

Installation Guidelines

Asphalt Concrete

Table of Content:

1. Preparatory Works	2
1.1 Cleaning of the road	
1.2 Filling of potholes and levelling uneven sections	
1.3 Filling of cracks	
2. Application of Binder	3
2.1 Type of Tack coat	
2.1.1 Influencing factors	
2.1.2 Recommended type of Tack coat	
2.2 Recommended Quantity of Tack coat	
2.3 Spraying of Tack coat	
3. Laying of PGM & PGM-G	5
3.1 Commencement	
3.2 Using an Installation machine	
3.3 Manual laying procedure	
3.4 Connecting of PGM & PGM-G panels	
3.5 Cutting of PGM & PGM-G	
3.6 Removing of folds or wrinkles	
3.6.1 Cutting	
3.6.2 Heating	
3.7 Blinding . spread chippings	
3.8 Weather Conditions	
3.8.1 Wind	
3.8.2 Rain	
4. Application of the Bituminous Overlay	7

Introduction

The following information reflects the present level of knowledge of TenCate Geosynthetics pertaining to the maintenance of roads with PGM & PGM-G. The data and techniques described in these guidelines apply **exclusively to PGM & PGM-G**. Due to differing production technologies and types of fibres, similar products may require substantially different methods of application.

Deviations of the guideline on hand suggested by the TenCate Polyfelt are permitted in the individual case due to special conditions on the construction site.

1. Preparatory work

1.1. Cleaning of the Road

Cleaning of the road surface and the cracks from debris, dust and vegetation shall be done by using a Road-sweeper.

1.2. Filling of Potholes and Levelling uneven Sections

Poor joints, excessively uneven or badly rutted areas should be either planed or regulated using suitable coated materials. The void content of the road surface shall not be higher than 8%. Concrete roads must be relaxed correspondingly by means of falling-weight so that a tilting of the concrete slabs is excluded.

1.3. Filling of cracks

Cracks >4mm wide should be cleaned and filled with a proprietary treatment to the surrounding level to eliminate either loss of tack coat in the crack.

The following treatments have been used successfully:

- Filling with coated materials
- Filling with chippings and emulsion
- Single surface treatment
- Application of a bituminous levelling layer (especially at substantial uneven sections)
- Joint filling compound (obligatory for crack distances >3m)

2. Application of binder

2.1. Type of Tack coat

Both straight-run bitumen and cationic bitumen emulsions (70%) are suitable tack coats. Polymer-modified bitumens are particularly recommended, whilst those containing fluxing agents should not be used.

2.1.1. Influencing factors

- Climatic conditions:

High surface temperatures can lead to bleeding and adhesion problems with the paving felt when tack coats with a softening point lower than the surface temperature are used. Similarly, low surface temperatures can lead to a loss of the adhesive bond strength of the layers.

- Asphalt overlays

Polymer-modified tack coats are generally recommended for thin asphalt overlays.

- Traffic load

Heavy traffic loads or high air and surface temperatures combined with thin asphalt overlays can lead to a reduction in the stability of the asphalt due to moving up of the tack coat.

2.1.2. Recommended Type of Tack coat

- Polymer-modified bitumen (or emulsions) are suitable in case of:

High air temperature (>25°C) during the installation or high traffic loading, Asphalt overlay <40mm (special type).

Characteristics of polymer-modified bitumen:

Softening point (Ring & Ball) > 50°C

Breaking point (Fraaß) < - 15°C

The stated values may vary according to the a.m. factors of influence!

- Standard bitumen (or emulsions) are suitable in case of:

Moderate air temperature conditions and medium traffic loading, Asphalt overlay >40mm

The term 'standard bitumen' refers to the type and grade required for each surface type, the overlay material, and the traffic loading, using conventional construction methods.

- Note should be taken of the following properties when using emulsions:

- High viscosity (min. 500 mPa at 40°C)

The relatively high amount of emulsion required - normally 1,80kg/m² when using U70K (K170) - can lead to run-off or creating a pond. These problems are exacerbated on roads with a steep camber or cross fall.

- Short curing time

The shortest possible curing period speeds up the work considerably. Note should be taken that high quantities of emulsion are required.

2.2. Recommended Quantity of Tack coat

The required amount of tack coat is calculated from the quantity necessary to impregnate the PGM & PGM-G and achieve full adhesive bonding.

The mean quantity Q of effective binder is: $Q = 1.10$ to 1.30kg/m^2

The quantity of tack coat must be adjusted to take into account the condition of the existing road surface to be overlaid, as follows:

Rough surface condition	+ 0.1 kg/m ²
Heavily cracked surface	+ 0.1 kg/m ²
Dry, brittle surface	+ 0.1 kg/m ²
Smooth mastic asphalts	- 0.1 kg/m ²
Open textured macadam of existing old surface	+ 0.1 kg/m ²
Dense macadam of existing old surface	- 0.1 kg/m ²

The maximum change in the mean quantity should not exceed + 0.2 kg/m² or - 0.1 kg/m².

When using emulsion, it is necessary to make a further adjustment to allow for the dilution caused by added water. In order to achieve the mean quantity $Q = 1.1$ to 1.3 kg/m^2 when using a 70% emulsion, the quantity of tack coat must be increased to 1.6 to 1.8 kg/m².

2.3. Spraying of Tack coat

Spraying of tack coat should always be undertaken using a truck-mounted calibrated spraying-bar to ensure the correct quantity is applied. The tack coat should be sprayed 15cm wider than the width of the paving fabric.

3. Laying of PGM

PGM & PGM-G should only be laid by trained staff.

