



# Fortrac 3D<sup>®</sup> – the ideal reinforcement against soil slippage and erosion protection



## Introduction

**Fortrac 3D<sup>®</sup>** is a further development of the well-known **Fortrac<sup>®</sup>** geogrid and is introduced as a slope protection material.

**Fortrac 3D<sup>®</sup>** is a flexible, three-dimensional reinforcement grid made from high-tenacity, low-creep polyester with the additional function to protect against soil erosion.

A special polymeric coating provides protection against UV

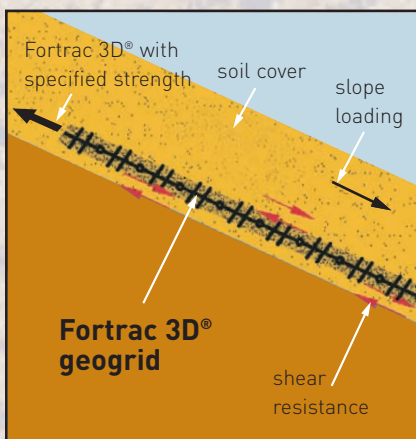
degradation and mechanical damage. Based on known long-term properties **Fortrac 3D<sup>®</sup>** can be dimensioned for project specific design lives.

## Product types

**Fortrac 3D<sup>®</sup>** is available in several strengths, offering a comprehensive project range. Information on standard products is given in the table below.

All technical product data presented in data sheets are based on ISO or/and EN standards.

As with all HUESKER products **Fortrac 3D<sup>®</sup>** can be manufactured as a project-specific material – please discuss it with us!



| Fortrac 3D <sup>®</sup>              | 30        | 40        | 60        | 90        | 120       |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Tensile strength – MD (kN/m)         | 30        | 40        | 60        | 90        | 120       |
| Extension – MD (%)                   | 12.5      | 12.5      | 12.5      | 12.5      | 12.5      |
| Thickness (mm)                       | 10        | 10        | 10        | 10        | 10        |
| Weight (approx.) (g/m <sup>2</sup> ) | ~300      | ~380      | ~450      | ~550      | ~620      |
| Roll size (m x m)                    | 4.5 x 100 | 4.5 x 100 | 4.5 x 100 | 4.5 x 100 | 4.5 x 100 |

## Functions

- Reinforcement on the slope (vener stability)
- Erosion protection of the surface layer
- **Reinforcement on the slope**

As a high tenacity geogrid **Fortrac 3D®** provides an ideal reinforcement against soil slippage on the slope. This failure can occur, for example, on highway embankments between the topsoil and the compacted core material or on thin landfill covering, which can be caused by inadequate relief for pore water pressure. **Fortrac 3D®**, through its structure, improves the soil retention on a vulnerable slip plane surface and its tensile strength carries the loading forces imposed on the anchorage zone. The surface stability of the structure is increased, resulting in a safer and more economical construction method.

- **Erosion protection on the surface**

Due to its distinctive three-dimensional structure **Fortrac 3D®** presents a valuable soil-retention method, which significantly increases erosion resistance. Fine soil particles are contained until such time as the root structure of new vegetation is established. This property is especially relevant when heavy rainfall generates high surface-water movement. **Fortrac 3D®** finds further use, for example, in river bank protection, water retention schemes, canal banks (in combination with bitumen-bound granular material) and hydro-seeding on steep slopes.



1. Unstable soil cover
2. **Fortrac 3D®** installation
3. Completed slope construction
4. Slope after vegetation growth

## Application

With the right design the use of **Fortrac 3D®** provides a safer and more economical construction approach, avoiding the problem of subsequent remediation work. Different geometries with various soils and sealing systems have already been designed and built. The flexibility, robustness and simple installation of **Fortrac 3D®** ensure a successful end result. The product properties offered by HUESKER are verified by detailed laboratory testing. High frictional values confirm the superior retention property of **Fortrac 3D®**.

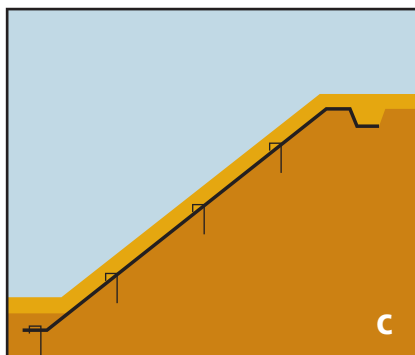
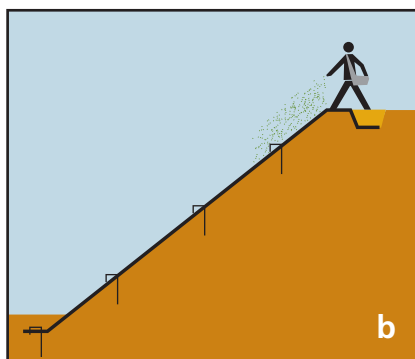
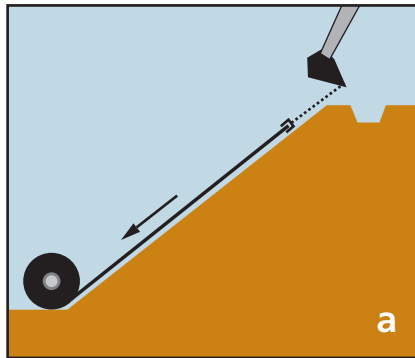
## Design and technical support

Documented and proven design guidelines are available.

The HUESKER team is always available to answer your questions on design or installation.

