INTERNATIONAL STANDARD

ISO 17892-8

First edition
2018-02

Geotechnical investigation and testing — Laboratory testing of soil —

Part 8: Unconsolidated undrained triaxial test

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

Partie 8: Essai triaxial non consolidé non drainé

Reference number
ISO 17892-8:2018(E)

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Published in Switzerland

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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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 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 of ISO 17892-8 cancels and replaces ISO/TS 17892-8:2004 and ISO/TS 17892-8:2004/Cor.1:2006.

A list of all the parts in the ISO 17892 series can be found on the ISO website.

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Introduction

This document covers areas in the international field of geotechnical engineering never previously standardized. 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 Reference [1]).

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Geotechnical investigation and testing — Laboratory testing of soil —

Part 8:
Unconsolidated undrained triaxial test

1 Scope

This document specifies a method for unconsolidated undrained triaxial compression tests.

This document is applicable to the laboratory determination of undrained triaxial shear strength under compression loading within the scope of geotechnical investigations.

The cylindrical specimen, which can comprise undisturbed, re-compacted, remoulded or reconstituted soil, is subjected to an isotropic stress under undrained conditions and thereafter is sheared under undrained conditions. The test allows the determination of shear strength and stress-strain relationships in terms of total stresses.

Non-standard procedures such as tests with the measurement of pore pressure or tests with filter drains are not covered in this document.

NOTE This document fulfils the requirements of unconsolidated undrained triaxial compression tests for geotechnical investigation and testing in accordance with EN 1997-1 and EN 1997-2.

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 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 17892-2, *Geotechnical investigation and testing — Laboratory testing of soil — Part 2: Determination of bulk density*

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.

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

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

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

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3.1
cell pressure
pressure applied to the cell fluid

3.2
deviator stress
difference between the applied vertical total stress and the horizontal total stress at the mid height of the specimen

3.3
undrained shear strength
equal to one half of the deviator stress at failure in the unconsolidated undrained triaxial compression test

3.4
failure
stress or strain condition at which one of the following criteria are met:

— peak deviator stress;

— a specified deformation criterion if a peak deviator stress has not been achieved, e.g., 15 % vertical strain.

4 Symbols

A_i	initial cross-sectional area of the specimen
A_{cor}	cross-sectional area of the specimen during shear
a	cross-sectional area of the piston if an external load cell is used
c_u	undrained shear strength
D_m	initial internal diameter of membrane (before it is placed on the specimen)
E_m	elastic modulus for the membrane, measured in tension
f	factor relating the vertical strain to the specimen volumetric strain
H_s	initial height of the specimen prior to shearing (=H_i-ΔH_i)
H_i	Initial height of specimen after preparation
h	distance from the top of the top cap to the mid height of the specimen
P	vertical load reading
t_m	initial thickness of the unstressed membrane
V_i	initial volume of the specimen after preparation
W	gravity force acting on the sum of the deadweight hanger (if used), the piston, the top cap and one half of the soil specimen
γ	unit weight of the cell fluid
ΔH_i	height change prior to shearing
ΔH_s	height change during shearing

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