



GEOSYNTHETICS

**Asphalt Overlays
Chip Seals
Joint Repairs**

Pavement Solutions



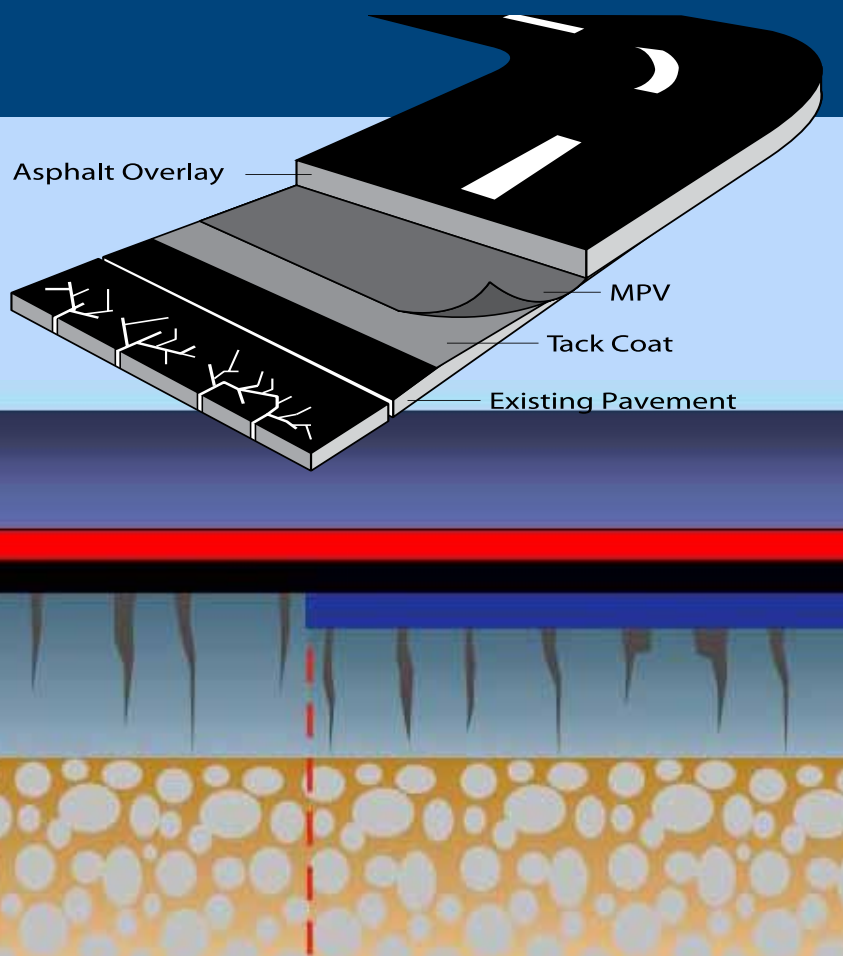
Pavement preservation and restoration applications have specific needs and objectives. No one understands that better than TenCate™ Geosynthetics.

Developed to increase performance, reduce costs and enable engineers to achieve what was once unachievable, TenCate™ Geosynthetics addresses the demands of both large-scale highway projects as well as smaller residential projects. Our interlayer products provide solutions to the most common problems of maximizing maintenance dollars, improving ride quality and reducing pavement deterioration.

Through engineering and research that span more than 50 years, TenCate™ Geosynthetics continues to lead the way in textile pavement preservation and restoration solutions.

Using our deep knowledge of materials and production methods, combined with a resourceful, hands-on approach, TenCate™ Geosynthetics delivers materials that make a tangible difference in our customer's businesses. Our products enable asphalt overlays, chip seals and joint repairs to last longer, stretching your maintenance dollars farther.

Regardless of the project type, the pavement being repaired or the design life of the pavement, TenCate™ Geosynthetics delivers the materials and knowledge that solve your maintenance challenges.



TenCate Geosynthetics Interlayer Solutions



Mirafi® MPV

Full-width, needle-punched, non-woven polypropylene paving fabric that is a stress-absorbing and waterproof interlayer when saturated with asphalt cement.



