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Design using geosynthetics —

Part 2: Separation

Conception utilisant des géosynthétiques —

Partie 2: Séparation

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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 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*.

A list of all parts in the ISO/TR 18228 series can be found on the ISO website.

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.

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Introduction

The ISO/TR 18228 series provides guidance for designs using geosynthetics for soils and below ground structures in contact with natural soils, fills and asphalt. The series contains 10 parts which cover designs using geosynthetics, including guidance for characterization of the materials to be used and other factors affecting the design and performance of the systems which are particular to each part, with ISO/TR 18228-1 providing general guidance relevant to the subsequent parts of the series.

The series is generally written in a limit state format and guidelines are provided in terms of partial material factors and load factors for various applications and design lives, where appropriate.

This document includes information relating to the separation function. Details of design methodology adopted in a number of regions are provided.

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Design using geosynthetics —

Part 2:
Separation

1 Scope

This document provides general considerations to support the design guidance to geotechnical and civil engineers involved in the design of structures in which a geotextile is used to fulfil the function of separation of soils and below ground structures in contact with natural soils and fills.

These considerations are always based on installed soils, the installation process and on the strength and/or deformation behaviour of geosynthetics.

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10318-1 apply.

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

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

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

4 Different concepts

4.1 General

There are several different concepts available worldwide for the design and application of geosynthetics for separation; several are presented in this document. The contents of the original documents are reproduced. However other concepts and approaches might also be available or applicable. The user of this document is intended to always refer to the most up to date version of the documents quoted.

4.2 GRK classification

4.2.1 General

This subclause presents a summary of the German GRK (Geotextilrobustheitsklasse)[22] guidance for the use of geosynthetics and geosynthetic-related products mainly in separation.

The GRK is based on two characteristics, mass per unit area and strength. The development of this system is based on on-site testing and evaluation of robustness.

The mass per unit area is usually determined in accordance with ISO 9864.

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In the case of non-woven geotextiles, the puncture force is usually measured in accordance with ISO 12236. In the case of woven geotextiles, the strength is usually measured in accordance with ISO 10319 in the weakest direction.

4.2.2 Stresses resulting from fill material

The GRK evaluation of which product to use is undertaken on the basis of several site-specific factors. This considers the type of soil that is used as fill material, the bearing capacity of the subgrade soil, as well as effects resulting from construction/installation operations.

The rut depth is not reduced substantially by the choice of a higher geotextile robustness class or a layer of fill material with increased thickness or shear parameters. Extreme stresses, resulting for example, from angular fill material and site traffic, which exceed the specifications of Table 1, can lead to more stringent requirements and would normally be considered on the basis of local experience or by preliminary tests.

Table 1 is applicable to fine grained, sandy subgrade soils (SW, SE, SI, SU*, SU).

Table 1 — Stress to geotextiles resulting from fill material [a]

Appreciation level	Rounded fill material	Angular fill material
AS 1	Applications where mechanical stresses resulting from the fill material have no influence on the selection	
AS 2	Coarse or mixed granular soils according to DIN 18196 (SW, SE, SI, GW, GE, GI, SU, SU*, GU, GU*)	
AS 3	Coarse or mixed granular soils ≤ 40 % stones and cobbles	Coarse or mixed granular soils according DIN 18196 (SW, SE, SI, GW, GE, GI, SU, SU*, GU, GU*)
AS 4	Coarse or mixed granular soils > 40 % stones and cobbles	Coarse or mixed granular soils ≤ 40 % stones and cobbles
AS 5		Coarse or mixed granular soils > 40 % stones and cobbles

[a] Processed fill material (e.g. crushed stone, recycled material) is classified according to particle size and shape.

* Indicates "very" silty.

NOTE For definitions of soil types, please refer to the original GRK document [22].

When the geotextile is placed on top of coarse or mixed granular subgrade soils (GW, GE, GI, GU, GU*, GT, GT*) the application level AS 2 to AS 4 would normally be increased by one level.

4.2.3 Stresses resulting from installation and construction operation

Rutting on the surface of a trafficked fill layer is caused by site traffic loading, which is counteracted by the resistance of the "fill material and subgrade soil" system. The resistance arises from the interaction of stiffness and deformability of the subgrade soil, as well as from the thickness and shear strength of the fill material. The rut depth cannot be influenced by the separation layer. The rut depth is a measure of the stress level applied to separation layers.

The geotextile robustness classes resulting from fill material and construction operation stresses given in Table 2 describe the stress level applied to the separation layer. If a separation product with corresponding geotextile robustness class is applied, it can be assumed that it will withstand these stresses and thereby maintains its separation function.

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