

GEOSYNTHETICS

 **TENCATE**
Polyfelt[®]

TenCate Polyfelt[®] PGM: Pavement Maintenance for long lasting roads



Protective Fabrics
Space Composites
Aerospace Composites
Advanced Armour

Geosynthetics
Grass

 **TENCATE**
materials that make a difference

EFFICIENCY PROVEN BY MILLIONS OF M²

Successful road rehabilitation since more than 30 years

UK

Location: Westminster Bridge
Solution: TenCate Polyfelt® PGM-G 200/200
Owner: City of London
Quantity: 5.000 m²
Date: May 2012

GERMANY

Location: Motorway A1
Solution: TenCate Polyfelt® PGM 14
Owner: Landesamt für Straßenwesen
Quantity: 75.000 m²
Date: October 2000

RUSSIA

Location: Tatarstan Republic
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: 000 Potok
Quantity: 24.000 m²
Date: June 2012

IRELAND

Location: Limerick Shannon Airport
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: Shannon Airport Authority plc
Quantity: 90.000 m²
Date: September 2011

NETHERLANDS

Location: Military Airport Deelen
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: Dutch Government
Quantity: 45.000 m²
Date: March 2011

AUSTRIA

Location: B3 Dürnstein
Solution: TenCate Polyfelt® PGM 14
Owner: JV Teerag Krems
Quantity: 10.230 m²
Date: June 1993

FRANCE

Location: Montbelliard Besançon
Solution: TenCate Bidim® PGM 14
Owner: APRR
Quantity: 145.000 m²
Date: May-July 2010

EGYPT

Location: Marsa Alam Airport
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: EMAK Marsa Alam SAE
Quantity: 100.000 m²
Date: July 2012

ROMANIA

Location: Bucharest - Pitesti
Solution: TenCate Polyfelt® PGM-G 50/50
Owner: CNANDR Romania
Quantity: 370.000 m²
Date: September 2006

ITALY

Location: Motorway A4 Milan - Turin
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: Autostrade per l'Italia Spa
Quantity: 60.000 m²
Date: May 2013

PORTUGAL

Location: Rodovias do Baixo Alentejo
Solution: TenCate Polyfelt® PGM-G 100/100
Owner: Estradas de Portugal, S. A.
Quantity: 630.000 m²
Date: 2011-2012

SPAIN

Location: Motorway A-2, Zaragoza
Solution: TenCate Polyfelt® PGM-14
Owner: Ministerio de Fomento
Quantity: 60.000 m²
Date: Juli 2010

HIGH QUALITY PAVEMENT REHABILITATION FROM TENCATE

Your Target: Long Lasting Roads

Keeping the existing road network in an acceptable condition is one of the major challenges of road authorities all over the world. The focus of attention is therefore, on maintenance techniques and refurbishment methods which allow the working life of the basic road structure to be extended in a cost-effective and technically reliable manner.

One method which has been successfully used world-wide for more than 30 years is the maintenance of asphalt and concrete roads using geosynthetic interlayers.

This method represents an economic means of considerably increasing the maintenance intervals and thus the working life of the road.

Our Solutions: TenCate Polyfelt® PGM and TenCate Polyfelt® PGM-G

Based on long experience, TenCate Geosynthetics has developed a complete range of products specifically suited for the application in asphalt pavements.

PGM:

- PGM is a mechanically bonded paving fabric made from 100% PP continuous filaments. In conjunction with a bitumen layer, it acts as a barrier to the ingress of water and delays the deterioration of the pavement.
- PGM is characterized by optimum bitumen storage capacity and has been especially developed for new asphalt road construction and rehabilitation of older roads. It conforms to EN 15381.
- The main functions are stress relief (STR) and sealing (B).
- The product is used between asphalt layers or applied directly on concrete surfaces or cement stabilized layers.

PGM-G :

- PGM-G paving composites are made of mechanically bonded 100% PP continuous filament nonwoven reinforced by an alkali resistant glass filament grid.
- PGM-G grades have been especially developed for new asphalt road construction and rehabilitation of cracked roads. They conform to EN 15381.
- The main functions are Stress Relief (STR), Sealing (B) and Reinforcement (R).
- The products are used between asphalt layers, or applied directly on concrete surfaces or on cement stabilized layers.