TruPave® Engineered Paving Mat

A robust fiberglass/polyester pavement interlayer designed to create a moisture-resistant barrier, retard reflective cracking and stand up to high-temperature hot-mix designs.



Mirafi® FGC

Paving grid composed of a fiberglass grid bonded to a nonwoven paving fabric that creates a waterproof interlayer as well as providing pavement reinforcement.



Mirafi® MTK

Waterproof, stress-absorbing, preformed, peel & stick composite strip membrane comprised of self-adhering rubberized asphalt and polypropylene non-woven fabric.



Mirafi® Pavement Solutions

The idea of waterproofing pavements and slowing reflective crack propagation in new and rehabilitated pavement structures has been around for years and can be seen in use today with asphalt overlays, chip seals, crack sealing and the use of modified asphalt binders. Our family of interlayer products takes these concepts one step further.

Textile pavement interlayer systems significantly increase the waterproofing benefits of conventional seals, and add additional reinforcing and/or stress-absorbing features to traditional reflective crack retardants.

Key features of geosynthetic interlayer systems:

- Reduces reflective cracking
- Reduces subgrade moisture infiltration
- Increases subgrade stability
- Increases asphalt strength
- Improves pavement strength

Key benefits of geosynthetic interlayer systems:

- Extends pavement life
- Reduces life cycle costs
- Extends pavement maintenance budgets

Mirafi® textile pavement interlayer system solutions are used as integral components in pavement applications such as:



