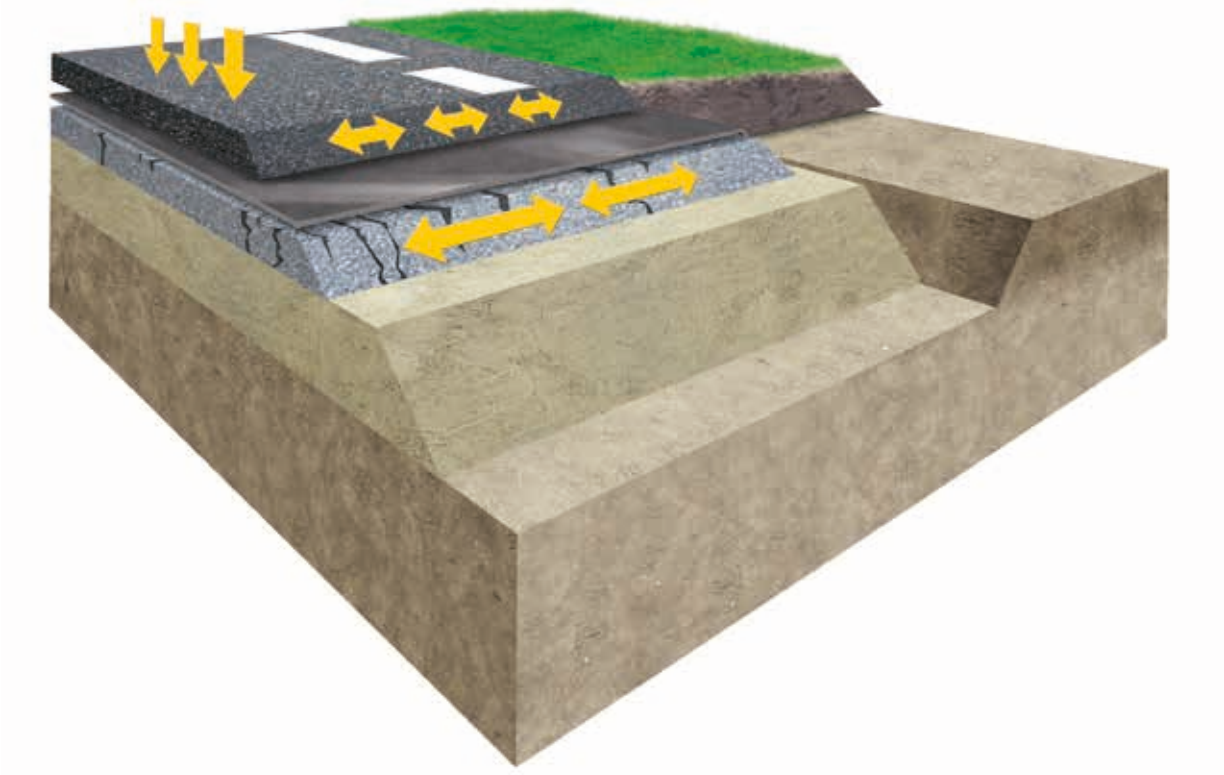
210.10

WINNING **TOGETHER**

Fibertex AM-2 for Stress relieving

Fibertex NONWOVENS

Fibertex AM-2 for
Stress relieving



- **To avoid reflective cracking of new asphalt**
- **To protect the subsoil from water intrusion and thereby loss of bearing capacity**

Fibertex AM-2 made from polypropylene fibres is a flexible pre-compressed needlepunched nonwoven fabric added thermal bonding on one side only.

Designing asphalt overlays with Fibertex AM-2

Paving fabrics are widely used in both new road constructions and in road maintenance to reduce reflective cracking in the pavement. The purpose is to distribute stresses originated from cracks in the lower part of the pavement by creating a stress relieving and/or waterproofing interlayer membrane system.

