

भू-प्रौद्योगिकी प्रयोगशाला
जानपद अभियान्त्रिकी विभाग
भारतीय प्रौद्योगिकी संस्थान
कानपुर-208 016 (उ.प्र.)



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Dr. Rajesh Sathiyamoorthy

Enquiry no. CE/GEOTECH/RS/2013-14/AUGUST/4

Faculty In charge

Date: 19/August/2013

M/S

Subject: Supply of Equipments for Geotechnical Engineering laboratory.

Dear Sirs,

We would like to purchase following equipments for our laboratory. Following are the general technical specifications required for these equipments

- 1.) Triaxial Test Apparatus, Digital with microprocessor based loading unit along with Data Acquisition System and software for online plot.

The Equipment should consist of:

A.) Load Frame, Motorized, 30 speeds, 50 kN consisting of a cabinet which houses the gear system and motor with sturdy angle iron frame. The loading is done through the bottom loading platen, which is carried on a lead screw, which advances upward. The top load bracket which slides over two upright pillars can be positioned at any desired height and locked. It carries a screw adaptor for standard proving ring or load cell.

Rate of Strain: 30 fixed speeds between 0.00048 mm/min to 6.0 mm/min.

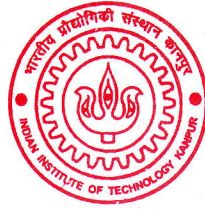
Suitable for operation on 220VAC, Single Phase

B.) Triaxial Cell for testing specimens of size (i.) 38 mm dia x 76 mm long and

(ii) 50mm dia X 100 mm long

It consist of:

o Top loading pad, Perspex, 38mm dia. and 50 mm dia 1 No. each



- o Plain Perspex disc 38mm dia and 50 mm dia x 6 mm thick 1 pair each
- o Porous Stone 38mm dia and 50 mm dia x 6 mm thick 1 pair each
- o Sheath stretcher for 38mm dia and 50 mm dia specimen 1 No. each
- o Sand former for 38 mm dia. and 50 mm dia 1 No. each
- o Rubber sheath for 38mm dia and 50 mm dia specimen 12 Nos. each
- o Drainage tube (short), 38 mm and 50 mm dia 4 Nos. each
- o Drainage tube (long), 38 mm and 50 mm dia 4 Nos. each
- o 'O' rings for 38mm dia and 50 mm dia specimen 8 Nos. each
- o Split Mould, 38mm Dia x 76mm long and 50 mm dia x 100mm 1 No. each
- o Top loading pad 38mm and 50 mm dia (plain) 1 No. each

C.) Constant pressure system oil-water type or air-water type with two cells One for Cell Pressure & another for Back Pressure. Quote separately for both the types.

D.) Triaxial Electronic Conversion Kit for direct reading of strain, load and pore pressure With an external load cell, 10 kN capacity, Pore Pressure Transducer, 20 bar (20 kg/cm²) capacity, an LVDT (Displacement Sensor) having a range of 0-20mm mm and a 3 - Channel Digital Indicator specially designed to meet the requirements of Triaxial Test.

The equipment consist of the following parts:

i.) Digital Indicator

Mode of Display : Micro controller multi line alpha numeric VFD display for all simultaneous channel (No need for channel selection) Power Supply : 220V, 50Hz, Single Phase

ii.) Load Cell Capacity : 10 kN, Max. overload : 10% of the rated, Excitation : 5 V DC

Resolution : 0.01 kN Sensing element : Strain gauges in full bridge configuration

iii.) Pore Pressure Transducer Capacity 20 bar (20 kg/cm²). Max. overload 150% of rated

Excitation 5 V DC. Resolution 0.01 bar (0.01 kg/cm²) Sensing element Strain Gauges in full bridge configuration

iv.) Displacement Transducer: Range : 0-20 mm Sensing element : LVDT



E.) Data Acquisition System (Hardware) includes:

- i.) Up to 16 single ended analog input Channels as Standard
- ii.) High Speed USB 2.0 Connectivity
- iii.) Accepts an input range of $\pm 10V$
- iv.) Up to 256 ks /s sampling
- v.) Compatible with complete range of transducers for most of Geotechnical Tests

F.) Data acquisition System (Software): Software should include all relevant plots including Stress-strain, Mohr circle, Shear strength parameter etc for all type of triaxial test (Unconsolidated Undrained /Consolidated Undrained/Consolidated Drained)

Data acquisition software should allow for a variety of calibration methodologies to suit the type of test being conducted and the type of sensor required for conducting a particular test.

The Calibration Methods should include Linear, Polynomial, Map Ranges & Table.

Data should be logged based on normally progressing Time, Logarithm of time, Square root of Time & Change in value in any one of Channel to be considered as master channel.

Real-time plot should be possible. Final output should arrive at shear strength parameters for all type of triaxial test.