Asphalt Overlays

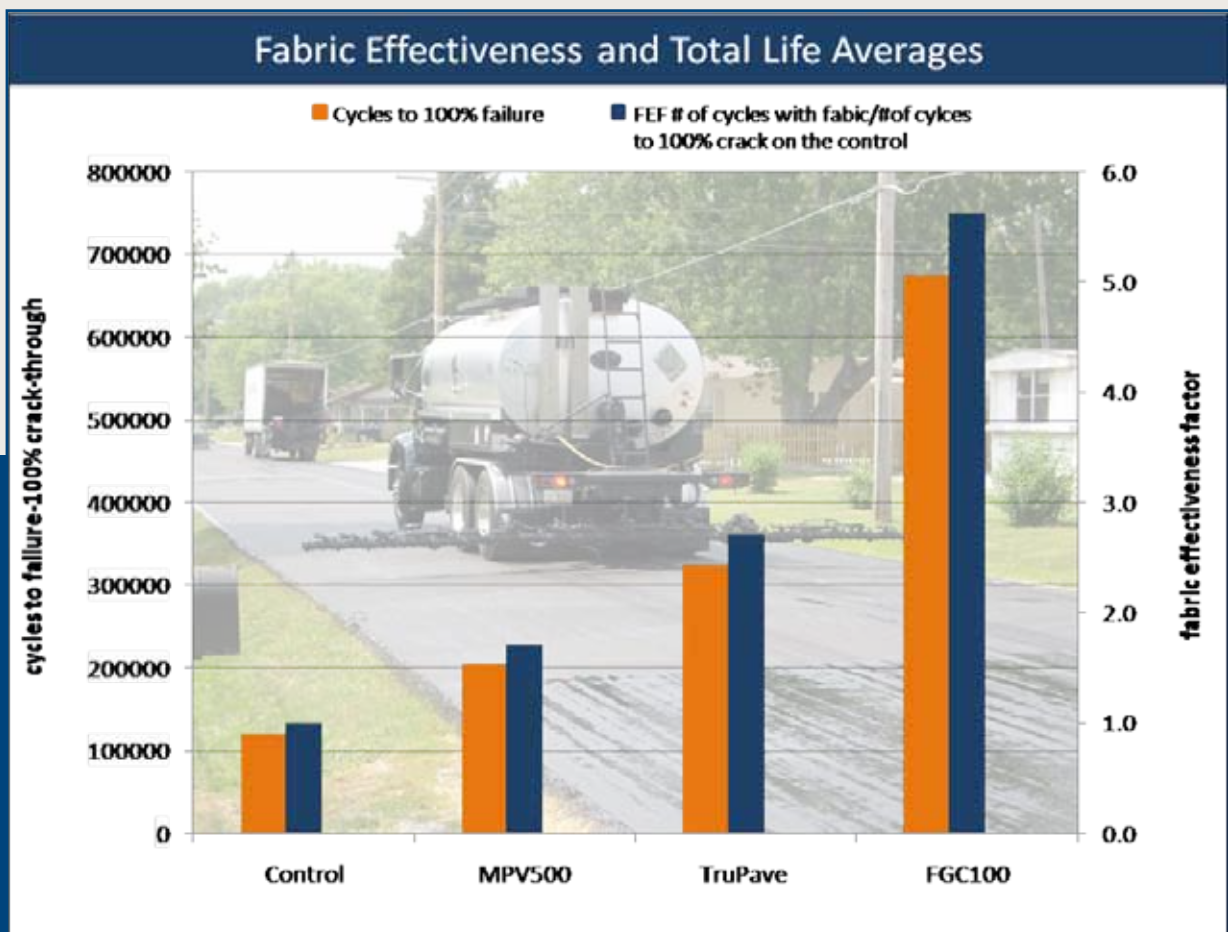
Chip Seals

Joint Repairs

TenCate™ Geosynthetics textile pavement interlayer system solutions cost significantly less throughout the life cycle of your pavement than conventional asphalt overlays and surface treatments. Their ease of use with climate specific asphalt binders and variety of strengths, widths, and asphalt retentions make them practical in all areas of the country in both large highway and small residential applications. They have proven performance when used over existing asphalt and concrete pavements and under asphalt overlays and chip seals.

How Interlayers Work:

- Reflective Crack Reduction interlayers reduce the number and dimensions of reflective cracks in an overlay by creating a stress-absorbing layer at the tip of an existing crack or by adding reinforcement and tensile strength at low strains to an asphalt overlay.
- Moisture Barrier interlayers prevent water from entering the subgrade through the pavement surface and cracks. This reduces the moisture content of the subgrade which increases the stability of the subgrade and reduces cracking and other pavement damage caused by wet subgrade conditions.
- Fatigue Reduction Reinforcement interlayers reduce a pavement's susceptibility to cracking by increasing the pavement's flexural strength at low strains.
- Interlayer products can be milled and recycled.



Interlayer Products under Asphalt Overlays

Reflective Crack Control, Waterproofing, Reinforcement

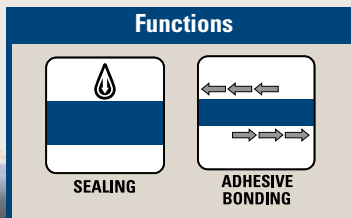
Cracked pavements allow surface water to infiltrate into subgrade soils, weakening the subgrade. A weak subgrade causes premature pavement failure. Asphalt overlays are often used as preventive maintenance before or as rehabilitation after the damage has occurred. TenCate™ Geosynthetics interlayer products provide solutions to reduce the potential for damage caused by surface water infiltration, reduce reflective cracking and add reinforcement to new overlays.

Key benefits of textile pavement interlayer systems:

- Provides a waterproof barrier for subgrade foundation soil protection.
- Creates a stress relieving membrane between the existing pavement and asphalt overlay.
- Retards the propagation of existing cracks through a new overlay (reflective crack control).
- Extends the useful life of the overlay.

Applications:

- Severe Climate Considerations: Freeze-thaw cycles cause expansion and contraction of water within a pavement. Laboratory and field studies have shown that a thicker interlayer may delay cracking longer than a thinner one in harsh environments. Thicker paving fabrics, such as Mirafi® MPV600 and Mirafi® MPV700 have higher asphalt retention, increasing the ability to absorb the crack tip stress and enhance waterproofing capabilities.
- Asphalt Overlays: Mirafi® MPV Series paving fabrics have been used successfully with innovative mix designs such as SUPERPAVE, stone matrix asphalts, rubber asphalt, Warm Mix Asphalt (WMA) and polymer modified mixes.
- Surface Preparation: Mirafi® MPV can be used over existing asphalt and concrete surfaces.