The waterproofing function prevents surface water from entering the bearing courses, whereas the stress relieving function is defined as:
Paving fabrics, properly installed in between an existing pavement surface and a new asphalt overlay, providing a stress relieving function, as the bitumen-saturated paving fabric allows for slight differential movements between the two layers.

Causes for reflective cracking in asphalt overlays

Fig. 1. The paving fabric absorbs differential movements in the asphalt layers preventing reflective cracking. Additionally it forms a waterproof interlayer preventing surface water from entering the old asphalt layer.

Fig. 2. Without paving fabric, reflective cracking of the new asphalt overlay will occur and surface water will enter the old asphalt layer. This will accelerate deterioration of the entire road construction.

Selecting bituminous tack coat

The tack coat should consist of pure bitumen or polymer-modified types of solventless bitumen.

The use of a paving fabric should never be combined with the use of softening additives. These are often applied in traditional paving projects to extend the workability of the bituminous tack coat, but will cause the bitumen to penetrate the paving fabric too fast, with the result that vehicle tyres may pick up the bitumen, which could damage the fabric.

Determining the penetration grade of the bituminous tack coat

When calculating suitable penetration grade for the paving fabric, weather conditions must be taken into consideration.

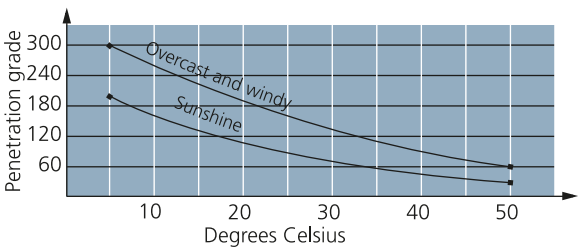


Fig. 3. Indication of suitable tack coat penetration grades for paving fabrics.

Fibertex AM-2 for Stress relieving

Determining the amount of bituminous tack coat

The amount of bituminous tack coat should be sufficient to ensure the bitumen retention properties of the paving fabric and to bond the paving fabric and the new asphalt overlay to the existing pavement surface.

The bitumen retention for Fibertex AM-2, Q_{fabric} is 900 g/m^2.

In order to account for the condition of the pavement surface, an additional quantity of retention bitumen, Q_c, should be specified. Even though it is often estimated on site, indications of Q_c can be read from fig. 4.

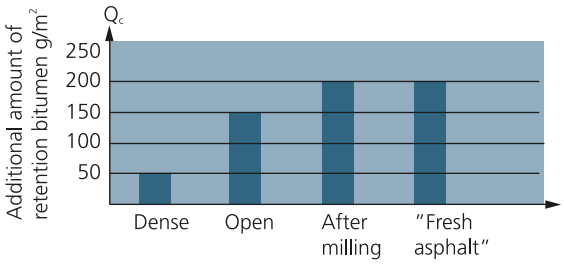


Fig 4. The amount of additional retention bitumen, Q_c , required on different pavement surfaces.

The necessary amount of sprayed bituminous tack coat, Q, can now be calculated:

Hot melted bitumen:

$$Q = Q_{fabric} + Q_c \qquad [g/m^2]$$

Thick liquid bitumen emulsions:
(bitumen content E > 65%):

$$Q = \frac{Q_{fabric} + Q_c}{E} \cdot 100 \qquad [g/m^2]$$

Q is the total amount of bituminous tack coat needed [g/m^2]

Q_{fabric} is the amount of bituminous tack coat needed to saturate the fabric [g/m^2]

Q_c is the additional amount of bituminous tack coat needed to take the condition of the existing pavement surface into account [g/m^2]

E is the percentage of bitumen in the bitumen emulsion [%]

Thin liquid bitumen emulsion:
(Bitumen content: 50% ≤ E ≤ 65%):

The application of thin liquid bitumen emulsion, is a two step process:

Step 1.
The bitumen emulsion is sprayed onto the existing pavement surface to create a sticky surface for the unrolling of the paving fabric. The amount of bitumen emulsion is calculated as:

$$Q_1 = \frac{375 + Q_c}{E} \cdot 100 \quad [g/m^2]$$

Step 2.
The bitumen emulsion is sprayed onto the paving fabric to create a waterproofing membrane. The amount of bitumen emulsion is calculated as:

$$Q_2 = \frac{425}{E} \cdot 100 \quad [g/m^2]$$

After the second spraying of emulsion, a thin layer of asphalt material is spread on the saturated fabric to prevent the emulsion from sticking to tyres and crawler tracks of the paving equipment.

