SLOVENSKI STANDARD
SIST-TS CEN ISO/TS 17892-1:2004

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Geotehniļ no preiskovanje in preskuģanje - Laboratorijsko preskuģanje zemljin - 1. del: Ugotavljanje vlaģnosti (ISO/TS 17892-1:2004)

Geotechnical investigation and testing - Laboratory testing of soil - Part 1: Determination of water content (ISO/TS 17892-1:2004)

Geotechnische Erkundung und Untersuchung - Laborversuche an Bodenproben - Teil 1: Bestimmung des Wassergehalts (ISO/TS 17892-1:2004)

Reconnaissance et essais géotechniques - Essais de laboratoire sur les sols- Partie 1: Détermination de la teneur en eau (ISO/TS 17892-1:2004)

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Geotechnical investigation and testing - Laboratory testing of soil - Part 1: Determination of water content (ISO/TS 17892-1:2004)

Reconnaissance et essais géotechniques - Essais de sol au laboratoire - Partie 1: Détermination de la teneur en eau (ISO/TS 17892-1:2004)

Geotechnische Erkundung und Untersuchung - Laborversuche an Bodenproben - Teil 1: Bestimmung des Wassergehalts (ISO/TS 17892-1:2004)

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Foreword

This document (CEN ISO/TS 17892-1:2004) 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.

CEN ISO/TS 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 soils.*

— *Part 8: Unconsolidated undrained triaxial test.*

— *Part 9: Consolidated triaxial compression tests.*

— *Part 10: Direct shear tests.*

— *Part 11: Permeability tests.*

— *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]).

1 Scope

This document specifies the laboratory determination of the water (moisture) content of a soil test specimen by oven-drying within the scope of the geotechnical investigations according to prEN 1997-1 and prEN 1997-2. The water content is required as a guide to classification of natural soils and as a control criterion in re-compacted soils and is measured on samples used for most field and laboratory tests. The oven-drying method is the definitive procedure used in usual laboratory practice.

The practical procedure for determining the water content of a soil is to determine the mass of water removed by drying the moist soil (test specimen) to a constant mass in a drying oven controlled at a given temperature, and to use this value as the mass of water in the test specimen related to the mass of solid particles. The mass of soil remaining after oven-drying is used as the mass of the solid particles.

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.

prEN 1997-1, *Eurocode 7 - Geotechnical design — Part 1: General rules.*

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 term and definition apply.

3.1
water (moisture) content
w
the ratio of the mass of 'pore' or 'free' water in a given mass of soil material to the mass of the 'dry' solid soil particles

NOTE In this context a soil is 'dry' when no further water can be removed at a temperature within the interval of 105 °C ± 5 °C.

4 Equipment

4.1 Drying oven

The drying oven shall be preferably of the forced-draft type, and capable of maintaining a uniform temperature of 105 °C ± 5 °C throughout the drying chamber. For ovens of the forced-draft type, the air circulation may not be so strong that any transport of particles can take place.

4.2 Balance

The balance shall have an accuracy of

— ± 0,03 g for test specimens having a mass of 200 g or less,

— ± 0,3 g for test specimens having a mass of between 200 g and 1 000 g, or

— ± 3 g for specimens having a mass greater than 1 000 g.

NOTE The accuracy of the water content determined on balances conforming to above specifications corresponds to 3 significant digits.

4.3 Test specimen containers

4.3.1 Test specimen containers shall be made of material resistant to corrosion and change in mass upon repeated heating, cooling and cleaning. A suitable number of the containers shall have close fitting lids. One container is needed for each water content determination.

4.3.2 The following test specimen containers should be used:

a) For fine-grained soils: a glass weighing bottle, fitted with a ground glass cap, or a suitable corrosion-resistant metal container;

b) for medium-grained soils: a corrosion-resistant container of 500 g capacity;

c) for coarse-grained soils: a corrosion-resistant container of about 4 kg capacity;

For hygroscopic soils or if the air humidity is more than about 60 %, containers with close-fitting lids should be used for testing test specimens having a mass of less than about 200 g.