PGM PAVING FABRIC INTERLAYER

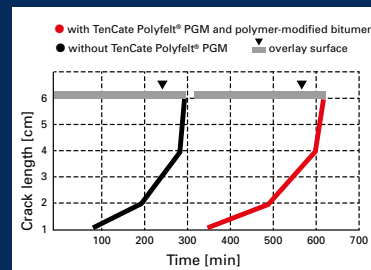
Reflective Crack Control and Waterproofing: more cost effective than classical maintenance methods

TenCate Polyfelt® PGM is ideal for

- **Stress absorbing membrane** underneath new asphalt wearing courses. Stresses in the asphalt layers are reduced, thereby considerably extending the working life and service intervals.
- **Maintenance with surface dressing.** Surface dressing still is one of the most cost effective methods to treat cracking and water penetration.
- **Maintenance of old asphalt roads without levelling layer.** If the existing road surface is sufficiently even and stable, PGM can be applied directly in combination with the adequate tack-coat.
- **Maintenance of old asphalt roads with regulating layer.** Levelling layers are recommended in case of very uneven or unstable existing surfaces. They are often installed on old cracked concrete pavements.
- **Severe climate conditions:** Freeze-thaw cycles cause expansion and contraction of water within a pavement. In harsh environments, a thicker interlayer with adequate amount of bitumen may delay cracking longer than a thinner one.

TenCate Polyfelt® PGM provides solutions:

- to reduce the potential for damage caused by surface water infiltration
- to reduce reflective cracking and
- to add reinforcement to new overlays



Double service life time proven by laboratory testing.

Distressed, cracked pavements allow surface water to infiltrate into subgrade soils, weakening the subgrade.

PGM retards crack growth and increases lifetime by a factor of 2-3. A weak subgrade causes premature pavement failures to occur.

Asphalt overlays are often used as preventive maintenance before or as rehabilitation after the damage has occurred.

PGM



APPLICATION:



Maintenance with surface dressing



Maintenance of an old asphalt road without regulating layer



Maintenance of an old asphalt road with regulating layer



SURFACE DRESSING INSTALLATION

5 easy steps to install TenCate Polyfelt® PGM in surface dressing

Application of the surface treatment is carried out normally. Adhere to standards and guidelines for the application of the chosen surface treatment, selection of materials and dimensioning.

- 1 Cleaning of the road surface, ideally with high pressure water jet.
- 2 Preparation of surface, filling of cracks > 4 mm.
- 3 Even distribution of the tack coat by machine. The first required quantity of tack coat (A) amounts to app. 0.9 kg/m². The exact quantity and type of tack coat depends on climatic conditions and on the type of surface dressing to be used.
- 4 Installation of TenCate Polyfelt® PGM starts after curing of the emulsion has begun. PGM is laid into the tack coat by unrolling using specially designed laying equipment. Pre-tensioning is not necessary. In case the installation has to be done on the completely broken emulsion, partial quantity A should be reduced to 0.8 kg/m², partial quantity B has to be increased accordingly.
- 5 Even distribution of the second partial quantity of tack coat (B). This quantity will serve to saturate the geotextile and to embed chippings. The exact quantity will depend upon the type of emulsion and on the type of chippings to be used. In any case recommendations of the supplier of the emulsion have to be followed.

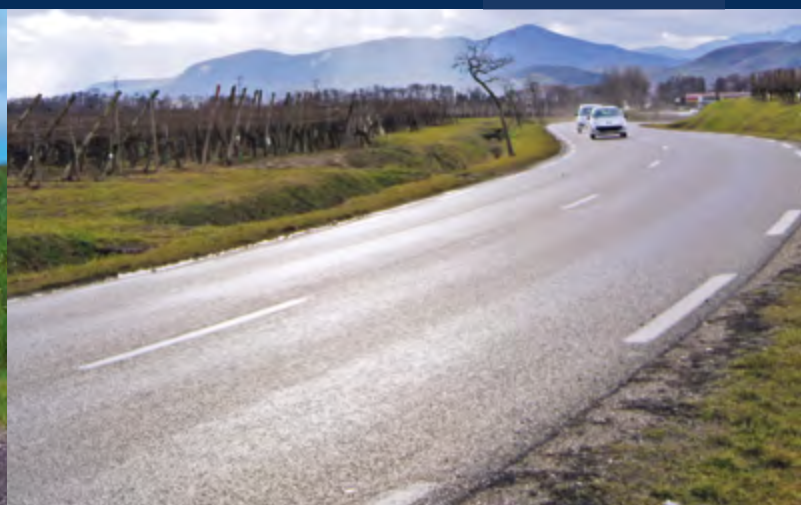
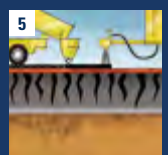
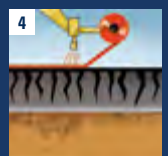
Immediately after application of the emulsion, the required amount of chips is spread evenly. This is followed by compaction preferably with rubber tyred rollers.

