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Geotextiles and geotextile-related products — Determination of index abrasion resistance characteristics under wet conditions for hydraulic applications

Géotextiles et produits apparentés — Détermination des caractéristiques de résistance à l'abrasion d'indice dans des conditions humides pour les applications hydrauliques

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Foreword

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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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 221, *Geosynthetics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The abrasion resistance under wet conditions is an important property for the application of geotextiles intended to be used as geobags (geotextile bags filled with soil) or filter beneath armourstone. The abrasion impact on geotextiles can be achieved under wet conditions by installing geotextile samples in a rotating drum. In the fixed rotating drum test facility, the drum is rotated with a defined speed and is filled with water and a mixture of angular-grained high-quality basalt chippings with determined sizes. The abrasion impact is caused by crushed stones tumbling over the geotextile. The assessment of the geotextile abrasion resistance characteristics can be achieved by comparing thickness and mechanical properties (tensile strength, elongation) and/or additional hydraulic properties (characteristic opening size, filtration behaviour) before and after abrasion impact.

Geotextiles and geotextile-related products — Determination of index abrasion resistance characteristics under wet conditions for hydraulic applications

1 Scope

This document specifies a test method for determining the abrasion resistance of geotextiles and geotextile-related products under wet conditions. This document is applicable to geotextiles and geotextile-related products intended to be used as e.g. geo bags or filter beneath armourstone.

The test method simulates abrasion impacts on geotextiles and geotextile-related products such as that caused by the movement of rocks in an embankment or transport of sediment in rivers.

This document provides an index test which can be used for performance and acceptance testing. It can be used as performance test by comparison of mechanical and/or additional hydraulic properties before and after abrasion impact.

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 9073-3, *Textiles — Test methods for nonwovens — Part 3: Determination of tensile strength and elongation*

ISO 9862, *Geosynthetics — Sampling and preparation of test specimens*

ISO 9864, *Geosynthetics — Test method for the determination of mass per unit area of geotextiles and geotextile-related products*

ISO 10318-1, *Geosynthetics — Part 1: Terms and definitions*

ISO 10772, *Geotextiles - Test method for the determination of the filtration behaviour of geotextiles under turbulent water flow conditions*

ISO 11058, *Geotextiles and geotextile-related products — Determination of water permeability characteristics normal to the plane, without load*

ISO 12956, *Geotextiles and geotextile-related products — Determination of the characteristic opening size*

EN 1097-1, *Tests for mechanical and physical properties of aggregates — Part 1: Determination of the resistance to wear (micro-Deval)*

EN 1097-6, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10318-1 and the following 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
abrasion resistance ratio
R_A
ratio of the mechanical and/or additional hydraulic properties before and after abrasion impact

3.2
index test
test method which can be used for performance and acceptance testing

Note 1 to entry: It can be used as performance test by comparison of mechanical and/or additional hydraulic properties before and after abrasion impact.

3.3
abrasive material
defined mixture of stone chippings which includes crushed basalt aggregates

4 Principle

The test method simulates abrasion impacts on geotextiles such as that caused by the movement of rocks in an embankment. Abrasive materials and water pass over geotextile specimens installed in a rotating drum for two abrasion phases of 40 000 revolutions each, and thereby the direction of rotation is changed every 5 000 revolutions. The abrasion resistance can be assessed by comparing tensile strength and/or additional hydraulic properties before and after abrasion impact.

NOTE The test principle is also used for the assessment of the abrasion resistance of concrete[1] and coating systems[2].

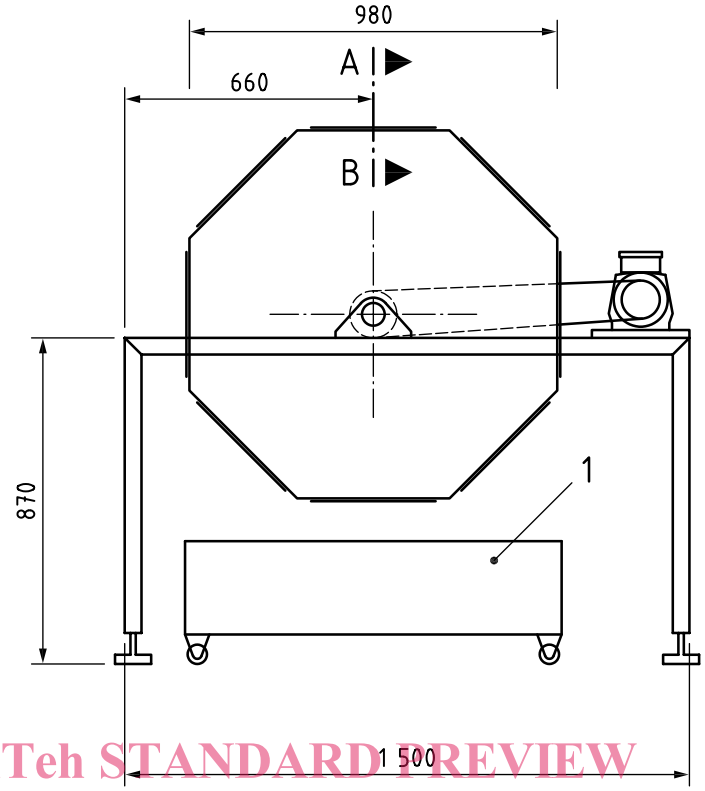
5 Apparatus and materials

5.1 Abrasion drum test machine.

The test apparatus shall comprise an octagonal steel drum with eight test sections driven by a horizontal shaft, an adjustable drive motor, an electronic control system and a test frame. It shall be possible to change the direction of rotation and it shall be possible to set the number of revolutions per minute and the total number of revolutions as required.

NOTE A typical abrasion drum test machine is shown in Figures 1 and 2.

Dimensions in millimetres



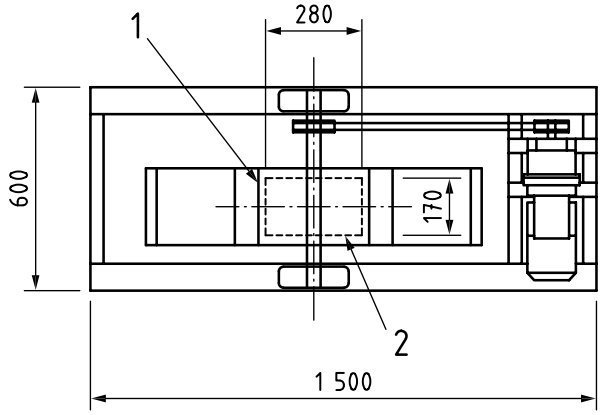
Key

1 moveable collection container

Figure 1 — Lateral view of the abrasion drum test machine

NOTE For cross section A-B, see Figure 3.

Dimensions in millimetres



Key

1 geotextile specimen 300 mm × 200 mm

2 test area 280 mm × 170 mm

Figure 2 — Top view of the abrasion drum test machine