NOTE The purpose of close-fitting lids is to prevent loss of moisture from test specimens before initial weighing and to prevent absorption of moisture from the atmosphere before final weighing.

4.4 Desiccator

The desiccator shall be of suitable size. It is not required if only test specimen containers with close-fitting lids are used.

NOTE The purpose of the desiccator is to prevent absorption of moisture, if containers without tight-fitting lids are used.

5 Test procedure

5.1 Test specimen preparation

5.1.1 The samples that are stored prior to testing shall be kept in non-corrodible airtight containers at a temperature between approximately 3 °C and 30 °C, in an area without direct sunlight.

5.1.2 The water content determination should be done as soon as practicable after sampling, especially if potentially corrodible containers (such as steel thin-walled tubes, paint cans, etc.) or sample bags are used.

5.1.3 The manner in which the test specimen is selected and its required mass is basically dependent on the purpose (application) of the test, type of soil being tested, and the type of sample (test specimen from another test, bag, tube split barrel, etc). Either a sample as representative of the soil as a whole shall be taken or separate portions from each type of soil shall be selected. If a layered soil or more than one soil type is encountered, either a sample as representative of the soil shall be taken as a whole or select separate portions from each type of soil. Details of test specimen selection shall be reported with the test results.

5.1.4 For bulk samples, the test specimen shall be selected from the soil after it has been thoroughly mixed. The minimum mass of moist soil selected shall be in accordance with Table 1.

Table 1 — Minimum test specimen mass

Grain size diameter D_{90} [b] mm	Minimum mass of moist test specimen [a] g
1,0	25
2,0	100
4,0	300
16,0	500
31,5	1 500
63,0	5 000

a Using a test specimen smaller than the minimum mass indicated requires discretion, though it may be adequate for the purpose of the test. A test specimen having a mass less than the indicated value shall be noted in the report of the results. In many cases, when working with a small sample containing a relatively large coarse-grained particle, is appropriate not to include this particle in the test specimen. If this occurs, it should be noted in the report of the results.

b Aperture of sieve mesh with 90% of soil passing.

5.1.5 For small samples, a representative portion shall be selected in accordance with the following procedure:

5.1.5.1 For cohesionless (coarse-grained) soils, the soil shall be thoroughly mixed and then a test specimen of moist soil having a mass according to Table 1shall be selected.

5.1.5.2 For cohesive (fine-grained) soils, a representative sample shall be sliced in half (to check if the soil is layered) prior to selecting the test specimen. If the soil is layered see 5.1.3. The minimum mass of moist soil selected should not be less than 25 g, or should be in accordance with Table 1, if coarse-grained particles are noted.

5.2 Test execution

5.2.1 The test specimen shall be placed in a clean, dry container of known mass, the lid shall be set, if used, securely in position, and the mass of the container and test specimen shall be determined. These values shall be recorded. If containers without lids are used weighing shall be done immediately after placing the test specimen into the container. To assist in the oven-drying of large test specimens, they should be placed in containers having a large surface area (such as pans) and the soil broken up into smaller aggregations.

5.2.2 The lid, if used, shall be removed and the container shall be placed with moist test specimen in a drying oven maintained at 105 °C ± 5 °C and shall be dried to a constant mass.

5.2.3 The time required to obtain constant mass will vary depending on the type of soil, size of test specimen, oven type and capacity, and other factors. The influence of these factors generally can be established by good judgement, and experience with the soils being tested and the apparatus being used. In most cases, drying a test test specimen for 16 h to 24 h is sufficient. In cases where there is doubt concerning the adequacy of drying, drying should be continued until the mass after two successive periods (greater than 1 h) of drying indicate an insignificant change (less than about 0,1 % of the test specimen mass). Test specimens of sand may often be dried to constant mass in a period of about 4 h, when a forced-draft oven is used.