2.) Electronics Three gang Consolidation Apparatus: Apparatus comprising of

- (i.) Fixed Ring type of consolidometer cells for testing specimens of 100 mm dia x 25 mm thick.
- (ii.) Floating Ring type of consolidometer cells for testing specimens of 100 mm dia x 25 mm thick.

Quote separately for both the types.

The Equipment Consist of:

A.) Loading Units mounted on Frame

B.) Consolidation Cell Assembly consists of the following:



- o Fixed ring and floating ring with Guide Ring
- o Top Porous Stone
- o Bottom Porous Stone
- o Pressure Pad
- o Channeled base with Water Inlet
- o Gasket
- o Water Jacket

C.) Set of weights:

- | | |
|--------------------------------|--------|
| i.) 0.05 kg/cm ² : | 7No's. |
| ii.) 0.1 kg/cm ² : | 5 Nos. |
| iii.) 0.2 kg/cm ² : | 6 Nos. |
| iv.) 0.5 kg/cm ² : | 6 Nos. |
| v.) 1.0 kg/cm ² : | 5 Nos. |

D.) Water Reservoir with plastic tube, T-connection and a pinch cock

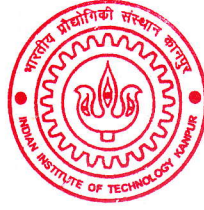
E.) Facility to measure permeability.

F.) Displacement Sensor, 0 ~ 10mm complete with 3m long cable (side entry) mounting bracket..

G.) Consolidation Indicator, 3 channel

H.) DAQ hardware and software used for triaxial test (see item 1,E and F) should be integrated with the consolidation apparatus. Software should facilitate consolidation test results also.

Triaxial and consolidation test (3 Gang-2 no's) should run parallely with single DAQ (Hardware and Software).



3.) Permeability test Apparatus:

The Equipment should meet the requirement of IS:2720 of (Part XVII)-1966 and comprises the following:

- i.) Metallic mould (Gun metal/Brass), 100 mmx127.3 mm high . Quote separately for both the types.
- ii.) Extension collar 100mmx60mm high.
- iii.) Drainage base plate with a recess for a porous stone and with an out let valve on off.
- iv.) Metallic clamping ring.
- v.) Drainage cap. (top plate) with a recess for a porous stone and fitted with an inlet valve and air release valve.
- vi.) Dummy plate to serve as a false bottom during compaction.
- vii.) Porous stone for drainage base plate.
- viii.) Porous stone for drainage cap.
- ix.) Set of glass stands pipes, 6 mm dia, 10 mm dia and 20 mm dia mounted on wooden board.
- x.) Length of 3 meter long rubber connecting tube with pinch cock.

4.) Motorized Sieve shaker with digital timer along with standard sieve set(Brass)

A.) Motorized Sieve Shaker: Suitable for operation on 220V, 50 Hz, Single phase AC supply

B.) Standard Sieve Set consists of 200 mm diameter, having 4.75mm, 2mm, 1mm, 0.425mm, 0.212mm, 0.150 and 0.075mm sieves with LID and PAN.

5.) Triaxial Electronics Shear indicator with load cell and LVDT and pressure transducer.

Triaxial shear indicator with following specifications.

- i.) Display: 4 Dig LCD display, 4line * 16 character.
- ii.) Resolution: One part in 2000 (for load =00.01 KN, pressure=00.01 bar and LVDT=0.001 mm)
- iii.) INPUT: from strain gauges based load cell, pressure cell and LVDT type displacement sensor.
- iv.) Load and pressure cell excitation: 10 V DC regulated.
- v.) LVDT Excitation: 1V AC rms @4 kHz
- vi.) Calibration Unit: KN for load , Bar for pressure and mm for displacement.
- vii.) Power supply: 230V+10%, 50 Hz AC mains.
- viii.) Cabinet: 206mm(w)x 106mm (H)x 275mm (D)

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- ix.) Load cell :capacity 10 KN
 - x.) Pressure cell: capacity 20 Bar
 - xi.) LVDT : (± 10 mm)
- 6.) HAND HYDRAULIC PALLET TRUCK of capacity 2500 Kg with Fork Span of 680mm, Fork Length 1220mm, Min height 85mm and Max height 205mm
- 7.) Sampling Tubes of 100 mm dia X 250 mm length.
- 8.) SPT Rods (mild steel) of 0.5m , 1m, and 1.5m long
- 9.) Plate Load test Anchors of following specifications:
Anchors (4 No's)
i.) Capacity: 5 Ton
ii.) Height: 1.50 m
iii.) Screw diameter (helical diameter) : approximately 20.0-25.0 cm
iv.) Nut Bolts 4 no's for clamping anchors head with I sections for making platform for Plate load test.
v.) Anchors Handle (for manual anchoring)

Kindly arrange to send the quotation(s) with detailed specifications of the item in a sealed envelope to the given address ,cited above , so as to reach us on or before the closing date 28 August 2013.

The undersigned reserves the right to accept the offer in part or full or reject without assigning any reason.

Thanking you

Sincerely

Rajesh Sathiyamoorthy