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

Part 3:
**Determination of particle density —
Pycnometer method**

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

*Partie 3: Détermination de la masse volumique des grains — Méthode
du pycnomètre*



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ISO/TS 17892-3 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 17892-3:2004) 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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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 describes a test method for determining the particle density by the pycnometer method within the scope of the geotechnical investigations according to prEN 1997-1 and prEN 1997-2.

The pycnometer method is based on the determination of the volume of a known mass of soil by the fluid displacement method. The density of solid particles is calculated from the mass of the soil and the volume. The pycnometer method applies to soil types with particle sizes under 4 mm.

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 part of this document, the following terms and definitions apply.

3.1

density of solid particles

ρ_s

mass of the particles divided by their volume.

NOTE In porous materials which contain enclosed pores, the particles have an apparent density. This is a consequence of the enclosed, air-filled, pores.

4 Equipment

4.1 Balance

A balance of at least 0,001 g accuracy, and a measuring range of 200 g.

4.2 Pycnometer

A pycnometer with a volume of at least 50 ml, which is provided with a glass stopper which has been ground to fit precisely, and a capillary rising tube (see Figure 1).

4.3 Water bath

Thermostatically controlled water bath, with temperature variations not exceeding $\pm 0,5$ °C.