INTERNATIONAL STANDARD

ISO 11508

Second edition
2017-09

Soil quality — Determination of particle density

Qualité du sol — Détermination de la masse volumique des particules

Reference number
ISO 11508:2017(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 voluntary nature of standards, 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.

This document was prepared by Technical Committee is ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

This second edition cancels and replaces the first edition (ISO 11508:1998), which has been technically revised.

The main changes compared to the previous edition are as follows:

a) the terms and definitions have been updated;

b) a new subclause 4.3 “Unified reference temperature” was added;

c) a new subclause 4.4 “Calculation of mean particle density” was added;

d) Table 1, “Density of water…”, was deleted under 4.1.4;

e) a new Annex A “Density of water at different temperatures” was added;

f) bibliographic references were added;

g) editorial changes were made.

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Introduction

This document specifies the particle density (ρ_s) which is used together with the dry bulk density ($^b\rho_s$, see ISO 11272) for the calculation of the pore volume of a soil layer.

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Soil quality — Determination of particle density

1 Scope

This document specifies two methods for the determination of particle density of soils calculated from the mass and the volume of soil particles.

The first method (4.1) is applicable to fine soil (<2 mm diameter) and the second method (4.2) is applicable to both porous and nonporous gravel and stones (>2 mm diameter).

The particle density can be used for the calculation of the proportion of solids and of the porosity of soil layers in combination with the procedure given in ISO 11272.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 11461, *Soil quality — Determination of soil water content as a volume fraction using coring sleeves — Gravimetric method*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
particle density
ratio of the total mass of oven-dry solid particles, e.g. minerals or organic matter, to the volume of these particles

Note 1 to entry: The volume comprises internal pores of soil particles but pore spaces between particles are excluded.

Note 2 to entry: The preferred SI unit of measurement is kilograms per cubic metre ($kg \cdot m^{-3}$) but grams per cubic centimetre ($g \cdot cm^{-3}$) is also very common. Note that $x\ g \cdot cm^{-3} = 1\ 000 \cdot x\ kg \cdot m^{-3}$.

4 Procedure

4.1 Fine soil (<2 mm diameter)

4.1.1 Principle

The mass of a portion of soil is determined by weighing. The volume of the soil is calculated from the mass and the density of water displaced by the sample in a pycnometer.

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