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Standards

Irish Standard  
I.S. EN ISO 22476-4:2012

# Geotechnical investigation and testing - Field testing - Part 4: Ménard pressuremeter test (ISO 22476-4:2012)

## I.S. EN ISO 22476-4:2012

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**Geotechnical investigation and testing - Field testing - Part 4:  
Ménard pressuremeter test (ISO 22476-4:2012)**

Reconnaissance et essais géotechniques - Essais en place  
- Partie 4: Essai au pressiomètre Ménard (ISO 22476-4:2012)

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Ménard (ISO 22476-4:2012)

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## **Foreword**

This document (EN ISO 22476-4:2012) has been prepared by Technical Committee CEN/TC 341 "Geotechnical Investigation and Testing", the secretariat of which is held by ELOT, in collaboration with Technical Committee ISO/TC 182 "Geotechnics".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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**Geotechnical investigation and testing —  
Field testing —**

**Part 4:  
Ménard pressuremeter test**

*Reconnaissance et essais géotechniques — Essais en place —*

*Partie 4: Essai au pressiomètre de Ménard*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 22476-4 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical investigation and testing*, in collaboration with Technical Committee ISO/TC 182, *Geotechnics*, Subcommittee SC 1, *Geotechnical testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 22476 consists of the following parts, under the general title *Geotechnical investigation and testing — Field testing*:

- *Part 1: Electrical cone and piezocone penetration test*
- *Part 2: Dynamic probing*
- *Part 3: Standard penetration test*
- *Part 4: Ménard pressuremeter test*
- *Part 5: Flexible dilatometer test*
- *Part 7: Borehole jack test*
- *Part 9: Field vane test*
- *Part 10: Weight sounding test* [Technical Specification]
- *Part 11: Flat dilatometer test* [Technical Specification]
- *Part 12: Mechanical cone penetration test (CPTM)*

# Geotechnical investigation and testing — Field testing —

## Part 4: Ménard pressuremeter test

### 1 Scope

This part of ISO 22476 specifies the equipment requirements, execution of and reporting on the Ménard pressuremeter test.

NOTE 1 This part of ISO 22476 fulfils the requirements for the Ménard pressuremeter test, as part of the geotechnical investigation and testing according to EN 1997-1 and EN 1997-2.

This part of ISO 22476 describes the procedure for conducting a Ménard pressuremeter test in natural soils, treated or untreated fills and in weak rocks, either on land or off-shore.

The pressuremeter test results of this part of ISO 22476 are suited to a quantitative determination of ground strength and deformation parameters. They may yield lithological information. They can also be combined with direct investigation (e.g. sampling according to ISO 22475-1) or compared with other *in situ* tests (see EN 1997-2:2007, 2.4.1.4(2) P, 4.1 (1) P and 4.2.3(2) P).

The Ménard pressuremeter test is performed by the radial expansion of a tricell probe placed in the ground (see Figure 1). During the injection of the liquid volume in the probe, the inflation of the three cells first brings the outer cover of the probe into contact with the pocket wall and then presses on them resulting in a soil displacement. Pressure applied to and the associated volume expansion of the probe are measured and recorded so as to obtain the stress-strain relationship of the soil as tested.

Together with results of investigations with ISO 22475-1 being available, or at least with identification and description of the ground according to ISO 14688-1 and ISO 14689-1 obtained during the pressuremeter test operations, the test results of this part of ISO 22476 are suited to the quantitative determination of a ground profile, including

- the Ménard  $E_M$  modulus,
- the Ménard limit pressure  $p_{LM}$  and
- the Ménard creep pressure  $p_{fM}$ .

This part of ISO 22476 refers to a probe historically described as the 60 mm G type probe. This part of ISO 22476 applies to test depths limited to 50 m and test pressure limited to 5 MPa.

NOTE 2 Ménard pressuremeter tests are carried out with other probe diameters and pocket dimensions such as shown below.

Probe		Drilling diameter (mm)	
Designation	Diameter (mm)	min	max
AX	44	46	52
BX	58	60	66
NX	70/74	74	80

Two alternative methods of measurement are provided as follows.

- Procedure A: data are recorded manually.
- Procedure B: data are recorded automatically.

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