PennDOT LTAP
technical
INFORMATION
SHEET #166
SUMMER/2015

GEOTEXTILE PAVING FABRIC (Used as a Pavement Interlayer)

by Michael H. Fleming. ISMF LLC

Motorists and taxpayers alike expect smooth safe roads with proper drainage and relatively maintenance-free surfaces. This technical information sheet will discuss pavement interlayers, a PennDOT-approved product that can be included within a paving project to improve the life-cycle performance of roads and ensure a smoother ride for motorists.

A section within the current list of PennDOT-approved construction materials in Publication 35, Bulletin 15, references two pavement interlayers or bituminous nonwoven geotextile paving fabrics. These products must meet the American Association of State Highway and Transportation Officials (AASHTO) standards, specifically AASHTO M288 specifications, which set forth a set of physical, mechanical, and endurance properties that must be met, or exceeded, by the manufactured geotextile. These specifications are intended to assure both good quality and performance of geotextiles used on our roadways.

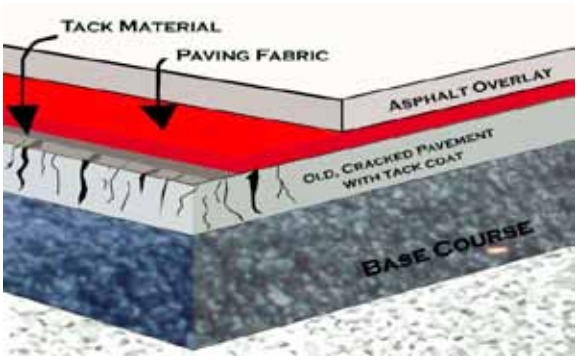

Photo courtesy of Asphalt Interlayer Association.

As of April 23, 2015, the PennDOT-approved products are Petromat 4597 (manufactured by Propex Inc.) and Mirafi MPV 600 (manufactured by TenCate Geosynthetics Americas). Be sure to check the current Publication 35 for updates prior to bid preparation or awarding of a contract that specifies paving fabric.

Benefits of Geotextile Paving Fabrics

Roadmasters or public works employees know that distressed pavements allow surface water to infiltrate into the base and subgrade soils resulting in weakened subgrade. A weak subgrade causes premature pavement failure to occur. Asphalt overlays are placed as preventive maintenance before or as rehabilitation after the damage has occurred. Placement of a geotextile paving fabric product will help to reduce the potential for damage caused by surface water infiltration and reflective cracking.

The following are the key benefits of installing a geotextile paving fabric as a pavement interlayer:

- Provides a moisture barrier for base and subgrade reinforcement protection.
- Creates a stress-relieving membrane between the existing pavement and new asphalt overlay.
- Retards the propagation of existing cracks through a new overlay to provide reflective crack control.
- Extends the useful life of the overlay.

Pennsylvania endures freeze-thaw cycles that cause expansion and contraction of water within the pavement and/or subgrade. Studies have shown that the use of thick geotextile paving fabrics with higher asphalt retention, increased ability to absorb pavement stresses, and enhanced water moisture-barrier capabilities will delay cracking longer than thinner non-approved paving fabrics.

The use of approved paving fabrics is ideal for the following locations:

- Public streets or highways
- Parking lots
- Bridges
- Recreational paths
- Playgroups

pennsylvania
DEPARTMENT OF TRANSPORTATION
PennDOT Local Technical Assistance Program

400 North Street, 6th Floor
Harrisburg, PA 17120
1-800-FOR-LTAP • FAX (717) 783-9152
www.ltap.state.pa.us

As with any product, municipalities should require the manufacturer and/or contractor to supply a Certificate of Compliance (CS-4171) to indicate that the material meets current PennDOT specifications.

Surface water infiltration into paving joints and improperly compacted pavements can be reduced through placement of an approved paving fabric. This material will help to prevent the penetration of surface water into the subgrade, thus allowing it to stabilize and stay dry and thereby extending the life of the pavement.

Discussion is under way in Pennsylvania for further research to allow the use of a paving fabric interlayer under bituminous emulsion seal coats to help keep the subgrade dry and to more than double the life of a seal coat. Neighboring states have already begun pilot tests of these products on public streets and highways.

Installation Steps

The key to good installation is to follow the manufacturer's recommendations and install the fabric with a sufficient asphalt cement tack coat on a properly prepared surface. This is followed by a Superpave overlay of a specific minimum compacted thickness at the proper application/compaction temperatures.

