

Technical Specifications for Purchases Exceeding 2.5 Lakhs for the Subsurface Mechanics and Geo-Energy Laboratory under the IoE-CoE

Requirement: Complete set of static triaxial apparatus including triaxial cell, 100 kN loading frame, pressure-volume controller with 20 MPa pressure and 200 cc volume, temperature control unit (both negative and positive temperature), gas pressure control unit (20 MPa), data acquisition system along with software interface. The apparatus should have sensitive internal submersible load cell, pressure transducer, linear actuators, necessary lifting equipment. All associated cables and accessories should be provided. The equipment should be capable of integration with compatible pressure-volume controllers, sensors, temperature control unit, gas-control unit and work in unison using a computer-controlled interface.

The following are the detailed technical specifications.

Sl No.	Specification	Requirement
1.	Digital loading frame with velocity controlled (electro-mechanical)	1 Nos.
i.	Axial load carrying capacity of loading frame	100 kN
ii	Controlled rates of strain	0.00001 to 9.99999 mm per minute
iii	Horizontal daylight	Minimum 500 mm
iv	Vertical daylight	Minimum 800 mm
v	Stroke length	Minimum 100 mm
2.	Environmental triaxial cell	1 Nos. capable of handling pressure and temperature (heat and cool)
i	Triaxial cell capacity: Maximum operating pressure Maximum operating load	20 MPa 250 kN
ii	Temperature range	-20⁰ C to +80⁰ C
iii	Loading ram diameter	50 mm
iv	Feed through ports in the base of the cell	At least 5 nos.
v	Insulated environmental cell cover	1 Nos.

vi	Cell top mounted internal stainless steel heat exchange coil	1 Nos.
vii	Specimen dimension and pedestals	Maximum diameter of specimen is 100 mm and 200 mm height. Pedestal and top cap set for 100 mm, 70 mm and 50 mm should be included
3.	Advanced pressure volume controller/ positive displacement pump without pulsation (electro-mechanical system)	2 Nos.
i	Pressure	20 MPa with less than 0.1% accuracy for full range (Resolution 2 kPa)
ii	Volume	200 cc with less than 0.1% accuracy for full range (Resolution 1 mm³)
iii	Standalone or PC controlled	USB with PC interface
4.	Temperature controller (closed loop remote feedback temperature-controlled system)	1 Nos.
i	Range	-20⁰ C to +65⁰ C
ii	Temperature probe	PT100
iii	Thermal stability of bath	±0.05⁰ C
iv	Water-resistant	Yes
5.	Internal submersible load cell	1 Nos.
i	Load rating	100 kN
ii	Pressure rating	Min 20 MPa
iii	Temperature rating	-20⁰ C to +80⁰ C
iv	Temperature compensation Temperature effect	-20⁰ C to +80⁰ C 0.003%/⁰ C
v	Load cell adaptors or accessories	If necessary, should be provided
6.	Displacement transducer (with DIN plug)	1 Nos.

i	Range	±25 mm
ii	Accuracy	Maximum 0.25% of the full range
7.	Pore pressure transducer (with DIN plug)	1 Nos.
i	Pressure range	20 MPa (Maximum)
ii	Accuracy	Maximum 0.1% of the full range
8.	Gaseous pressure controller	1 Nos.
i	Pressure range	20 MPa (Maximum)
ii	Type of gas that can be injected	Compressed air, Nitrogen, Methane
iii	Pressure transducer	20 MPa - 0.1% accuracy at full range
iv	Computer controlled	Yes
9.	Data acquisition (including power and communication cables)	Minimum 16-bit system
i	Number of channel	Minimum 8
ii	Input voltage	±5 volts
iii	Input ranges for each channel	±10V, ±5V, ±1V, ±200mV, ±100mV, ±30mV, ±20mV, ±10mV
iv	RS232 to USB adaptor	Yes
v	Sampling frequency	Minimum 500 Hz
vi	Power and communication cables to PC	Yes
10.	Software	Yes
i	UU, CU, CD testing module	Yes
ii	Independent control of axial stress, axial strain or axial load, radial stress, temperature, back pressure and slow cycles (low frequency cyclic loading) of load, displacement	Yes
11.	Minimum warranty	One year + Two year extended warranty

12	Vendor Eligibility Criteria	The manufacturer/vendor should furnish the list of the customers (same equipment) supplied in India or Abroad. The committee will cross check with the customers if necessary. The manufacturer or vendor should have supplied at least 3 such equipment in the past five years. The manufacturer or vendor need to furnish their experience in manufacturing laboratory equipment for geotechnical engineers.
13	Installation	Installation and commissioning support to be provided by the vendor