Installation procedure for Fibertex AM-2 paving fabric

The existing pavement surface - concrete or asphalt - is cleaned thoroughly to remove dirt, oil, water and other impurities. If necessary, large holes and cracks are patched and levelled.

Unrolling of Fibertex AM-2

If the bituminous tack coat consists of hot melted bitumen, the unrolling of paving fabric can begin shortly after the bitumen has cooled down. However, if the tack coat is a bitumen emulsion it has to "break" first (turn from brown to black as the water evaporates).

The fabric can be unrolled both manually and mechanically, but mechanical unrolling is preferable as it is faster and minimises the number of wrinkles. For this purpose a custom-made tractor can be rented from Fibertex. Please note that Fibertex AM-2 is for manual unrolling and Fibertex AM-2 Special is for mechanical unrolling (for mechanical unrolling the fabric is inversely rolled up).

Fig 5. When unrolling Fibertex AM-2 manually, using a pushing tool makes it easier to keep the direction and avoid wrinkles.

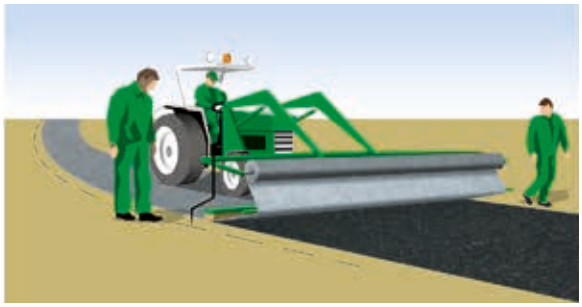


Fig. 6. Mechanical unrolling of Fibertex AM-2 Special is fast and minimises wrinkles even in soft curves.

Fibertex AM-2 for
Stress relieving

Overlaps

Longitudinal overlaps should be approx. 10 cm and transverse overlaps approx. 20 cm.

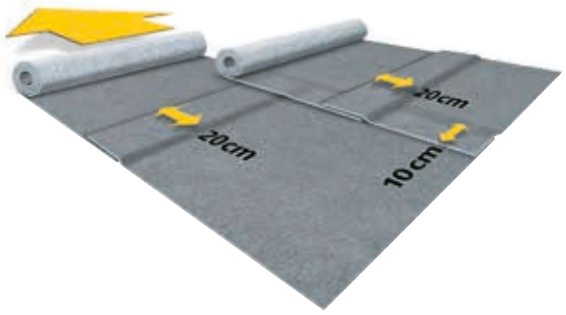


Fig. 7. A sufficient overlap in both longitudinal and transverse direction is recommended.

Transverse overlaps should be made in the paving direction to prevent edge pick-up by the asphalt paver.

To ensure total saturation of the overlap, extra bituminous tack coat should be added between the two layers of paving fabric.

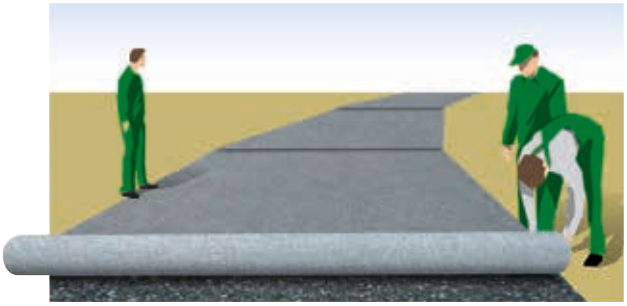


Fig. 8. Manual unrolling of Fibertex AM-2 can only be done in squares, demanding extra overlap in curves.

