INTERNATIONAL STANDARD

ISO 17892-4

First edition
2016-11-01

Geotechnical investigation and testing — Laboratory testing of soil —

Part 4: Determination of particle size distribution

Reconnaissance et essais géotechniques — Essais de laboratoire sur les sols —

Partie 4: Détermination de la distribution granulométrie des particules

Reference number
ISO 17892-4:2016(E)

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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.

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).

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For an explanation on 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 17892-4 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical investigation and testing*, in collaboration with ISO Technical Committee TC 182, *Geotechnics*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition cancels and replaces the first edition (ISO/TS 17892-4:2004), which has been technically revised.

It also incorporates the Technical Corrigendum ISO/TS 17892-4:2004/Cor 1:2006.

A full list of parts in the ISO 17892 series, published under the general title *Geotechnical investigation and testing — Laboratory testing of soil*, can be found on the ISO website.

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Introduction

This part of ISO 17892 covers areas in the international field of geotechnical engineering never previously standardized. It is intended that this part of ISO 17892 presents broad good practice throughout the world and significant differences with national documents is not anticipated. It is based on international practice (see Reference [2]).

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Geotechnical investigation and testing — Laboratory testing of soil —

Part 4: Determination of particle size distribution

1 Scope

This part of ISO 17892 specifies a method of determining the particle size distribution of soils.

This part of ISO 17892 is applicable to the laboratory determination of the particle size distribution of a soil test specimen by sieving, or sedimentation, or a combination of both within the scope of geotechnical investigations.

The particle size distribution is one of the most important physical characteristics of soil. Classification of soils is mainly based on the particle size distribution. Many geotechnical and geohydrological properties of soil are related to the particle size distribution.

The particle size distribution provides a description of soil based on a subdivision in discrete classes of particle sizes. The size of each class can be determined by sieving and/or sedimentation. Coarse soils are usually tested by sieving, but fine and mixed soils are usually tested by a combination of sieving and sedimentation, depending on the composition of the soil.

The sieving method described is applicable to all non-cemented soils with particle sizes less than 125 mm. Two sedimentation methods are described: the hydrometer method and the pipette method.

NOTE This part of ISO 17892 fulfils the requirements of the particle size distribution testing in accordance with EN 1997-2.

2 Normative references

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

ISO 3310-1, *Test sieves —Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3310-2, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

ISO 4788, *Laboratory glassware — Graduated measuring cylinders*

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

ISO 17892-1, *Geotechnical investigation and testing — Laboratory testing of soil — Part 1: Determination of water content*

ISO 17892-3, *Geotechnical investigation and testing — Laboratory testing of soil — Part 3: Determination of particle density*

3 Terms and definitions

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

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3.1
sieving
process of separating soil particles into size classes by the use of test sieves consisting of a wire mesh or slotted metal plate that permits particles smaller than the mesh size to pass through

3.2
sedimentation
process of separating soil particles into size classes by the gravitational settling of soil particles in a liquid, where different size classes settle at different rates

3.3
particle size distribution
proportions by mass of the various particle size classes present in a soil

3.4
dispersion
mechanical or chemical treatment of the soil to separate any aggregations into single particles

3.5
coagulation
process of aggregation of soil particles in suspension

3.6
equivalent particle diameter
particle diameter calculated from *sedimentation* (3.2) data using Stokes' law, assuming spherical particles

Note 1 to entry: Stokes' law establishes the relationship between the terminal velocity of a sphere falling through a column of fluid, the sphere's diameter, the density and dynamic viscosity of the fluid and the density of the sphere.

4 Apparatus

4.1 General

See Annex A for calibration, maintenance and checks on the following apparatus.

4.1.1 Balances

The balance for sieve test and hydrometer test shall have an accuracy of 0,01 g or 0,1 % of the weighed mass, whichever value is greater. The balance for pipette test shall have an accuracy of 0,001 g or 0,1 % of the weighed mass, whichever is greater.

4.1.2 Drying ovens

The drying oven should be of the forced-draught type and shall be capable of maintaining a uniform temperature throughout the drying chamber. Any air circulation shall not be so strong that any transport of particles can take place.

4.1.3 Timing devices

The watch or clock shall be readable to 1 s.

4.1.4 Temperature measuring devices

Temperature measuring devices, such as thermometers and thermocouples, shall cover the temperature range of that part of the test and be readable to 0,1 °C.

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