The following steps explain the storage and installation of nonwoven heat-set, polypropylene geotextiles with high asphalt absorption.

Storage

During storage, geotextile rolls must be elevated off the ground and adequately covered to protect them. Each roll of geotextile paving fabric must be wrapped with material provided by the manufacturer that will protect it, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants.

Geotextile rolls must be stored off the ground and adequately covered to protect them. Photo courtesy of ISMF LLC.

Surface Preparation

Clean Surface – The surface on which the paving fabric is to be placed must be free of dirt, water, vegetation, or other debris. Cracks must be filled with suitable filler/sealer. Potholes must be properly repaired. Superpave leveling courses must be allowed to cool prior to placement of the paving fabric.

The paving fabric is placed over the Superpave leveling course, which was done the previous day to allow the roadway to cool prior to applying the sealant and paving fabric. Photo courtesy of ISMF LLC.

Sealant Material – The sealant material used to impregnate and seal the fabric, as well as to bond it to both the base pavement and overlay, must be paving-grade asphalt similar to the asphalt performance grade used within a Superpave mixture. Examples are PG 58-28 (for northern cold areas of Pennsylvania), PG 64-22, and PG 76-22.

Application of the sealant must be by distributor spray bar. Temperature of the sealant must be high to permit a uniform spray pattern. The width of the spray pattern must be 6 inches wider than the width of the fabric. The sealant must not be applied too far in advance of the paving fabric to prevent wrinkling of the fabric and to ensure the sealant has not cooled or lost its tackiness.

The paving fabric distributor truck sprays PG 64-22 sealant followed by placement of the paving fabric by the spreader/broom tractor unit. Photo courtesy of ISMF LLC.

Installation of Fabric

Paving Fabric – Brooming and/or pneumatic rolling is required to maximize contact of the paving fabric with the pavement surface.

Overlap of the paving fabric joints must be as specified by the manufacturer to ensure full closure of the joint, but this overlap should not exceed 6 inches. Transverse fabric joints must be lapped in the direction of paving to prevent edge pickup by the paver. Occasionally a second application of sealant will be required to ensure proper bonding of the double paving fabric layer.

To protect the fabric at this point in the installation, the only traffic permitted to travel over the paving fabric are emergency and construction vehicles. Washed sand may be spread over the asphalt saturated paving fabric to facilitate movement of equipment during construction or to prevent tearing or delamination of the paving fabric.

The paver turns on the paving fabric without damaging the fabric. Loader tri-axle trucks also traveled across the fabric with no resulting damage. Photo courtesy of ISMF LLC.

Superpave Overlay

Placement of the Superpave overlay should closely follow the laying down of the paving fabric. The temperature and compacted thickness of the Superpave mixture must be in accordance with the paving fabric manufacturer. Proper compaction of the Superpave mixture and subsequent opening the roadway to traffic should follow the specifications of normal Superpave overlays.

9.5-mm hot-mix asphalt Superpave is placed over the paving fabric. Photo courtesy of ISMF LLC.

As with any product, issues could occur with application, so it is very important to follow the paving fabric manufacturer's recommendations and PennDOT specifications when using these products.

Paving fabric and tack coat form an impermeable fabric interlayer system that is fully recyclable and adds long term life-cycle and costs benefit to your roadways.

The paving fabric is placed around a sanitary sewer manhole. PG 64-22 material was used to seal the fabric overlap. Photo courtesy of ISMF LLC.

The Superpave mat is compacted prior to placement of a second pass. Photo courtesy of ISMF LLC.

References

- PennDOT Publication 35, Bulletin 15, Approved Construction Materials
  ftp://ftp.dot.state.pa.us/public/pdf/BOCM_MTD_LAB/PUBLICATIONS/PUB_35/BULLETIN_15.pdf
- AASHTO M288 Specifications
  ftp://ftp.wfl.fhwa.dot.gov/geotech/Geotech%20FP-12/207,%20714%20-%20Geosynthetics/AASHTO%20M-288%20spec%20(DAN).pdf
- Asphalt Interlayer Association
  www.aia-us.org/interlayer-specification-options/paving-fabric-interlayer/
- Propex Inc.
  http://geotextile.com/product/petromat.html
- TenCate Geosynthetics Americas
  www.tencate.com/amer/geosynthetics/products/pavement-solutions/tencate-mirafi-mpv/default.aspx