The Benefits of TenCate Polyfelt® PGM

- **Sealing:** rain and oxygen cannot penetrate into the road structure.
- **Stress relief:** PGM retards crack propagation from the old surface to the new overlay.
- **Adhesive bonding:** PGM provides uniform bonding between old and new asphalt layers.
- **Temperature behaviour:** PGM provides good performance even at low temperatures.
- **Recycling:** PGM can be easily milled without any problem.
- **Installation:** easily done by laying machine even in curves and on uneven surfaces.
- **Longevity:** Maintenance intervals are extended considerably, even with low overlay.

Construction Methods

- Single surface dressing.
- Sandwich surface dressing.
- Single surface dressing with double chip layer.
- Double surface dressing.
- Macadam (double surface dressing on un-bound supporting layer).



PGM-G - REINFORCEMENT PLUS SEALING FOR HIGHLY STRESSED PAVEMENTS

Giving cracked roads a break!

TenCate Polyfelt® PGM-G is ideal for

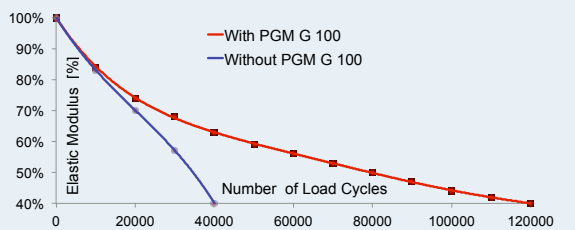
- Complete Asphalt Reinforcement.
- Asphalt Reinforcement on old concrete roads.
- Local reinforcement of a longitudinal crack with milling.
- Local repair over excavated trenches.

The application of a geosynthetic interlayer is a reliable and smart solution for road surface repair.

Both vertical and horizontal forces induced between the layers result in crack formation, as well as local differential settlements, which lead to cracking of the asphalt layers.

TenCate Polyfelt® PGM-G is the optimum solution for owners and all stakeholders in road management, who are interested in a sustainable and high quality method of road rehabilitation. Asphalt reinforcement is achieved by high modulus glass filaments, combined with the effects of sealing and uniform bonding which is secured by a continuous filament non-woven geotextile. This provides effective maintenance and prolongs service lifetime and maintenance intervals of the road structure.

Lifetime increases by a factor of 3



The comparison of the elastic modulus of a reinforced and an unreinforced beam shows an increase in lifetime by a factor of **2-4 for PGM G**.

PGM-G is a multi-functional geosynthetic interlayer for high quality pavement rehabilitation.

PGM-G fulfills the functions of sealing, stress-relief and reinforcement in one product.

PGM-G is the most advanced engineered high strength paving composite, acting as moisture barrier, providing dissipation of low strain energy and maximizing the delay of reflective cracks.



Test setup and FE- simulation

PGM-G



APPLICATION:



Complete asphalt reinforcement of old concrete roads



Partial reinforcement of a longitudinal crack with grinding



Repair of the road surface over excavated trenches



INSTALLATION OF HOT ROLLED ASPHALT OVERLAYS

5 easy steps to install TenCate Polyfelt® PGM-G

In this method of road rehabilitation and crack repair a bituminous wearing course is applied onto an existing bituminous layer. This might be an existing wearing course (a binder or sub-base or a milled surface). Depending on traffic load, various types of asphalt can be used. TenCate Polyfelt® PGM-G-reinforced wearing course absorbs traffic stress and protects the base course.

