INTERNATIONAL STANDARD

ISO 11277

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Soil quality — Determination of particle size distribution in mineral soil material — Method by sieving and sedimentation

Qualité du sol — Détermination de la répartition granulométrique de la matière minérale des sols — Méthode par tamisage et sédimentation

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

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 11277 was prepared by Technical Committee ISO/TC 190, *Soil quality*.

This second edition cancels and replaces the first edition (ISO 11277:1998), of which it constitutes a minor revision, and incorporates ISO 11277:1998/Cor.1:2002.

Introduction

The physical and chemical behaviour of soils is controlled in part by the amounts of mineral particles of different sizes in the soil. The subject of this International Standard is the quantitative measurement of such amounts (expressed as a proportion or percentage of the total mass of the mineral soil), within stated size classes.

The determination of particle size distribution is affected by organic matter, soluble salts, cementing agents (especially iron compounds), relatively insoluble substances such as carbonates and sulfates, or combinations of these. Some soils change their behaviour to such a degree, upon drying, that the particle size distribution of the dried material bears little or no relation to that of the undried material encountered under natural conditions. This is particularly true of soils rich in organic matter, those developed from recent volcanic deposits, some highly weathered tropical soils, and soils often described as “cohesive” (Reference [3] in the Bibliography). Other soils, such as the so-called “sub-plastic” soils of Australia, show little or no tendency to disperse under normal laboratory treatments, despite field evidence of a large clay content.

The procedures given in this International Standard recognize these kinds of differences between soils from different environments, and the methodology presented is designed to deal with them in a structured manner. Such differences in soil behaviour can be very important, but awareness of them depends usually on local knowledge. Given that the laboratory is commonly distant from the site of the field operation, the information supplied by field teams becomes crucial to the choice of an appropriate laboratory procedure. This choice can be made only if the laboratory is made fully aware of this background information.

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WARNING — All procedures in this International Standard must be carried out by competent, trained persons, with adequate supervision. Attention is drawn to certain known hazards, but it is essential that users follow safe working practices. If in any doubt, seek professional advice.

It is essential that users of this International Standard read all of it before commencing any operation, as failure to note certain points will lead to incorrect analysis and could be dangerous.

1 Scope

This International Standard specifies a basic method of determining the particle size distribution applicable to a wide range of mineral soil materials, including the mineral fraction of organic soils. It also offers procedures to deal with the less common soils mentioned in the introduction. This International Standard has been developed largely for use in the field of environmental science, and its use in geotechnical investigations is something for which professional advice might be required.

A major objective of this International Standard is the determination of enough size fractions to enable the construction of a reliable particle-size-distribution curve.

This International Standard does not apply to the determination of the particle size distribution of the organic components of soil, i.e. the more or less fragile, partially decomposed, remains of plants and animals. It is also realized that the chemical pretreatments and mechanical handling stages in this International Standard could cause disintegration of weakly cohesive particles that, from field inspection, might be regarded as primary particles, even though such primary particles could be better described as aggregates. If such disintegration is undesirable, then this International Standard is not used for the determination of the particle size distribution of such weakly cohesive materials.

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.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 3310-1:2000, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3310-2:1999, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 11464:2006, *Soil quality — Pretreatment of samples for physico-chemical analysis*