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Geotechnical investigation and testing - Geohydraulic testing - Part 5: Infiltrometer test
(ISO/DIS 22282-5:2007)

Geotechnische Erkundung und Untersuchung - Geohydraulische Versuche - Teil 5:
Infiltrometerversuche (ISO/DIS 22282-5:2007)

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Reconnaissance et essais géotechniques - Essais géohydrauliques - Partie 5: Essai
d'infiltromètre (ISO/DIS 22282-5:2007)

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Geotechnical investigation and testing - Geohydraulic testing -
Part 5: Infiltrometer test (ISO/DIS 22282-5:2007)

Reconnaissance et essais géotechniques - Essais
géohydrauliques - Partie 5: Essai d'infiltromètre (ISO/DIS
22282-5:2007)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 341.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Foreword

This document (prEN ISO 22282-5:2007) 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 document is currently submitted to the parallel Enquiry.

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Geotechnical investigation and testing — Geohydraulic testing —

Part 5: Infiltrometer test

Reconnaissance et essais géotechniques — Essais géohydrauliques —

Partie 5: Essai d'infiltromètre

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In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

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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.

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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.

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.

ISO 22282-5 was prepared by Technical Committee ISO/TC 182, *Geotechnics*, Subcommittee SC 1, and by Technical Committee CEN/TC 341, *Geotechnical investigation and testing* in collaboration.

ISO 22282 consists of the following parts, under the general title *Geotechnical investigation and testing — Geohydraulic testing*:

- Part 1: *General rules*
- Part 2: *Water permeability tests in a borehole using open systems*
- Part 3: *Water pressure test in rock*
- Part 4: *Pumping tests*
- Part 5: *Infiltrometer tests*
- Part 6: *Water permeability tests in a borehole using closed systems*

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DRAFT

Geotechnical investigation and testing — Geohydraulic testing —

Part 5: Infiltrometer test

1 Scope

This document deals with requirements for ground investigations by means of infiltrometer tests as part of geotechnical investigation services in accordance with EN 1997-1 and prEN 1997-2.

This document applies to the *in situ* determination of the water permeability of an existing geological formation or of treated or compacted materials.

The infiltrometer test is used to determine the infiltration capacity of the ground at the surface or shallow depth. It is a simple test for determining permeability coefficient. The method can be applied using either steady state or transient conditions, in saturated or unsaturated soils.

The principle of the test is based on the measurement of a surface vertical flow rate of water which infiltrates the soil under the influence of a positive hydraulic head.

Surface infiltration devices include single and double-ring infiltrometer designs of the open or closed type.

The test is appropriate to determine water permeability values in the range of 1×10^{-5} m/s and 1×10^{-10} m/s. Depending on the environmental conditions and the water permeability of the soil, a duration of a few minutes to a few days is needed to run the test.

The measurement devices and measurement procedures are adapted to different ranges of permeability: open systems are adapted to permeability ranges from 10^{-5} to 10^{-8} m/s and closed systems for permeability lower than 10^{-8} .

This document defines the terminology and the measured parameters. It specifies the required characteristics of the equipments, defines the procedures of the tests relating to the different measurement techniques and specifies the tests results.

It is applicable to:

- civil engineering projects;
- hydrogeology studies;
- waste disposal.

2 Normative references

This document incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this document only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1997-1, *Eurocode 7: Geotechnical design – Part 1: General rules*.

prEN 1997-2, *Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing*.

EN ISO 14688-1, *Geotechnical investigation and testing - Identification and classification of soil – Part 1: Identification and description*.

prEN ISO 22282-1, *Geotechnical investigation and testing — Geohydraulic testing – Part 1: General rules*.

EN ISO 22475-1, *Geotechnical investigation and testing – Sampling by drilling and excavation methods and groundwater measurements – Part 1: Technical principles of execution.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN ISO 22282-1 apply.

4 Symbols and abbreviated terms

Table 1 — Symbols and abbreviated terms

Symbol	Designation	Unit
d_1	diameter of the inner ring	m
d_2	diameter of the outer ring	m
z_p	penetration depth of the cell	m
$h(t)$	water head at time t	m
k	permeability coefficient	$m \cdot s^{-1}$
z_w	thickness of saturated zone	m
v	flow rate velocity	$m \cdot s^{-1}$
η_T	dynamic viscosity at temperature T	$mPa \cdot s$
t	time	s
θ	volumetric water content	-
w	(gravimetric) water content	-
ρ_d	density of dry soil	$kg \cdot m^{-3}$
ρ_s	density of solid particles	$kg \cdot m^{-3}$
ψ_f	suction at the infiltration front	m

5 Equipment

5.1 General

The test equipment comprises:

- a test cell for infiltrating the water into the soil;
- a device for measuring pressure, water level and/or infiltrated volumes as a function of time. In some cases (e.g. with constant head procedure) equipment and piping connecting the pressure and volume controller to the test cell is also needed.
- equipment for installation of the rings (pushing, anchoring, bonding and/or sealing);
- water supply and pump (optional);
- a time measuring and/or recording device, reading in seconds;