3.1. Commencement

The starting of the installation is determined by the TenCate Installer and takes into account the quality of the used tack coat and the predominant climate conditions.

If the tack coat chosen is bitumen - either polymer-modified or straight-run - then laying the PGM can commence immediately. If however the tack coat is to be emulsion, laying of the PGM must be delayed until the emulsion has nearly broken. This can cause delays, as the breaking-time cannot be accurately forecast and varies according to the climatic conditions.

3.2. Using an Installation machine

When laying PGM & PGM-G more than 1.0m wide, it is recommended using a laying rig. It shall be handled only by trained and experienced staff.

3.3. Manual laying procedure

Laying PGM & PGM-G smaller than 1.0m wide does not normally demand the use of a laying rig, and occasions may arise when a rig is unavailable. PGM & PGM-G can then be laid by hand.

The following points must be considered:

- The paving felt must be kept under light tension to prevent the formation of folds or wrinkles - a suitable bar passed through the centre core will facilitate this.

1. Lift up the roll
2. Unwind only short lengths, 2 to 3 m, at a time
3. Maintain the tension
4. Apply the paving fabric onto the tack coat under tension
5. Press the paving fabric lightly onto the tack coat with a brush

- Emulsions are preferable for hand laying to allow corrections. When laying the paving felt they should not yet have achieved their full adhesive force.

- Cut the paving felt into segments for laying around curves.

If the PGM & PGM-G have been laid onto emulsion which has not yet broken, bleeding might occur. 'Blind' these areas as well as all transverse jointing with coated materials or chippings (app. 2kg/m²).

3.4. Connecting PGM & PGM-G panels

For connecting PGM & PGM-G panels along the road butt joints are preferable. Gaps up to 40mm can be ignored when there are no severe cracks underneath. Occasional overlaps wider than 30mm need an additional 0.9kg/m² tack coat applied to the lower edge.

3.5. Cutting of PGM & PGM-G

PGM & PGM-G are easily cut by using a knife or a pair of scissors.

3.6. Removing folds or wrinkles

The paving felt should be laid wrinkle-free; however it is inevitable that they will appear from time to time. Small wrinkles are unimportant and can be disregarded, however any folds which can be formed into three layers of paving felt should be removed by cutting or heating.

3.6.1. Cutting

Large folds as described should be cut using a knife or a pair of scissors. One part of the fold is then laid in the tack coat and a further 0.9kg/m² applied before the other part is pressed into place.

3.6.2. Heating

A gas burner can be applied to the fold to burn it off. Care must be taken to ensure that holes are not made in the paving fabric.

3.7. Blinding & spread chippings

It is not normally necessary to 'blind' PGM & PGM-G, however certain circumstances may require the newly-laid paving felt to be protected:

- Bleeding of the tack coat (in this case the tyres of the vehicles may stick to the paving felt).
- The softening point of the tack coat is too low, causing the wheels of the paver to displace the paving fabric.

It is sufficient to lightly 'blind' the wheel tracks by spreading chippings (2kg/m²) or the coated material being placed in the permanent works. Transverse joints should be lightly 'blinded' to allow site traffic to travel freely before the tack coat has reached its' full adhesive strength.

3.8. Weather

3.8.1. Wind

Wind is extremely unlikely to affect the laying of the paving fabric. However, should it become necessary due to lack of adhesion to the tack coat, lightly roll using a rubber wheeled roller.

3.8.2. Rain

Surfacing onto the paving felt should not commence until rain has evaporated, as the adhesive bond will be greatly reduced. Slight residual dampness is acceptable if the temperature of the overlay is sufficient to allow evaporation. It is possible for the traffic to run on the wet PGM & PGM-G, but care must be taken as tyre grip is considerably reduced.

4. Application of the Bituminous Overlay

All types of bitumen bound asphalts and macadamø within a temperature range of 140°C and 180°C can be used.

The thickness of the asphalt layer built-in over the paving fabric must be at least 40mm. The overlay should be applied in the conventional manner, taking into account the following:

- Normally construction traffic can travel over correctly laid PGM & PGM-G. Heavy braking or acceleration as well as movement of the steering wheels whilst the vehicle is stationary should be avoided. When the tack coat has fully hardened public traffic can be allowed onto the PGM & PGM-G for a short time, taking into account the reduced grip between the paving felt and the vehicle tyres.
- No tack coat shall be applied onto PGM & PGM-G (exception in overlapped areas)
- 'Blinding' of the wheel tracks must be carried out if bleeding occurs.
- If the paving felt is applied semi laterally, a strip of up to 200mm must be left uncovered to enable a longitudinal joint.
- As the paving felt provides low grip for tyres, the paver should not be loaded to full capacity.
- If the paver has tendency to swerve on the felt, 'blinding' the wheel tracks will both protect the PGM & PGM-G and add grip.

The information given in this guideline is to the best of our knowledge true and correct, however new research results and practical experiences can make revisions necessary. No guarantee or liability can be drawn from the information mentioned herein. Furthermore it is not our intention to violate any patents or licences. From the use of the installation device rented or the activity of the supervisor, the liability for damages is excluded completely. TenCate Polyfelt is only liable for the choice of the supervisor supplied by it, it isn't liable for a certain work success. The customer is obliged to observe the proper compliance of this installation guideline. Every installer is liable for the compliance of all legal regulations, particularly in the field of the licence and patent law. The right is reserved to make changes without notice at any time.

TenCate Geosynthetics Austria GmbH

Schachermayerstraße 18

A-4021 Linz

Tel. +43 732 6983-0

Fax. +43 732 6983-5353

www.tencate.com