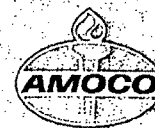
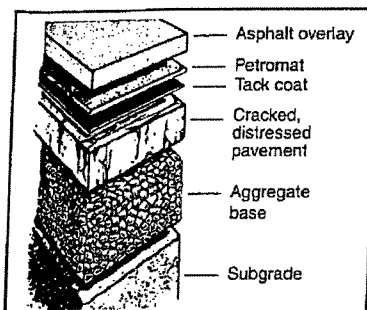


Petromat®

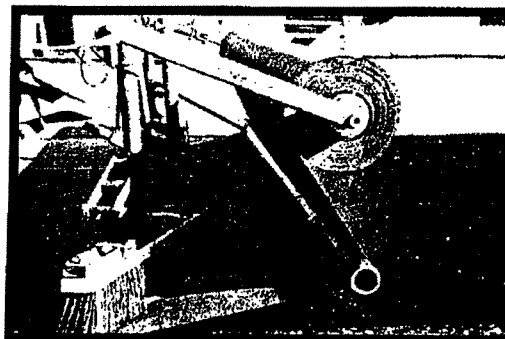


Introduction



The Amoco Petromat® System extends the life of new asphalt concrete (AC) pavements and AC overlays. The Petromat System consists of Amoco's Petromat non-woven polypropylene fabric which is field saturated with an asphalt cement tack coat. When placed between pavement layers, the Petromat system becomes an integral part of the roadway section, forming a barrier to water infiltration and absorbing stresses to reduce reflective and fatigue cracking of the new AC surface layer. Since 1965, the economical Petromat System has had an outstanding record of improving pavement performance while reducing maintenance and roadway

life-cycle costs. Paving fabric systems are currently being used at a rate of over 15,000 equivalent lane miles per year in North America alone.



Benefits

> Moisture Barrier

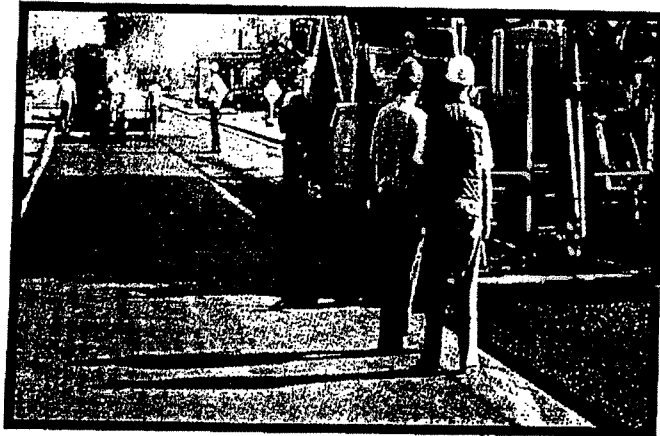
Function: The greatest source of damaging water in road structural sections is precipitation infiltration through pavements. Most pavements do not have adequate drainage systems to quickly remove infiltrated water. If a pavement base is saturated as little as 10% of the time, the useful life of that pavement will be reduced by 50 %. The Petromat fabric, when saturated with the asphalt cement tack coat, becomes a moisture barrier in the pavement, minimizing surface water infiltration. The American Association of Highway and Transportation Officials (AASHTO) 1993 flexible pavement design methodology gives a substantial structural credit to unbound roadbase materials when they are well drained and not allowed to become saturated. By minimizing water infiltration, the Petromat System moisture barrier will keep the road base more well drained and will therefore maximize the structural strength of unbound roadbase materials.



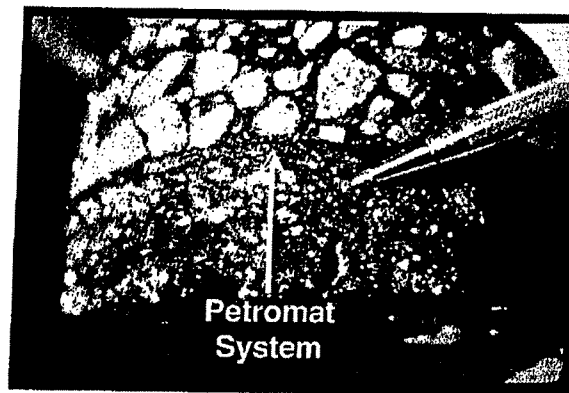
Amoco Fabrics and Fibers Company

A M O C O
G E O T E
S E L T

In rehabilitation of an existing pavement, capping the surface with the Petromat System can be a much more efficient and cost effective way to control moisture problems than retrofitting edge drain systems to typically poor draining road bases.