Case Study

application	Commercial Street Asphalt Overlay
location	Pennsylvania Ave., Washington D.C.
products	Mirafi® MPV700

When it became necessary to overlay Pennsylvania Ave. in Washington D.C. for the 2009 Presidential Inauguration Mirafi® MPV500 was chosen to be installed to improve the service life and performance of the new asphalt overlay.

The project was performed at night due to the heavy volume of traffic on Pennsylvania Ave. during the daytime and was installed over three consecutive nights. The tight construction schedule dictated that all phases of the construction operation perform without delay.

The construction process consisted of three phases: milling up the existing pavement, installation of the Mirafi® MPV500 and finally the new asphalt overlay. After the pavement was milled, PG64-22 asphalt cement was applied to the milled surface at a rate of .25 galyd2. MPV500 was installed over the AC tack coat and was directly followed by 2" of new asphalt pavement. MPV500 extends pavement life by providing a waterproof barrier, retarding reflective cracking and creating a stress relieving membrane between the existing and new pavement layers.

Interlayer Products under Chip Seals

Reflective Crack Control, Waterproofing, Chip Retention

Mirafi® MPV is also successfully used with chip seal surface treatments to improve pavement performance. A fabric interlayer, comprised of a Mirafi® MPV Series paving fabric and an appropriate tack coat, installed between an existing asphalt pavement and a chip seal is proven to extend the life of chip seals from 60 to 100%.

The key component of successful chip sealing over fabric is a quality installation on the right pavement at the right time. TenCate™ Geosynthetics paving fabric interlayers can be used under chip seals almost anywhere a conventional chip seal can be used.

At TenCate™ Geosynthetics, we take a hands-on, active approach to every project. Our industry experts are available to help you determine where using paving fabric interlayers in your chip seal program will give you the most performance and cost benefits.

TenCate™ Geosynthetics has the largest and most experienced paving fabric installer network in the industry. They are available for project quotes and installations in most areas of the U.S. If you use your own crews for in-house chip seals, our experts are also available for training.

Key benefits of textile pavement interlayer systems under chip seals:

- Increases chip seal life by 60-100%
- Prevents surface water infiltration
- Allows wet subgrade to dry out and strengthen
- Eliminates reflective cracking in chip seal
- Increases chip retention
- Reduces the frequency of maintenance rehabilitation
- Reduces the effects of thermal expansion and contraction



Case Study

application	Pavement Restoration with Chip Seal
location	Martin St., Newton, IL
products	Mirafi® MPV500

The existing seven-year-old asphalt pavement surface of Martin Street was heavily oxidized starting to show signs of fatigue cracking. The city chose to use Mirafi® MPV500 paving fabric in addition to their normal chip seal procedure. Mirafi® MPV500 acts as a moisture barrier within the pavement and prevents water from penetrating the roadway, which reduces the deterioration of the subgrade due to saturated conditions.

PG-64-22 asphalt cement (AC) was applied to the existing pavement surface at a rate of 0.79 l/m² (0.25 gal/yd²). AC placement was directly followed by the installation Mirafi® MPV500. RC-70 asphalt emulsion was applied to at a rate of 0.79 l/m² (0.25 gal/yd²). The chip seal aggregate, which consisted of a CA-16 graded crushed stone material, was then applied using a variable width spreader at a rate of 20 lb/yd². After the chip seal was placed, a second application of RC-70 and crushed stone was applied. The final step was to compact the finished road surface with a rubber-tired (pneumatic) roller compactor.

