

PRESSUREMETER TESTING

HIGH PRESSURE DILATOMETER (HPD)

In Situ Site Investigation offer a full range of pressuremeter testing services to suit a variety of ground conditions.

The High Pressure Dilatometer (HPD) is designed to perform in situ load-displacement tests to determine strength and stiffness properties of the ground. It is primarily designed for testing in rock but can also be used for testing stiff clay and cemented sand. The HPD is inserted into a test pocket formed by conventional drilling methods and is referred to as a pre-bored pressuremeter.

The HPD is operated in conjunction with a rotary drilling rig which is used to drill the test pocket, lower the probe into the borehole on drill rods and advance the borehole between test locations.

The sequence of testing involves drilling at full borehole diameter to above the scheduled test depth, then drilling a 2.0 to 3.0 m long test pocket. Test pockets are preferably cored, at T6H or HWAf size (99 mm), so that the test material can be examined and to maximize the uniformity of the pocket diameter and wall quality.

In some cases, the pocket can be formed by open-hole drilling. Longer test pockets can be drilled in suitable ground to enable 2 or more successive tests to be carried out.

Production rate for HPD testing is typically 1 to 2 tests per shift. However, this is dependent on a number of factors; for example, the test spacings, drilling progress rate, other tests within the borehole, etc.



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www.insitusi.com/pressuremeter-testing

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HIGH PRESSURE DILATOMETER SPECIFICATION

Generic type	Pre-bored (PBP)
Test type	Stress controlled
Manufacturer	ISSI/PACE Geotechnical Ltd or Cambridge Insitu Ltd
Nominal diameter, mm	95
Instrument length, m	1.58 or 2.03
Expanding section length, m	0.64 or 0.58
Strain Capacity	45% diametric strain, 80% volumetric strain
Maximum working pressure, MPa	20
Displacement measurement	6 arms at 60° (3 diametrically opposite pairs)
Pore pressure measurement	None fitted
Deployment	Inserted into test pocket drilled with HWAF or T6H size equipment using a rotary rig. Test pocket can be drilled long enough to allow 2 or more tests, depending on borehole and ground conditions.
Reliability of test results	Drilling of test pocket results in some stress relief of ground which is accounted for in interpretation of data. Results can be affected by disturbance or over size test pocket, dependent on ground conditions and quality of drilling.
Preferred ground conditions for use	Originally developed for rock but with improvements in instrument sensitivity now routinely used in stiff overconsolidated clay and dense sand where stable test pocket can be formed and stays open.
Limiting ground conditions	Requires clean stable test pocket. Limited usefulness of data in stronger rocks where yield is not induced.
Strength – Clay or rock (assumes test carried out under undrained conditions)	Reasonable / Good (providing sufficient yielding or rock occurs during test)
Strength - Sand (assumes test carried out under drained conditions)	Good
Stiffness - shear modulus, G (including non-linear stiffness-strain parameters if appropriate)	Good
In situ lateral stress (difficult to obtain by other means)	Moderate. By interpretation of loading curve.
Testing Standard	BS EN ISO 22476-5:2012