Technical Report

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Design using geosynthetics —

Part 5: Stabilization

Conception utilisant des géosynthétiques —

Partie 5: Stabilisation

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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 document 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 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.

Ultimate limit state (ULS) design is necessary for some applications, e.g. slab foundation design, working platform design etc., but usually must be proven separately. This document is a state of practice report and information is provided in terms of the application of the mechanisms and design methods. A discussion on separation, filtration and other relevant engineering issues addressed with geosynthetics are addressed in the separate parts of ISO 18228.

This document includes information relating to the stabilization function. Details regarding design methodologies adopted in a number of regions are provided.

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Design using geosynthetics —

Part 5:
Stabilization

1 Scope

This document provides a summary of general guidance for the design of geosynthetics to fulfil the function of stabilization of granular layers in contact with natural soils, fills, asphalt or other materials.

The concepts of the summarised guidance are based on installed materials, the installation process and on either the strength or deformation behaviour, or both, of geosynthetics.

This document provides general considerations to support the design of unbound layers of paved and unpaved roads, working platforms and foundations utilizing the stabilization function of geosynthetics. This is typically for the serviceability limit state (SLS).

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 Concepts and fundamental principles

4.1 General

There are two primary mechanisms by which geosynthetics can improve the performance of a granular layer, the confinement mechanism and the tensioned membrane mechanism. The distinction between these two mechanisms and their relevant applications must be understood.

The first mechanism provides stabilization by way of particle confinement, or lateral restraint. By minimizing the movement of aggregate particles, confinement increases the shear resistance and widens the load distribution angle, improving the mechanical properties of the granular (i.e. aggregate) layer, thereby controlling deformation under load (i.e. SLS).

The second mechanism provides reinforcement by way of friction, or interlock, or deforming, or a combination of these three, out of the plane under load. In this case, the geosynthetic material is anchored on

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