Products

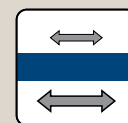


Mirafi® MPVCS

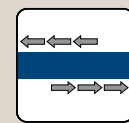
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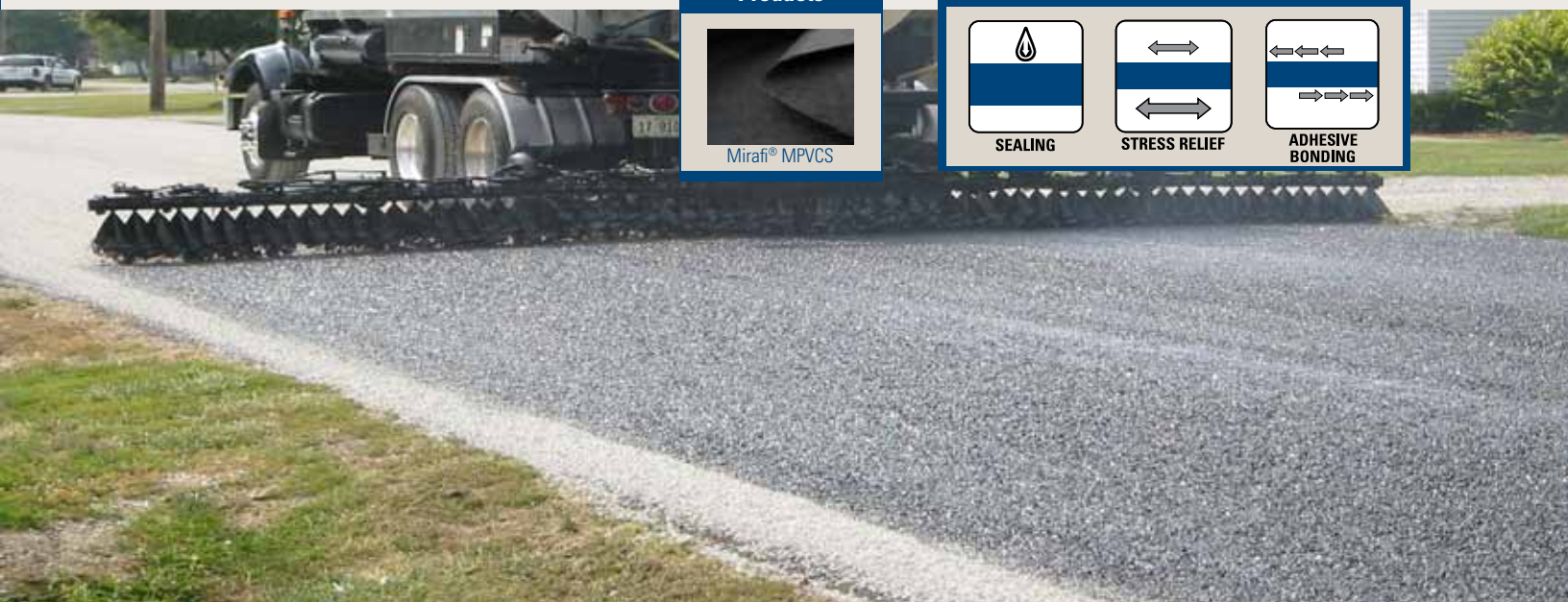
SEALING



STRESS RELIEF



ADHESIVE BONDING



TruPave® Engineered Paving Mat

Reflective Crack Control, Waterproofing

TruPave® Engineered Paving Mat from Owens Corning is a pavement interlayer designed to create a moisture-resistant barrier, retard reflective cracking and stand up to high-temperature hot-mix designs. And at the end of the pavement's life, it's millable and recyclable. The result of these benefits? TruPave® engineered paving mat can extend the performance of your pavement rehabilitation investment by up to 500 percent.

TruPave®'s unique, nonwoven, randomly dispersed fiberglass construction process, gives your pavement 360 degree tensile reinforcement. Because pavements crack in all directions, the forces that cause cracking can be curtailed with the addition of TruPave® in your pavement overlay application. Highway, parking lot, runway or driveway - TruPave® Engineered Paving Mat is designed to preserve and extend the life of any hot-mix asphalt concrete surface.