Paving with hot mixed asphalt material

The retention heat of the hot asphalt material paved on top of the paving fabric must be sufficient to soften the underlying bitumen to ensure maximum saturation of the fabric.

Standard hot mixed asphalt materials have plant temperatures varying between 140 - 170 °C, which are suitable temperatures for paving fabrics made from polypropylene. These temperatures allow a flexible behaviour of the paving fabric when it is in contact with the hot asphalt material (milled asphalt material containing polypropylene paving fabric is recyclable).

If the temperature of the asphalt material exceeds 170 °C, a small quantity of the asphalt material should be spread manually before paving to protect the paving fabric.

The thickness of the asphalt layer on top of the paving fabric should be 2½ - 5 times larger than the diameter of the largest grain size. With a minimum of 3 cm on top of asphalt pavements and 4 cm on top of concrete slabs.

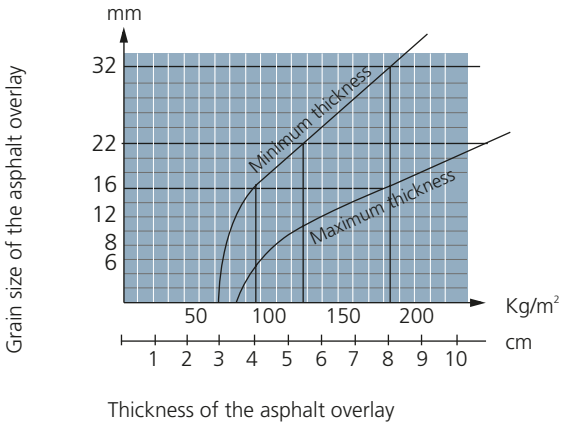


Fig 9. Thickness of hot mixed asphalt overlay on top of paving fabrics.

Operation of paving machinery when using paving fabrics

Unrolling of the paving fabric and distribution of asphalt material are often done simultaneously to allow for traffic on the fabric. If crawlers or vehicle tyres stick to the paving fabric they may damage the fabric. To avoid this, some asphalt material has to be spread in the wheel tracks.

When backfilling asphalt material in front of the asphalt paver, the truck driver must not use the brakes and must avoid any unnecessary driving at longitudinal overlaps and in spots with plenty of bitumen. Furthermore, caution is required when changing direction.

Weather conditions

When working with bitumen emulsion, the temperature should be above + 10 °C. If hot bitumen is used the temperature should be above + 5 °C.

Facts about Fibertex

Fibertex Nonwovens A/S is a market-leading manufacturer of nonwovens for industrial and technical applications. With corporate office in Aalborg, Denmark, and manufacturing sites in Denmark, the Czech Republic, France, the USA, Turkey, South Africa and Brazil, Fibertex is globally represented. Since its foundation in 1968, Fibertex has continuously expanded and today manufactures nonwovens for customers all over the world for many different applications.

Close to our customers

Our goal is to be local on the global market. Sales staff, subsidiaries and distribution network play a decisive role in helping us to achieve this. Worldwide technical service is offered close to you.

Find inspiration on www.fibertex.com

Visit our website for more information. Under the business area "Geotextiles" you will find detailed information about our products, data sheets and brochures for download as well as contact information.

The information given in this publication is of an illustrative nature. The manner of use is the sole responsibility of the user and the user must assume all risk and liability in connection herewith.

CE
1071-CPR-1846

Fibertex Nonwovens A/S
Svendborgvej 16
DK-9220 Aalborg
Denmark
Tel. +45 96 35 35 35
Fax +45 98 15 85 55
fibertex@fibertex.com
www.fibertex.com

Fibertex NONWOVENS

B10 MARKETING A/S 031 379 01 EN/08 2018