## Installation

- lay **Fortrac 3D®** in the slope direction and cut (a)
- ensure **Fortrac 3D®** is lightly tensioned to pull out any folds. In a reinforcement application use a designed anchor trench (b)
- in surface erosion and vegetative cover applications use soil pegs (2 – 3 per m<sup>2</sup>) to hold **Fortrac 3D®** securely onto the sub-layer (b)
- complete the toe detail as per the design (b)
- introduce over-seeding onto **Fortrac 3D®** (b)
- fill **Fortrac 3D®** with soil cover material and complete surface cover (c)

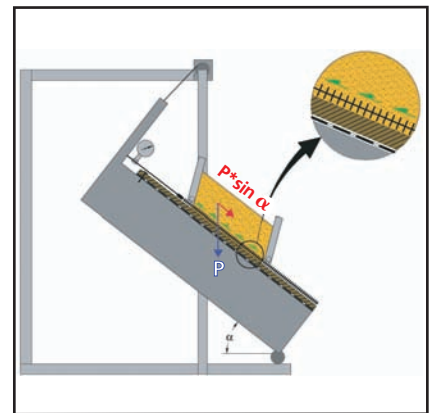


## Property testing

**Fortrac 3D®**'s excellent soil interaction properties have been verified by extensive shear- and pull-out tests. Interaction values greater than 1.0 confirm an ideal bond with commonly used soils and so with **Fortrac 3D®** no new potential slip planes are introduced. The low-creep property throughout the **Fortrac 3D®** family of products is fully verified. Testing also confirms high resistance to installation damage.



**Fortrac 3D®**'s polymeric coating provides high resistance to UV-degradation and protection from any adverse effects in naturally occurring soil conditions.

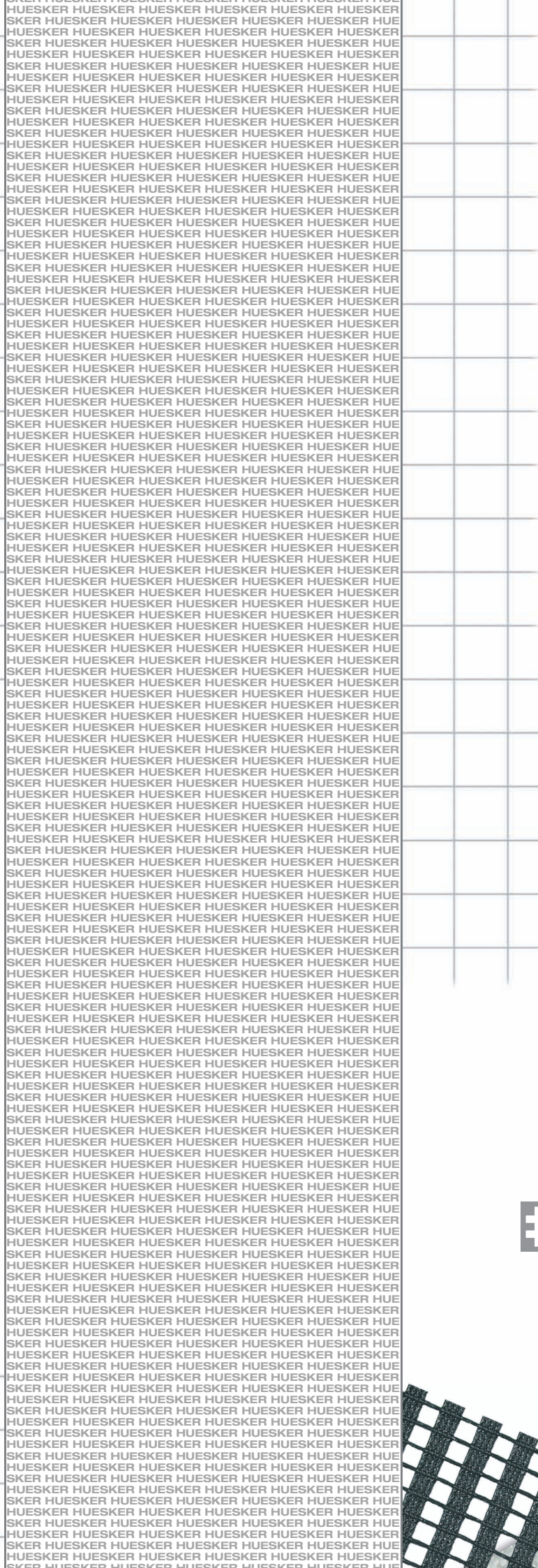


Examples of the shear and pull-out tests.



# HUESKER

Ideen. Ingenieure. Innovationen.



HUESKER Synthetic GmbH is a certified manufacturer:



HUESKER offers a wide range of technically demanding solutions relying on our many years' experience. Our solutions are economical, reliable and up-to-date and used in:

**Earthworks and foundation engineering, landfill construction, hydraulic engineering, road construction**

Technical assistance, planning, support - worldwide

Reliable and advanced techniques characterise our products in many applications:

**Fortrac®** - a flexible, high-modulus and low-creep geogrid for soil reinforcement

**HaTelit®** - a flexible, high-modulus and temperature resistant grid for asphalt reinforcement

**Stabilenka®** - a high-modulus polyester woven for reinforcement and separation of soils

**Robutec®** - a very high-modulus and alkaliresistant woven for reinforcement and separation of soils

**Fornit®** - a biaxial geogrid for subbase reinforcement

**Comtrac®** - a geocomposite for reinforcement, separation and filtration of soils

**Duogrid®** - a geocomposite made of biaxial high-modulus, flexible geogrid and a nonwoven

**NaBento®** - geosynthetic clay liner for sealing

**Incomat®** - a concrete- or sand-mat for sealing and erosion control

**Ringtrac®** - geotextile tube for reinforcement and soil containment

**HaTe®** - wovens and nonwovens for separation, filtration, drainage and protection

**SoilTain®** - systems for hydraulic engineering and dewatering



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