INTERNATIONAL STANDARD

ISO 22476-11

First edition
2017-04

Geotechnical investigation and testing — Field testing —

Part 11: Flat dilatometer test

Reconnaissance et essais géotechniques — Essais en place —

Partie 11: Essai au dilatomètre plat

Reference number
ISO 22476-11:2017(E)

Documents
Document Sharing Hub
© ISO 2017

Full document details: ISO 22476-11-2017



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Documents
Document Sharing Hub

© ISO 2017 – All rights reserved

Full document details: ISO 22476-11-2017

Contents

Page

Foreword ... **iv**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms, definitions and symbols ... **1**
3.1 Terms and definitions ... 1
3.2 Symbols ... 4

4 Equipment ... **4**
4.1 Dilatometer equipment ... 4
4.2 Insertion apparatus ... 6

5 Test procedure ... **7**
5.1 Maintenance and checks ... 7
5.2 Membrane calibration procedure ... 8
5.3 Flat dilatometer test ... 8
5.3.1 Operations before testing ... 8
5.3.2 Basic test procedure ... 8
5.3.3 C-pressure readings ... 9
5.3.4 Operations after testing ... 9
5.4 DMT dissipation test (DMTA) ... 9
5.5 DMT short dissipation test (DMTA-s) ... 9
5.6 Safety requirements ... 10

6 Test results ... **10**

7 Report ... **11**
7.1 General ... 11
7.2 Reporting of test results ... 11
7.2.1 General information ... 11
7.2.2 Location of sounding ... 12
7.2.3 Test equipment ... 12
7.2.4 Test procedure ... 13
7.2.5 Test results ... 13
7.3 Presentation of results ... 13

Annex A (informative) **Example interpretation formulae** ... **15**

Bibliography ... **17**

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub

Full document details: ISO 22476-11-2017

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

ISO 22476-11 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical investigating and testing*, in collaboration with ISO Technical Committee TC 182, *Geotechniques*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition of ISO 22476-11 cancels and replaces ISO/TS 22476-11:2005, which has been technically revised.

A list of all parts in the ISO 22476 series can be found on the ISO website.

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: ISO 22476-11-2017

Geotechnical investigation and testing — Field testing —

Part 11: Flat dilatometer test

1 Scope

This document establishes guidelines for the equipment requirements, execution of and reporting on flat dilatometer tests.

NOTE This document fulfils the requirements for flat dilatometer tests as part of the geotechnical investigation and testing according to EN 1997-1 and EN 1997-2.

The basic flat dilatometer test consists of inserting vertically into the soil a blade-shaped steel probe with a thin expandable circular steel membrane mounted flush on one face and determining two pressures at selected depth intervals: the contact pressure exerted by the soil against the membrane when the membrane is flush with the blade and, subsequently, the pressure exerted when the central displacement of the membrane reaches 1,10 mm.

Results of flat dilatometer tests are used mostly to obtain information on soil stratigraphy, *in situ* state of stress, deformation properties and shear strength. It is also used to detect slip surfaces in clays. The flat dilatometer test is most applicable to clays, silts and sands, where particles are small compared to the size of the membrane.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
dilatometer blade
dilatometer probe
blade-shaped steel probe that is inserted into the soil to perform a flat dilatometer test

3.1.2
membrane
thin circular steel diaphragm that is mounted flush on one face of the blade and is expanded by applying a gas pressure at its back

© ISO 2017 – All rights reserved

AVA Documents Document Sharing Hub
Full document details: ISO 22476-11-2017

3.1.3
switch mechanism
apparatus housed inside the blade, behind the membrane, capable of switching on and off an electric contact when the membrane expands and reaches two preset deflections equal, respectively, to 0,05 mm (*A-pressure* (3.1.10) reading) and 1,10 mm (*B-pressure* (3.1.11) reading)

3.1.4
signal
activation (signal on) or disconnection (signal off) by the switch mechanism between the blade and the membrane to detect two preset positions of the membrane equal to 0,05 mm and 1,10 mm

3.1.5
pneumatic-electric cable
cable that connects the control unit to the blade, delivers gas pressure at the back of the membrane and provides electric continuity between the control unit and the switch mechanism

3.1.6
control and calibration unit
set of suitable devices capable of supplying gas pressure to the back of the membrane and measuring the pressure when the switch mechanism activates and disconnects the electric contact behind the membrane

3.1.7
earth wire
wire connecting the control unit to the earth

3.1.8
pressure source
pressurized gas tank filled with any dry non-flammable and non-corrosive gas incorporating a pressure regulator

3.1.9
dilatometer sounding
sequence of dilatometer tests executed from the same station at ground level in a vertical direction at closely spaced intervals with depth increments ranging from 100 mm to 300 mm

3.1.10
A-pressure
A
pressure that is applied to the back of the membrane to expand its centre 0,05 mm against the soil

3.1.11
B-pressure
B
pressure that is applied to the back of the membrane to expand its centre 1,10 mm against the soil

3.1.12
C-pressure
C
pressure that is applied to the back of the membrane when the centre of the membrane returns to the A-pressure position during a controlled, gradual deflection following the B-pressure

3.1.13
A-membrane-calibration-pressure
ΔA
suction recorded as a positive value that is applied to the back of the membrane to retract its centre to the 0,05 mm deflection in air

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: ISO 22476-11-2017

3.1.14
B-membrane-calibration-pressure
ΔB
pressure that is applied to the back of the membrane to expand its centre to the 1,10 mm deflection in air

3.1.15
zero gauge value
Z_M
pressure gauge deviation from zero when venting the blade to atmospheric pressure

3.1.16
***<A>* soil pressure**
p_0
corrected *A-pressure* (3.1.10)

Note 1 to entry: The term “contact pressure” is also used.

3.1.17
***<B>* soil pressure**
p_1
corrected *B-pressure* (3.1.11)

3.1.18
***<C>* soil pressure**
p_2
corrected *C-pressure* (3.1.12)

3.1.19
***in situ* pore water pressure**
u_0
water pressure prior to blade insertion at the depth of the centre of the membrane

3.1.20
***in situ* effective vertical stress**
σ'_{vo}
vertical stress prior to blade insertion at the depth of the centre of the membrane

3.1.21
dilatometer material index
I_D
index used to classify soils according to their response to the test

3.1.22
dilatometer horizontal stress index
K_D
index related to the *in situ* horizontal stress

3.1.23
dilatometer modulus
E_D
parameter related to the stiffness of the soil

3.1.24
pore pressure index
U_D
index related to the permeability of the soil

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO 22476-11-2017