Key benefits of TruPave® Engineered Paving Mat:

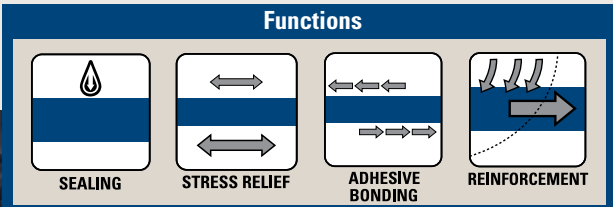
- Millable and recyclable: TruPave® will breakdown under milling operations due to the unique use of fiberglass and polyester fibers; it is perfect for use in recycled asphalt paving mixes for sustainability and reducing the carbon footprint of producing virgin asphalt mixes and conventional pavement removal techniques.
- Improves fatigue resistance in flexible pavements: Laboratory testing proves that TruPave®'s high tensile strength improves flexural pavement performance under loading.
- Helps to reduce the long-term maintenance and rehabilitation costs associated with pavements.
- Withstands the higher temperatures of today's hot mix asphalt paving mixes.



Case Study

application	Crack Retarding
location	Winston Salem, NC, USA
products	TruPave® Paving Mat

North Carolina Department of Transportation (NCDOT) had a 2 mile section of US52, where they wanted to find a way to retard reflective cracking over an existing Portland Cement Concrete (PCC) pavement that had previously been overlaid with a Hot Mix Asphalt (HMA). The joints from the old PCC pavement had reflected back through rather quickly, creating transverse and longitudinal cracking in the overlay. There was also major block cracking in the existing HMA. TruPave® Paving Mat was able to extend the life of their overlay. The paving mat tack coat (PG64-22) was placed at the specified rate and then the TruPave® Paving Mat was placed. Over the last four years, the control section has continued to deteriorate while the TruPave® Paving Mat section is only now starting to see typical top down cracking that most asphalt pavements experience.



Paving Fabric Interlayer with a Modified Asphalt Binder

Reflective Crack Control, Waterproofing

Heavier fabrics ($\geq 6\text{oz / Yd}^2$) have shown to have a greater ability to retard reflective cracking than conventional 4oz/ Yd² paving fabric. Polymer modified liquid asphalt has proven its ability to improve the performance of hot mix asphalt pavements. The combination of a modified liquid asphalt binder and a heavier paving fabric have been proven to increase pavement life in colder regions where pavement environments are harsh. The polymer modified liquid asphalt/paving fabric interlayer system has shown superior performance using polymer modified asphalt binders.

There is a limit as to how many times a pavement can withstand flexural loading before cracking. An overlay in combination with Mirafi's paving interlayers installed with a polymer modified binder can withstand a higher number of vehicular loadings, improving a pavements overall service life and performance even under today's heavy traffic loads.

Key benefits:

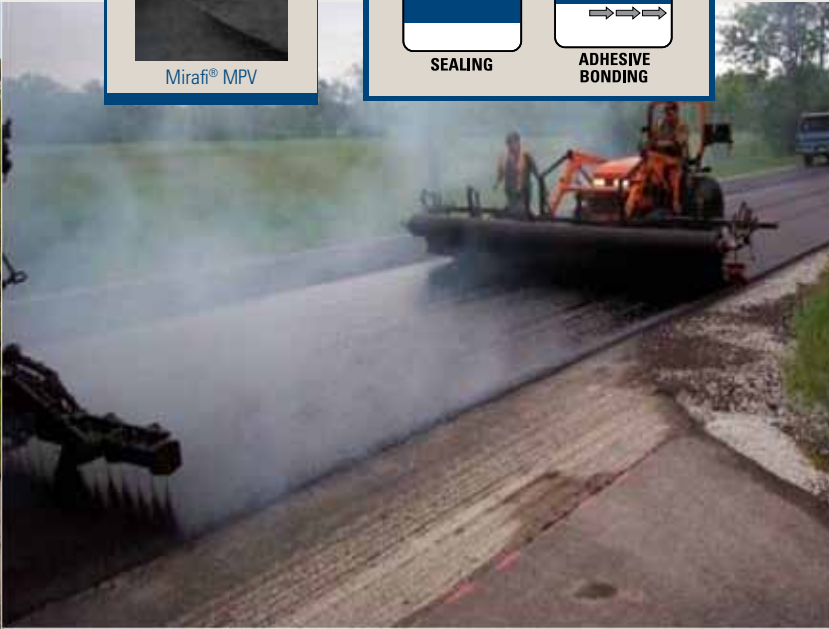
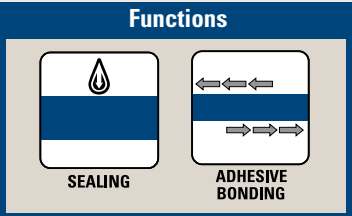
- Increased life in cold climate
- Improved resistance to reflective cracking
- Moisture barrier
- Longer service life



