years stability with following composition by volume with key, flexible hose, manual flow meter, Sliding wrench and spanner of appropriate size for 1/2 litre calibration gas cylinders
 1. CO₂ - 5%, CH₄ - 90%, N₂-5% - 02 Nos.
 2. CO₂ - 10%, CH₄ - 80%, N₂-10% - 02 Nos.
 3. CO₂ - 15%, CH₄ - 70%, N₂-15% - 02 Nos.
 4. CO₂ - 20%, CH₄ - 60%, N₂-20% - 02 Nos.
 5. CO₂ - 30%, CH₄ - 40%, N₂-30% - 02 Nos.
 6. CO₂ - 60%, CH₄ - 30%, Argon-10% - 02 Nos.
 7. CO₂ - 85%, CH₄ - 15% - 02 Nos.
 8. CO₂ - 95%, CH₄ - 5% - 02 Nos.
- **Tools:** Sliding wrench, spanner, screwdrivers, Allen keys of suitable sizes for handling reference cells, sample cells, valves, gaskets, O rings, extra tubing and other necessary spare parts of the system and cylinders should be provided by the supplier
- **Transportation and Delivery** at CSIR-CIMFR, Barwa Road, Dhanbad is to be taken care by the supplier
- **Delivery period:** 4 Months from the date of issue of purchase order
- **Installation** at CSIR-CIMFR, Barwa Road, Dhanbad – within two weeks from the date of delivery
- **Training:** One week training on software/hardware operations and maintenance
- **Warranty and AMC:** Comprehensive Warranty for 3 years and price should be quoted for AMC of 2 years for the entire set-up. AMC price will be freeze for two years.
- **Note:** After technical suitability, the price evaluation will be based on equipment price, accessories price, 3 years comprehensive warranty price and AMC two years price.

Sorption Induced Strain Measurement System

ANNEXURE I

