

Menard Pressuremeter

Control Unit (C.U), tubings and 3-cells probe to perform in situ Pressuremeter test in soils according to the ISO 22476-4 standard.



A **Pressuremeter test** is an in-situ stress controlled loading test performed on the wall of a borehole using a **cylindrical probe** which can expand radially.

From the test readings (volume variation based on controlled pressure), a **stress-strain curve** can be obtained, in the case of plane deformation, which yields :

- the Menard Pressuremeter modulus E_m
- the creep pressure P_f
- the Menard limit pressure P_l

CU technical specifications

- Dimensions: 86x43x26 cm (tripod height 65cm)
- Mass : 24.5kg (tripod 3,5kg)
- Aluminium box with protection cover
- Transport handle
- Tripod and level allowing adjustment of verticality on all sites

Equipment :

The Control Unit

Equipped with devices to precisely regulate the pressure applied to the probe and to read its volume changes with pressure increments and time. A nitrogen cylinder provides the pressure source. The control unit stands on a tripod. It includes a 800 cm³ volumeter with a sight tube, a main pressure regulator, a differential pressure regulator, pressure gauges 0-25, 0-60 bar for measuring and guard cells (0-100 bar in additional for weak rock tests), and the necessary valves and couplings.

The tubing

This **coaxial or twin tubing, flexible, high resistance with small dilatation**, connects the probe to the control unit.

The 3-cell probe

It includes a central measuring cell, filled with water. Its volume changes are read on the Control Unit volumeter. The probe is totally protected by a cover (different types according to soils stiffness) which is inflated by the gas to form the 2 guard cells. Pressures applied to the 3 cells are balanced through the differential pressure regulator to ensure a true cylindrical deformation along the measuring cell.

Test procedure

The borehole is drilled so as to minimize wall disturbance and keep a cavity diameter compatible with the probe size. The probe is lowered into the borehole to the required test depth and the pressure is applied by equal increments. Pressure and volume readings are taken on the Control Unit.

In gravely soils and/or under water table level where the borehole would cave-in, the probe can be inserted in a specially designed slotted tube which is hammered or vibrodriven into the soil. Used without acquisition, the C.U meets the requirements of the ISO 22476-4 standard part A .

Data acquisition system for pressuremeter data.

General presentation

GeoSPAD[®]2 allows the **acquisition of Pressuremeter data** according to the **NF EN ISO 22476-4 and NF EN ISO 22476-5 standards** via the central unit GeoBOX[®]. This system displays the **conduct of pressuremeter tests** and **automatically records the conditions and data** of these tests.

GeoSPAD[®]2 system is integrated into Menard pressuremeter which keep his full performance range whether or not they are used with GeoSPAD[®]2. GeoSPAD[®]2 is a waterproof box including 2 pressure sensors of 0-100 bar and a magnetostrictive sensor for volume.

New : recording of the cyclic tests

It is a unique system, **fully integrated into Menard Pressuremeter**, which sends data directly to your **GeoBOX[®]** : **reducing both material tidiness and installation time**. It is **user-friendly**, and totally compatible with pressuremeters already equipped with sensors.



Setting up

- 1 Positioning the probe and starting the pressuremeter test.
- 2 Follow the test in real time with GeoBOX[®].



- 3 Print and/or save on a USB key.
Forward the data to the office via 4G system (option).



Conformed to procedure B of **NF EN ISO 22476-4 standard**, recordings are automatically carried out after 1, 15, 30 and 60 seconds, with optimized accuracy : 0.1 cm³ on the volume and 15 kPa on the pressures. GeoBOX[®] shows the curve of the data during the test, allowing instant display of test results.

The pressure of the central cell, the real and theoretical differential pressure, the volume $\Delta V_{60/30}$ and $\Delta V_{60/60}$, the number of steps and the time are also displayed during the execution of the test.



Test treatment

Data transfer and test analysis on GeoVISION[®] via a USB key or **4G system** (option).