Case Study

application	Residential Street with Utility Restrictions
location	Kensington St., Schaumburg, IL
products	Mirafi® MPV700 & PG 70-16

The pavement of this street was highly distressed and required a thick pavement section to restore its condition and delay reflective cracking. Because of utility restrictions it was not practical and was too expensive to specify a thick overlay. Mirafi® MPV 700 overlay fabric was selected with a modified asphalt binder to reduce reflective cracking and seal the pavement in this cold environment project with (2 in) of IDOT hot mix asphalt. Construction started with a leveling course to fill in the irregular surfaces. Next a polymer modified asphalt tack coat PG 70- 26 modified with an SBS polymer was spread at a rate of .32gal/yd². MPV700 overlay fabric was then placed in the binder. The pavement overlay consisted of 5 cm (2 in) of IDOT hot mix asphalt.



Asphalt Overlay Reinforcement

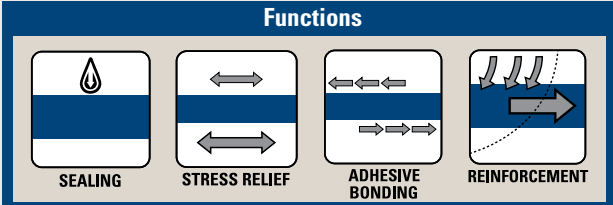
Waterproofing, Reinforcement

Mirafi® FGC paving grids are composed of a fiberglass grid that is bonded to a nonwoven paving fabric meeting AASHTO specifications. Mirafi® FGC paving grid products are specifically designed for use in the construction and repair of flexible (asphalt) and rigid (concrete) pavements such as roads, parking lots, airfields, and other paved surfaces.



Key benefits of Mirafi® FGC Paving Grid:

- Provides a waterproof barrier for subgrade foundation soil protection
- Improves the fatigue resistance of the new overlay to traffic loads by providing reinforcement through the use of high strength fiberglass, extending pavement performance and the overall life cycle of the pavement.
- Retards the propagation of an existing crack through the new overlay (reflective cracking)



Cracked pavements allow surface water to permeate to the subgrade soils, which then saturate and weaken the subgrade. Typical maintenance procedures using nonwoven paving fabric are to install these fabrics with an asphaltic tack coat and hot mix asphalt overlay. The addition of the fiberglass grid to the paving fabric with high tensile modulus, gives Mirafi® FGC paving grid the ability to reinforce the pavement by improving the flexural strength and enhance the performance of the pavement.



Mirafi® FGC paving grid is specifically designed to provide high strength at very low strains (less than 2% strain). This material property, commonly referred to as *modulus*, is the key to adding reinforcement to your paved structure. The nonwoven paving fabric, grid and properly applied asphalt tack coat will ensure moisture protection and provide outstanding pavement reinforcement and enhance pavement stability.



Self-Adhering Waterproofing Membranes

Waterproofing, Reflective Crack Control

As a pavement ages, imperfections appear, joints become prominent and cracks occur, allowing water to infiltrate into and weaken the subgrade causing even more damage to the pavement. Asphalt overlays are commonly used over asphalt and concrete surfaces to lengthen the life of the pavement and reduce the effects of aging, saturated subgrade and fatigue. Eventually, the process will repeat itself, as cracks and joints reflect through the new overlay.