Performance: Both laboratory and field testing have shown pavements to be 10 to 1000 times less permeable when the Petromat System is incorporated as an interlayer. A complete treatise on the need for pavement moisture control and the effectiveness of paving fabric systems as moisture barriers may be found as a Transportation Research Board (TRB) Circular and is summarized as Tech Note 4 by Amoco Fabrics and Fibers Company. The circular, EC006, may be found on the TRB web site as an online publication at "<http://www.nas.edu/trb/publications/ec006.html>". Also shown in the referenced paper is the need for a uniform application of the proper amount of asphalt cement tack coat for the Petromat System to achieve the desired very low permeabilities.

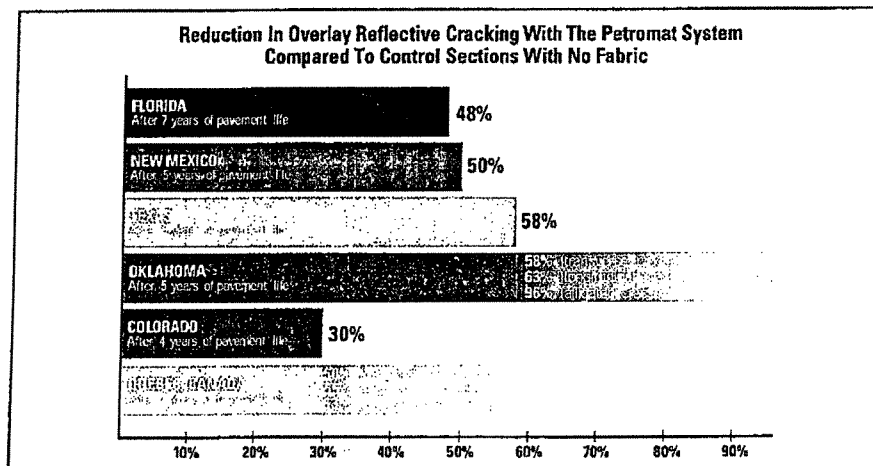


➤Stress Absorbing Interlayer

Function: Petromat paving fabric, saturated with asphalt cement, forms a substantial interlayer media within which stresses can be absorbed. Stresses associated with limited movement along cracks and joints in existing AC or Portland cement concrete (PCC) pavements are absorbed within the paving fabric system and therefore, are not translated, or reflected, up into the asphalt concrete layer over the system. If there is excessive movement of existing cracks or joints, there are more robust membrane interlayer products available, such as, Petrotac®, Pro-Guard®, or PetroGrid™, for pavement treatment.

Asphalt concrete flexible pavements will eventually develop fatigue cracking due to tensile stresses while flexing. The inclusion of the Petromat System interlayer results in a layered pavement with greatly reduced tensile stresses compared to monolithic pavements with no interlayer. The result is a dramatic increase in the fatigue life of new pavements or overlays.

Performance: Laboratory simulation of comparable pavements both with and without the Petromat System interlayer indicated a 100 to 300% increase in the number of pavement load applications before fatigue or reflective cracking appeared over the Petromat System. Field performance indicates a 50 to 150% increase in overlay life before fatigue or reflective cracking occurs in overlays over the Petromat System versus control sections with no fabric. A comprehensive study, Maxim Technologies (1997), which examined available paving fabric research and empirical evidence, concluded that properly applied paving fabric systems, such as the Petromat System, equate to an additional 0.1 to 0.15 foot (3 to 4.4 cm) thickness of AC overlay for the retardation of reflective cracking. The study, which can be viewed at "<http://www.gmanow.com/techdoc/doc1.html/docindex.html>", cited both the moisture barrier environmental benefits and the stress absorbing interlayer functions as the reasons for the success of paving fabric systems. Widespread field evaluations have verified the effectiveness of the Petromat System as shown below:



Petromat, Number One In The Business

Petromat, the original paving fabric, is the most widely used paving fabric in the world for the following reasons:

>Fabrics Designed Specifically For Pavement Application:

- a heat set side on top to minimize asphalt cement tack coat bleed-through and to protect against damage from construction traffic,
- a special blend of fiber sizes to promote rapid, uniform tack coat saturation and to give the interlayer stability while holding the asphalt cement in place indefinitely, and
- an engineered amount of stretch to ease installation while maintaining stability.



