Geotechnical investigation and testing - Field testing - Part 1: Electrical cone and piezocone penetration test (ISO 22476-1:2012)

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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 22476-1:2012 sisaldab Euroopa standardi EN ISO 22476-1:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 22476-1:2012 consists of the English text of the European standard EN ISO 22476-1:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.09.2012.	Date of Availability of the European standard is 15.09.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN ISO 22476-1:2012) 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of an identical text or by endorsement, at the latest by March 2013, and conflicting national standards shall be withdrawn at the latest by March 2013.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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Introduction

The electrical cone penetration test (CPT) consists of pushing a cone penetrometer using a series of push rods into the soil at a constant rate of penetration. During penetration, measurements of cone resistance and sleeve friction are recorded. The piezocone penetration test (CPTU) also includes the measurement of pore pressures around the cone. The test results can be used for interpretation of stratification, classification of soil type and evaluation of engineering soil parameters. Two International Standards define cone penetration tests: ISO 22476-1 defines CPT and CPTU practice using electronic transducers; ISO 22476-12 defines CPT practice using mechanical measuring systems.

“Cone resistance” is the term used in practice and in this part of ISO 22476, although “cone penetration resistance” is a more correct description of the process.

The test results of this part of ISO 22476 are specially suited for the qualitative and/or quantitative determination of a soil profile together with direct investigations (e.g. sampling according to ISO 22475-1 [2]) or as a relative comparison of other *in situ* tests.

The results from a cone penetration test are used to evaluate:

— stratification;

— soil type;

— geotechnical parameters such as

  — soil density,

  — shear strength parameters, and

  — deformation and consolidation characteristics.

Geotechnical investigation and testing — Field testing —

Part 1:
Electrical cone and piezocone penetration test

1 Scope

This part of ISO 22476 deals with equipment requirements, the execution of and reporting on electrical cone and piezocone penetration tests.

NOTE 1 This part of ISO 22476 fulfills the requirements for electrical cone and piezocone penetration tests as part of geotechnical investigation and testing according to EN 1997-1 [3] and EN 1997-2 [4].

Within the electrical cone and piezocone penetration test, two subcategories of the cone penetration test are considered:

— electrical cone penetration test (CPT), which includes measurement of cone resistance and sleeve friction;

— piezocone test (CPTU), which is a cone penetration test with the additional measurement of pore pressure.

The CPTU is performed like a CPT with the measurement of the pore pressure at one or several locations on the penetrometer surface.

NOTE 2 CPT or CPTU can also be used without measurement of sleeve friction, but this is not covered in this part of ISO 22476.

This part of ISO 22476 specifies the following features:

a) type of cone penetration test, according to Table 1;

b) application class, according to Table 2;

c) penetration length or penetration depth;

d) elevation of the ground surface or the underwater ground surface at the location of the cone penetration test with reference to a datum;

e) location of the cone penetration test relative to a reproducible fixed location reference point;

f) pore pressure dissipation tests.

NOTE 3 This part of ISO 22476 covers onshore and nearshore CPT. For extra requirements for offshore CPT, see NORSOK G-001 [8].

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 8503, *Preparation of steel substrates before application of paints and related products — Surface roughness characteristics of blast-cleaned steel substrates*

ISO 10012, *Measurement management systems — Requirements for measurement processes and measuring equipment*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.1.1

average surface roughness
Ra
average deviation between the real surface of the cone penetrometer and a medium reference plane placed along the surface of the cone penetrometer

3.1.2

cone
conical shaped bottom part of the cone penetrometer and the cylindrical extension

NOTE 1 When pushing the penetrometer into the ground, the cone resistance is transferred through the cone to the load sensor.

NOTE 2 This part of ISO 22476 assumes that the cone is rigid, so when loaded its deformation is very small relative to the deformation of other parts of the cone penetrometer.

3.1.3

cone penetration test
CPT
pushing of a cone penetrometer at the end of a series of cylindrical push rods into the ground at a constant rate of penetration

3.1.4

cone penetrometer
assembly containing the cone, friction sleeve, any other sensors and measuring systems as well as the connection to the push rods

NOTE An example of a cone penetrometer is shown in Figure 1; for other filter locations, see Figure 2.