PROBEX - Rock Pressuremeter / Dilatometer

Pressuremeter

RUGGED AND SAFE
VERY HIGH CAPACITY
REAL TIME PLOTTING OF TEST RESULTS
MAY BE USED IN DEEP BOREHOLES

The PROBEX Rock Pressuremeter or Flexible Volumetric Dilatometer is a radially expandable borehole probe used to determine in situ the deformability of rock mass and the creep properties of soft rock.

Description

The dilatometer test is a loading test run inside a borehole with a radially expandable cylindrical probe. It is used to determine in situ the deformability of rock mass and the creep properties of very soft rock. The **PROBEX** determines the deformations by measuring the total volume change of the probe. This method is the same well-proven method used with the pressuremeter. It provides a mean modulus value of a large volume of rock, contrary to the use of callipered probes which can be affected by local heterogeneities. The volume changes of the probe are measured by monitoring the displacement of a piston. This configuration eliminates the parasitic expansion of the tubing and pumping system.

The **PROBEX** consists of:

- An inflatable NQ membrane mounted on a steel core — an optional HQ membrane kit is available
- A hydraulic module comprising a dual piston and cylinder assembly, to inflate and deflate the membrane
- A measuring module containing a linear transducer, which monitors the injected volume
- The hydraulic and electrical lead lines
- A hydraulic hand pump and pressure gauge
- A pressure transducer
- A readout unit consisting of the **DP Box** unit operated with an Android tablet. This versatile readout is compatible with other pressuremeters manufactured by Roctest. A special application, installed on the tablet, allows configuring the tests and calibrations, to read and plot the test results in real-time, to log the data, and to review test results.

Advantages & Limitations

- Deformation modulus measured over a large volume of rock
- May be used in deep borehole
- Test in NQ boreholes (optional HQ membrane)
- Very high capacity (30 000 kPa)
- Automatic acquisition & real-time visualisation for enhanced control of the test on a tablet
- Rugged membrane (polyurethane & fiberglass-reinforced) allowing its use in moderately bad quality zones of rock
- The use of the PROBEX in hard rock requires special pre-cautions
- The HQ membrane has a reduced radial expansion (10%) and requires a very tight borehole
- Volumetric Dilatometer as described in ASTM D8359-21

Applications

- Deformations estimation of tunnel linings, concrete dam foundations, and bridge supports
- Settlement and end bearing capacity estimation of deep foundations like caissons
- Lateral deflection analysis of drilled shaft

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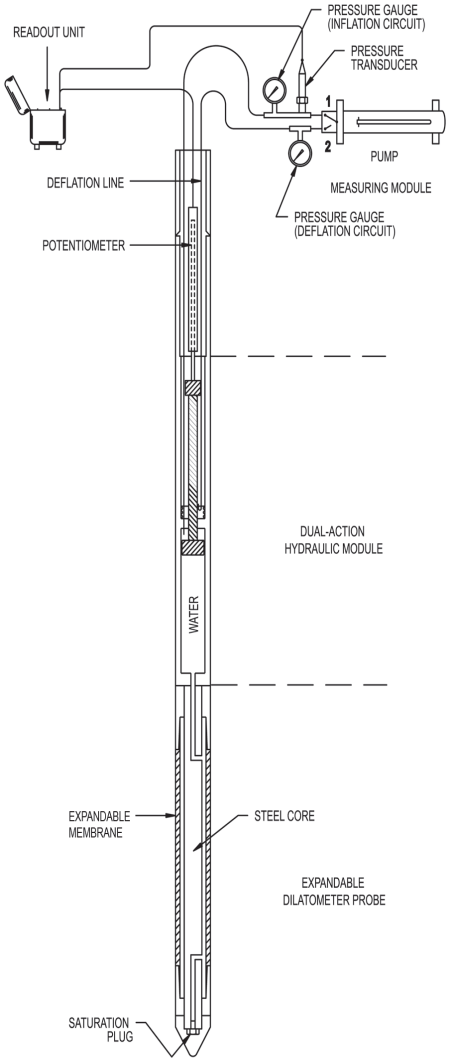
Specifications

PROBE	**NQ** (Standard)	**HQ** (Option)
Maximum pressure	30 000 kPa	
Diameter		
Minimum (deflated)	73.7 mm	93 mm
Maximum (inflated)	85.5 mm	102.6 mm
Length (membrane)	457 mm	
Probe upper threads	BW / NQ rod	HQ
Inertia (MPa) at 650 cc	2 to 2.5	3 to 3.5

READOUT – DP BOX	
Function	Volume and pressure indicator
User interface	Bluetooth with an Android tablet
Resolution	
Diametrical change	0.001 mm (0.05 cc)
Pressure	0.1 % F.S.
Logging capacity	Typically over 10 000 data sets (tablet-dependent)
Power supply interface	Universal AC wall plug with US/Euro adapter + adapter cable for car (lighter) and for external battery
Operating temperature	-20 to +70 deg. C
Autonomy	> 8 hours
Battery	2 x 12 V 2.3 A, rechargeable
Case	Waterproof, shock resistant ABS plastic
Dimensions	25 x 28 x 12 cm (l x w x h)



Test & Interpretation

The leads are threaded inside a B-size casing or NQ rods that are used to lower the probe to test depth. The tests are stress controlled. Increments of pressure are applied in stages using the hand pump. The probe compressibility and inertia are previously determined by running calibrations. The hybrid nature of the PROBEX allows to use it according to testing sequences and interpretation methods associated to pressuremeters or flexible dilatometers. However, the results obtained in very hard rock with this equipment should be used with precautions. The method used to reduce the data is the same one used for pressuremeter data. It is based on Lame's equations and yields a mean modulus of deformation for the rock mass tested. A tool (ProbexCompanion) developed by Roctest can be used for determining this modulus.

Ordering Information

Please specify:

- Cable / Tubing length (50, 100, 150 or 200 m)
- Optional accessories

Optional Accessories

- Spare Membranes
- NQ, HQ or BW to AW rod slotted adapter
- Kit for the HQ membrane
- Cable & tubing extension

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