- **Choice of Styles:** Petromat styles 4598 and 4599 are the most widely recommended and used paving fabrics. Style 4598 meets the requirements of AASHTO guideline specification M-288-96.
- **Cost-effective:** The installed cost of the Petromat System (fabric and asphalt cement tack coat) is typically less than half the cost of 0.1 foot (3cm) of AC. For extending pavement life, the installation of the Petromat System is therefore much less expensive than placing additional asphalt concrete or increasing roadway maintenance. Use of paving fabrics generally yields a savings in pavement rehabilitation system costs of more than \$7,000 per lane mile.
- **Versatile:** The Petromat System is effective within new AC pavements, below AC overlays over rigid and flexible pavements, and below surface treatment (chip-seal) pavements. It can improve the performance of highways, city streets, parking areas, airport pavements, bridge decks and other pavement surfaces.
- **Made by Amoco:** A pioneer in the paving fabrics and geotextiles, Amoco provides customers with quality products, a wealth of technical information and assistance, and the nation's most extensive and knowledgeable distributor network. If you have any questions or need technical assistance, please call us at 800-445-SPEC (7732).

Installation

Detailed information on installation of Petromat paving fabrics can be found in the Amoco Petromat Installation Guide.

Published Reports

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State of Florida, *Reduction of Reflective Cracking in Bituminous Overlays, Payne's Prairie Experimental Project*, Florida Department of Transportation, Office of Materials & Research, Research Report 176-A, State Project No. 26260-8426, June 1977.

State of New Mexico, *New Mexico Study of Interlayers Used in Reflective Crack Control*, New Mexico State Highway Department, Research Report MB-RR-84/1, Sept. 1984.

State of Oklahoma, *The Evolution of Non-Woven Fabrics*, Oklahoma Department of Transportation, Research & Development Division, Report No. FHWA/OK 82(6), May 1982.

State of South Carolina, *Evaluation of Petromat When Used With Bituminous Surface Treatment*, South Carolina Department of Highways & Public Transportation, Research & Materials Laboratory, In-House Study 82-5, Dec. 1990.

State of Texas, *Overlay Construction and Performance Using Geotextiles*, Texas Transportation Institute, Texas A&M University System, Paper No. 880424, Jan. 1989.

State of Virginia, *Control of Reflection Cracking in a Fabric-Reinforced Overlay on Jointed Portland Cement Concrete Pavement*, Virginia Highway & Transportation Research Council, VHTC 83-R8, Aug. 1982.

City of Verdun, Quebec Canada, *Paving Fabric Repairs Road in Severe Canadian Climate*, Oct. 1995.

Maxim Technologies, Inc., *"Nonwoven Paving Fabrics Study" for Industrial Fabrics Association International*, Oct. 1997.
<http://www.gmanow.com/techdoc/doc1.htm/docindex.html>

Marienfeld, M.L. and Baker, T.L., *Paving Fabric Interlayer System as a Pavement Moisture Barrier*, Transportation Research Board Paper # 9881112, 1998.
<http://www.nas.edu/trb/publications/ec006.html>

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Amoco Fabrics and Fibers Company

260 The Bluffs
Austell, GA 30168
770-944-4569 800-445-7732
770-944-4584 - fax
email address: geotextiles@bp.com
<http://www.geotextile.com>

Part of the BP Amoco Group

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PAVING FABRIC GUIDE SPECIFICATION

DESCRIPTION This work shall consist of furnishing and placing an asphalt overlay geotextile (paving fabric) beneath a pavement overlay or between pavement layers to provide a moisture barrier membrane and a stress absorbing interlayer.