Mirafi® MTK is a preformed composite membrane designed specifically to prevent water from permeating into joints and large cracks and to minimize the number and size of reflective cracks. Mirafi® MTK is used to seal concrete and wood bridge decks. Mirafi® MTK products are comprised of self-adhering rubberized asphalt and durable polypropylene non-woven fabric. A *peel-n-stick* release paper makes installation fast and simple.



Applications

- Highway and street surfaces
- Transverse and longitudinal cracks
- Concrete joints
- Lane-widening joints
- Taxiways and runways
- Bridge deck restoration

Benefits

- Reduces further structural decay
- Easy and inexpensive to install
- Can be installed in a wide range of temperatures
- Reduces traffic disruption
- Minimizes reflective cracking when bridging transverse and longitudinal cracks
- Minimizes reflective cracking between dissimilar surfaces
- Minimizes reflective cracking of concrete joints
- Prevents surface moisture intrusion
- Provides stress-relief layer to pavement section
- Sticks to concrete, asphalt and wood decks

Products

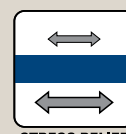


Mirafi® MTK

Functions



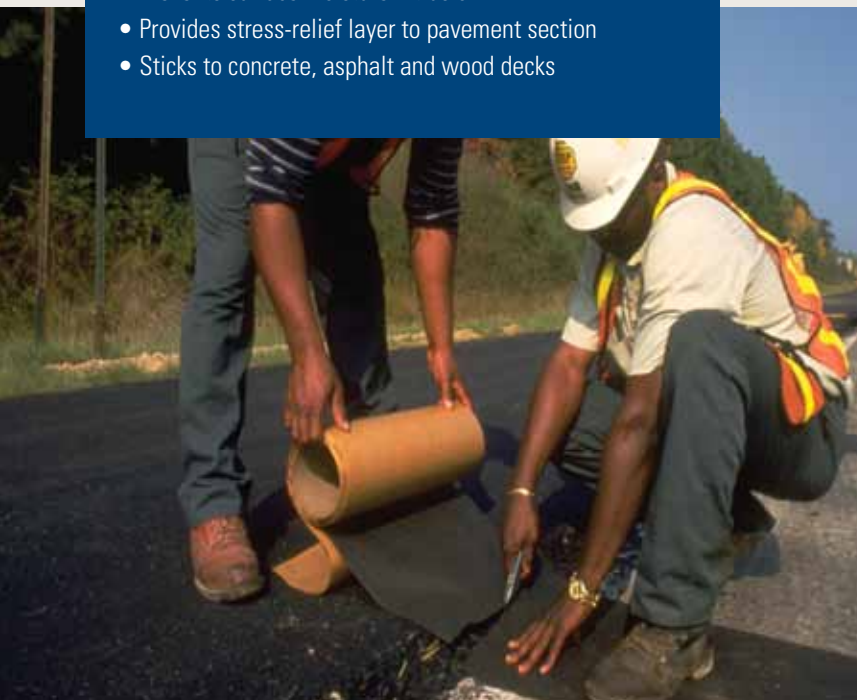
SEALING



STRESS RELIEF



ADHESIVE BONDING



TenCate™ Geosynthetics North America develops and produces materials that increase performance, reduce costs and enable people to achieve what was once unachievable. Our goal is to contribute significantly to progress in the industries in which we work.

Features and Benefits	TenCate Paving Products									
	Mirafi® MPV					Mirafi® FG & FGC			TruPave® Engineered Paving Mat	Mirafi® MTK
	400	500	600	700	MiraGreen® HD	FG100	FGC100	FG200		
 SEALING	✓	✓	✓	✓	✓		✓		✓	✓
 STRESS RELIEF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
 ADHESIVE BONDING	✓	✓	✓	✓	✓		✓		✓	✓
 REINFORCEMENT						✓	✓	✓	✓	✓

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 **TENCATE**
materials that make a difference