

GEOSYNTHETICS

 **TENCATE**
Polyfelt[®]

TenCate Polyfelt[®] TS Nonwovens in Road Construction

For road-base stabilisation



Protective Fabrics
Outdoor Fabrics
Advanced Composites
Advanced Armour

Geosynthetics
Grass

 **TENCATE**
materials that make a difference

TenCate Polyfelt® TS nonwovens in road construction

TenCate Polyfelt® TS geotextiles have been successfully used for over 40 years in the stabilisation of trafficked areas on weak soils, and as filters in drainage applications.

TenCate Polyfelt® TS geotextiles are mechanically bonded non-woven fabrics with a mass per unit area between 90 g/m² and 400 g/m². The special manufacturing process using continuous-filament technology and with UV-stabilised polypropylene as the raw material offers the following advantages:

- High strength to resist installation damage and stabilise the road.
- Very good water permeability to enhance soil drainage and, at the same time, excellent retention of fine soil fractions.
- Very long service life, high chemical and biological resistance, especially in alkaline environments.
- No negative impact on either the environment or the groundwater.

The main functions of TenCate Polyfelt® TS in road construction are:

- Separation of fine-grained soil and coarse aggregate. By preventing intermixing, the load-distributing, the drainage and the frost-inhibiting properties of the sub-base are retained.
- Filtration of fine soils. The water in the soil must pass easily through the geotextile without fine particles being transported at the same time. This allows the subgrade to consolidate more rapidly, thus increasing its bearing capacity. Precipitation or rising groundwater levels do not cause damage.
- Reinforcement of the road substructure. Local soil failure is prevented. Compaction of the aggregate is optimised by the increased resistance offered by the geotextile-covered subgrade.

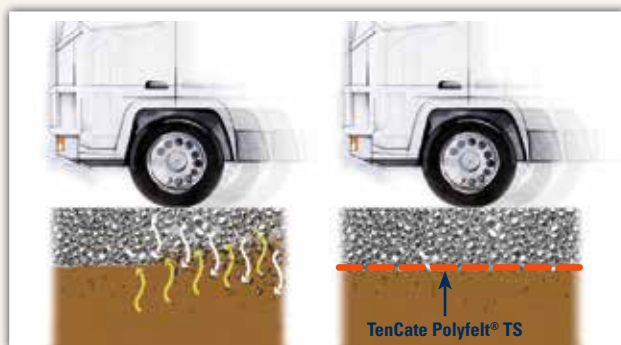


Figure 1:
Functions of TenCate Polyfelt® TS in road construction. Effect of compaction and traffic on base layer thickness without and with TenCate Polyfelt® TS

Economic advantages of TenCate Polyfelt® TS:

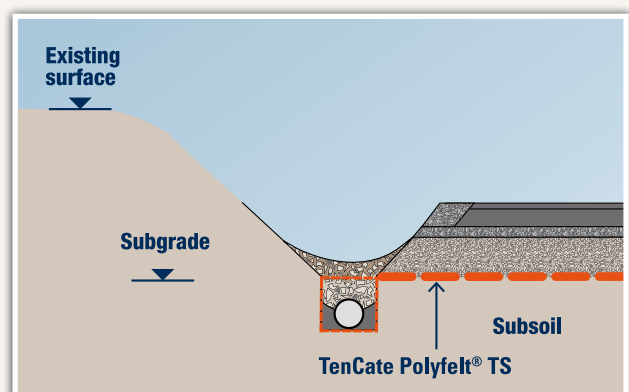
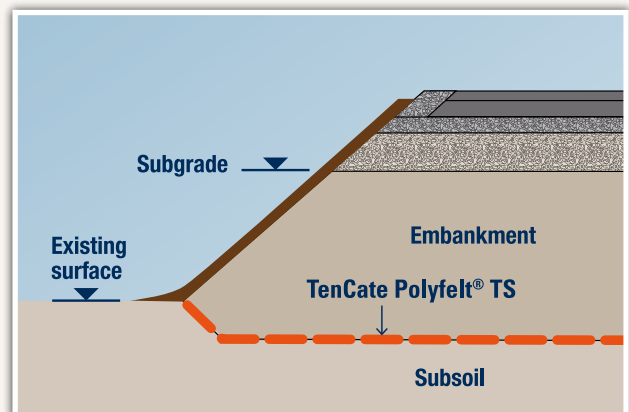
- Reduced aggregate requirement, since the layer separation prevents aggregate penetration into the subgrade.
- Rapid construction progress.
- Avoidance of “dirt tracks”.
- Increased service life of the road, reduced maintenance.

In addition, there are important environmental advantages. The use of geotextiles leads to 75% lower environmental impact.¹⁾

PRODUCT RECOMMENDATION

Stabilisation of the road substructure

The most important parameters in the choice of the correct grade of TenCate Polyfelt® TS for subgrade stabilisation are the properties of the subgrade, the quality of the aggregate (particle size) and traffic loading on base layer.



Figures 2 and 3:
Typical locations of TenCate Polyfelt® TS in road construction

A computational determination of the required properties of separation and filter geotextiles is hardly possible due to the complexity. Therefore in some countries national guidelines have been developed which define minimum technical standards for geotextiles (e.g. NORGEOSPEC in Scandinavia, Merkblatt in Germany, RVS 08.97.03. in Austria, SN 670241 in Switzerland). The recommendations for the TenCate Polyfelt® TS product range are based on the average of these guidelines, but take also into account our more than four decades of experience with geotextiles in road construction.

The weaker the subgrade (Table 1) and the heavier the traffic, the higher the required tensile strength of the geotextile.

Subgrade	Deformation modulus $E_v^{(1)}$ [MN/m ²]	CBR [%]	Soil bearing capacity
Subgrade 1	≤ 5	1–3	Very low
Subgrade 2	5–15	3–6	Low
Subgrade 3	15–30	6–12	Medium

Table 1: Subgrade Classification

The larger the maximum particle size, the higher the required CBR and dynamic-perforation strength of the geotextile.

Besides the mechanical properties, the hydraulic properties are of high importance. There must be no increase in subgrade saturation due to low geotextile permeability.

The opening size must be selected so that, on the one hand, no clogging of the geotextile occurs, while on the other hand permanent fine-particle migration through the geotextile is effectively prevented. An opening size O_{90} in the range from 0.08 to 0.12 mm (ISO 12956) and a permeability ≥ 50 l/m²s (ISO 11058) have proven effective.

Based on these requirements and on the application standard EN 13249 we recommend the following products:

Particle size d_{max}	Subgrade 1	Subgrade 2	Subgrade 3
≤ 150 mm	TS 65	TS 50	TS 30
≤ 500 mm	TS 80	TS 65	TS 50

Table 2: Grade recommendation as a function of subgrade and sub-base material

¹⁾ Comparative life cycle assessments of geosynthetics versus conventional construction materials; EAGM

Minimum thickness of fill material is a function of subsoil condition, quality of fill material and traffic load.

Subgrade	CBR [%]	Min. thickness [mm]
Subgrade 1	1–3	400
Subgrade 2	3–6	300
Subgrade 3	> 6	200

Table 3: Minimum fill layer acc. SN 670241



This recommendation is valid for well compacted, good quality fill material. In case of rutting thickness has to be increased.

We will be happy to provide advice.

GEOSYNTHETICS

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