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**Geotechnical investigation and testing —  
Laboratory testing of soil —**

**Part 11:  
Determination of permeability by  
constant and falling head**

*Reconnaissance et essais géotechniques — Essais de sol au  
laboratoire —*

*Partie 11: Détermination de la perméabilité au perméamètre à charge  
constante ou variable*



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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.

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- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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An ISO/PAS or ISO/TS is reviewed after three years with a view to deciding whether it should be confirmed for a further three years, revised to become an International Standard, or withdrawn. In the case of a confirmed ISO/PAS or ISO/TS, it is reviewed again after six years at which time it has to be either transposed into an International Standard or withdrawn.

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/TS 17892-11 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 182, *Geotechnics*, Subcommittee SC 1, *Geotechnical investigation and testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European pre-Standard..." to mean "...this Technical Specification...".

ISO 17892 consists of the following parts, under the general title *Geotechnical investigation and testing — Laboratory testing of soil*:

- *Part 1: Determination of water content*
- *Part 2: Determination of density of fine-grained soil*
- *Part 3: Determination of particle density — Pycnometer method*
- *Part 4: Determination of particle size distribution*
- *Part 5: Incremental loading oedometer test*
- *Part 6: Fall cone test*

- *Part 7: Unconfined compression test on fine-grained soil*
- *Part 8: Unconsolidated undrained triaxial test*
- *Part 9: Consolidated triaxial compression tests on water-saturated soil*
- *Part 10: Direct shear tests*
- *Part 11: Determination of permeability by constant and falling head*
- *Part 12: Determination of the Atterberg limits*

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## Foreword

This document (CEN ISO/TS 17892-11:2004) has been prepared by Technical Committee CEN/TC 341 "Geotechnical investigation and testing", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 182 "Geotechnics".

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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- *Part 12: Determination of Atterberg limits*

## Introduction

This document covers areas in the international field of geotechnical engineering never previously standardised. It is intended that this document presents broad good practice throughout the world and significant differences with national documents is not anticipated. It is based on international practice (see [1]).

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## 1 Scope

This document is intended for use in earthworks and foundation engineering. It specifies laboratory test methods to establish the coefficient of permeability of water through water-saturated soils. In the proposed laboratory tests soil specimens are subjected to a flow of water passing through the specimen. The water pressure conditions and volume of water passing through the specimens are measured for evaluation of the permeability.

The results obtained serve to calculate groundwater flow and to assess the permeability of man-made impervious layers and filter layers.

## 2 Normative references

The following referenced document is 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.

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

## 3 Terms and definitions

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

### 3.1 flow rate

$Q$

quantity of water passing through a specimen per unit time,  $t$

### 3.2 discharge velocity

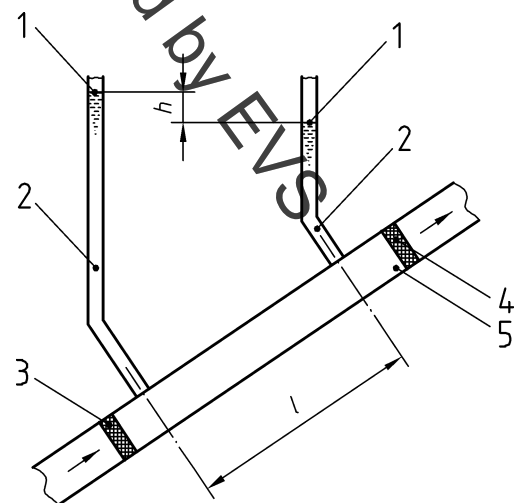
$v$

rate of flow of water per unit area of soil (including particles and voids) normal to the direction of flow

### 3.3 hydraulic gradient

$i$

ratio of the difference in total head of water (head loss),  $h$ , between two gland points, to the length of the flow path,  $l$  (distance between the gland points measured in the direction of flow, see Figure 1)



#### Key

- 1 Standpipe head
- 2 Standpipe
- 3 Filter block
- 4 Filter block
- 5 Specimen

Figure 1 — Water flow in a soil specimen