MATERIAL REQUIREMENTS

Paving Fabric: will be a staple fiber, needle-punched, nonwoven material consisting of at least 85 percent by weight polyolefins, polyesters or polyamides. The paving fabric shall be resistant to chemical attack, rot and mildew and shall have no tears or defects that will adversely alter its physical properties. The fabric shall be specifically designed for pavement applications and be heat-set on one side to reduce tack coat bleed-through and to minimize fabric pick-up by construction equipment during installation. The fabric shall meet the physical requirements specified in Table 1.

Tack Coat: The tack coat used to impregnate the fabric and bond the fabric to the pavement is typically the same grade asphalt cement as used in the hot mix asphalt. A cationic or anionic emulsion may be used as approved by the Engineer. The Contractor shall follow the recommendations of the paving fabric manufacturer when an asphalt emulsion is used. The use of cutbacks or emulsions that contain solvents shall not be permitted.

CONSTRUCTION AND INSTALLATION REQUIREMENTS*

Shipping and Storage: The paving fabric shall be kept dry and wrapped such that it is protected from the elements during shipping and storage. If stored outdoors, the fabric shall be elevated and protected with a waterproof cover. The paving fabric shall be labeled in accordance with ASTM D 4873-88, "Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls."

Weather Limitations: The air and pavement temperatures shall be at least 50°F(10 °C) and rising for placement of asphalt cement and shall be at least 60°F(16 °C) and rising for placement of asphalt emulsion. Neither asphalt tack coat nor paving fabric shall be placed when weather conditions are not suitable, in the opinion of the Engineer.

Surface Preparation: The pavement surface shall be dry and thoroughly cleaned of all dirt and oil to the satisfaction of the Engineer. Cracks 1/8" (3mm) wide or greater shall be cleaned and filled with suitable bituminous material or by a method approved by the Engineer. Crack-filling material shall be allowed to cure prior to placement of paving fabric. Potholes and other pavement distress shall be repaired. Repairs shall be performed as directed by the Engineer.

Tack Coat Application: The tack coat shall be applied using a calibrated distributor spray bar. Hand spraying, squeegee and brush application may be used in locations where the distributor truck cannot reach. Every effort shall be made to keep hand application to a minimum. The tack coat shall be applied uniformly to the prepared, clean, dry pavement surface. The asphalt cement tack coat application rate must be sufficient to saturate the fabric and to bond the fabric to the existing pavement surface. The tack coat application rate shall be 0.22 to 0.28 gallons per square yard (1.0 to 1.3 liters per square meter) as required by the roadway surface and environmental conditions. When using emulsions, the application rate must be increased as directed by the Engineer to offset the water content of the emulsion. Within street intersections, on steep grades or in other zones where vehicle braking is common, the normal application rate shall be reduced by about 20 percent as directed by the Engineer, but to not less than 0.20 gallons per square yard (0.9 liters per square meter).

The temperature of the tack coat shall be sufficiently high to permit a uniform spray pattern. For asphalt cements, the minimum temperature shall be 290°F(143 °C). To avoid damage to fabric, distributor tank temperatures shall not exceed 325°F(163 °C). For asphalt emulsions, the distributor tank temperatures shall be maintained between 130°F(55 °C) and 160°F(71 °C).

The target width of the tack coat application shall be equal to the paving fabric width plus 6"(15.2cm). Tack coat application shall be wide enough to cover the entire width of fabric overlaps. The tack coat shall be applied only as far in advance of paving fabric installation as is appropriate to ensure a tacky surface at the time of paving fabric placement. Traffic shall not be allowed on the tack coat. Excess tack coat shall be cleaned from the pavement.

Paving Fabric Placement: The paving fabric shall be placed onto the tack coat using mechanical or manual laydown equipment capable of providing a smooth installation with a minimum amount of wrinkling or folding. The paving fabric shall be placed before the asphalt cement tack coat cools and loses its tackiness. Paving fabric shall not be installed in areas where the overlay asphalt tapers to a minimum compacted thickness of less than 1.5"(3.8cm).

***Note:**

Additional instructions on paving fabric installation are available from Amoco Fabrics and Fibers Company in their Petromat® Installation Manual, which may be found at <http://www.geotextile.com>.