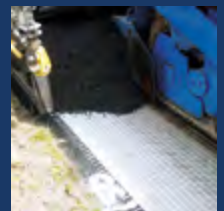
- 1** Cleaning of the road surface, ideally with high pressure water jet.
- 2** Filling of cracks (> 4 mm) and potholes or application of a levelling regulating layer.
- 3** The total effective tack coat quantity of approximately 1.1 kg/m² is evenly applied over the whole area, extending max. 10 cm over the edge of the geocomposite to be installed. The type and exact amount of tack coat depends on the climatic conditions, the status of the existing surface and on the type of asphalt overlay to be used.
- 4** Installation of PGM-G starts after curing of the emulsion has begun. TenCate Polyfelt® PGM-G is laid into the tack coat by unrolling using specially designed laying equipment. Pre-tensioning or fixing with nails is not necessary.
- 5** The hot rolled asphalt (min thickness 40 mm) can be installed immediately after the unrolling of TenCate Polyfelt® PGM-G.

The Benefits of TenCate Polyfelt® PGM-G

- **Reinforcement:** high load-uptake at low strain rates (< 3 %).
- **Cost effectiveness:** suitable for local spot maintenance.
- **Sealing:** asphalt saturated paving fabric reduces water intrusion into the pavement structure.
- **Longevity:** maintenance intervals are considerably extended.
- **Stress relief:** TenCate Polyfelt® PGM-G retards crack propagation from the old surface to the new overlay.
- **Recycling:** TenCate Polyfelt® PGM-G can be easily milled without problem.
- **Installation:** easily done by laying machine even in curves and on uneven surfaces.
- **Resistance:** chemically resistant to road salt.

TenCate suggestions

- The use of crawler-type pavers may exert less stress on the geosynthetic interlayer.
- If appropriate, local spreading of small amounts of asphalt-mix, chipping or sand can avoid sticking of the paving fabric to the tyres.



GEOSYNTHETICS

For further information on pre-design, installation and cost savings contact:

TenCate Geosynthetics Austria GmbH
Schachermayerstr. 18
A-4021 Linz - Austria
Tel. +43 (0)732 6983 0
Fax +43 (0)732 6983 5353
service.at@tencate.com

TenCate Geosynthetics France S.A.S.
9, rue Marcel Paul - B.P. 40080 95873
Bezons Cedex - France
service.fr@tencate.com
Fax : +33 (0)1 34 23 53 48
www.tencategeosynthetics.com

BeNeLux
Central Eastern Europe
Czech Republic
France / Africa
Germany
Italy
Near Middle East
Poland
Russia/CIS
Scandinavia / Baltics
Spain / Portugal
Turkey
United Kingdom / Ireland

Tel. +31 546 544 811 service.nl@tencate.com
Tel. +43 732 6983 0 service.at@tencate.com
Tel. +420 2 2425 1843 service.cz@tencate.com
Fax: +33 1 34 23 53 48 service.fr@tencate.com
Tel. +49 30 3435 02 10 service.de@tencate.com
Tel. +39 0362 34 58 11 service.it@tencate.com
Tel. + 971 (0)4 8103295 service.nme@tencate.com
Tel. +48 12 268 83 75 service.pl@tencate.com
Tel. +43 732 6983 0 service.ru@tencate.com
Tel. +31 546 544 811 geonordic@tencate.com
Tel. +34 607 499 962 service.es@tencate.com
Tel +43 732 6983 0 service.tr@tencate.com
Tel. +44 1952 588 066 service.uk@tencate.com

©2015, Koninklijke Ten Cate nv and/or its subsidiaries

This brochure contains proprietary information of Koninklijke Ten Cate nv and/or its subsidiaries (TenCate), including but not limited to trademarks, trade names, and graphic material, as protected by law. Any reproduction, distribution, or sales in any form of the content of this brochure without the express written approval of TenCate is strictly prohibited.

All information published in this brochure is selected with the utmost care, however, no rights whatsoever can be derived from this brochure and/or its content and TenCate accepts no liability for it.

TenCate Polyfelt, TenCate Rock, TenCate Miragrid, TenCate GeoDetect, TenCate Geotube and all related characters, logos and trade names are claimed and/or registered trademarks and/or trade logos of Koninklijke Ten Cate nv and/or its subsidiaries. Use of trademarks, trade names and other IP rights of TenCate without express written approval of TenCate is strictly prohibited.

North America
South America

Europe
Middle East
Africa

Asia
Australia

 **TENCATE**
materials that make a difference

www.tencategeosynthetics.com

