

ASPHALT REINFORCEMENT

REINFORCING ASPHALT WITH INTERLAYERS



» Tensor® asphalt reinforcement applications – innovative, simple and technically sound.



Helping You Deliver Increased Value from Your Roads Maintenance Budget

With over 30 years of pavement reinforcement experience, Tensor's asphalt reinforcement solutions have demonstrated that they deliver increased service life, and thereby save money over the life of the pavement. Tensor's solutions provide better cost savings over traditional methods to achieve the same level of performance or better.

Tensor's solutions comprise a range of interlayer products which have been successfully installed in many countries and in a range of climates.

Tensor offers you a solution to suit the conditions and requirements of your project. Tensor asphalt reinforcement products have been designed to address both structural and functional pavement performance issues such as fatigue cracking and reflective cracking. Tensor's reflective cracking solutions address composite pavement point cracks, thermal cracks, block cracks, oxidation and aging cracks, fatigue crack initiation, and lane widening cracks.



Common structural pavement problems, surface rutting, fatigue and reflective cracking can be addressed by Tensor asphalt reinforcement products.



Rely on Experience for Your Projects

TENSAR PROJECT SERVICE

Tensar is your partner with the necessary experience and competence to provide a customised service that meets the specific requirements for your project. We develop efficient and economical solutions that suit your individual needs. Our staff and installation partners are happy to assist you in all areas covering technical, design assistance and construction support.

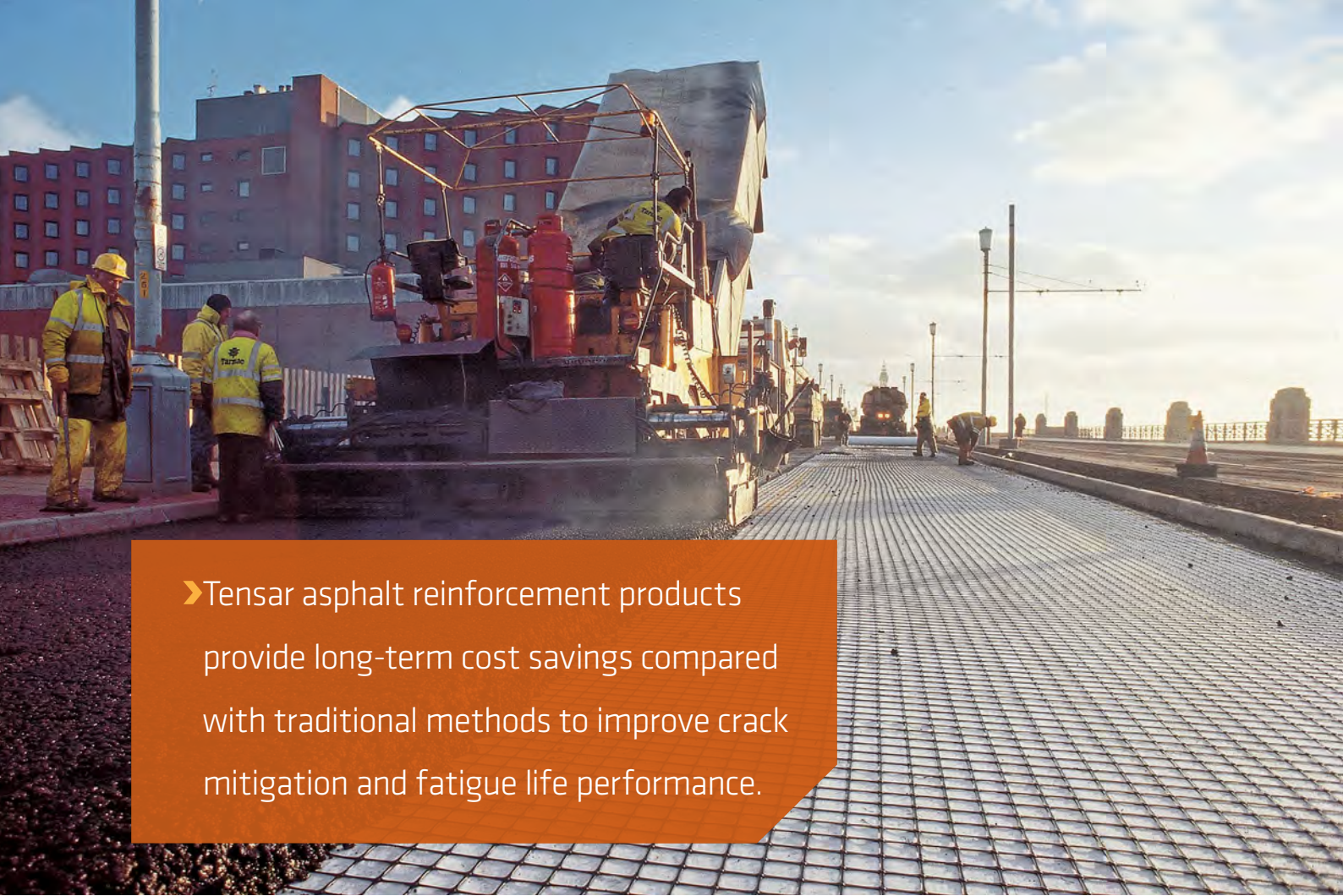
FROM THE CONCEPT STAGE TO FINAL CONSTRUCTION, WE OFFER YOU THE FOLLOWING RANGE OF SERVICES

- ▶ Technical advice on interlayer products and applications
- ▶ Application suggestion for specific pavement distress types
- ▶ Application suggestions for unique pavement types and loadings
- ▶ Customised information and training programmes on product selection, specification development, or installation

YOUR BENEFITS:

By selecting the appropriate Tensar solution, proven benefits can include:

- ▶ Reduced reflective and fatigue cracking
- ▶ Reduced rutting
- ▶ Extended pavement structural life
- ▶ Initial and long-term cost savings compared with traditional rehabilitation methods
- ▶ The optimal interlayer type for the solution due to our diverse range of interlayer products
- ▶ Large network of specialist installers and distributors



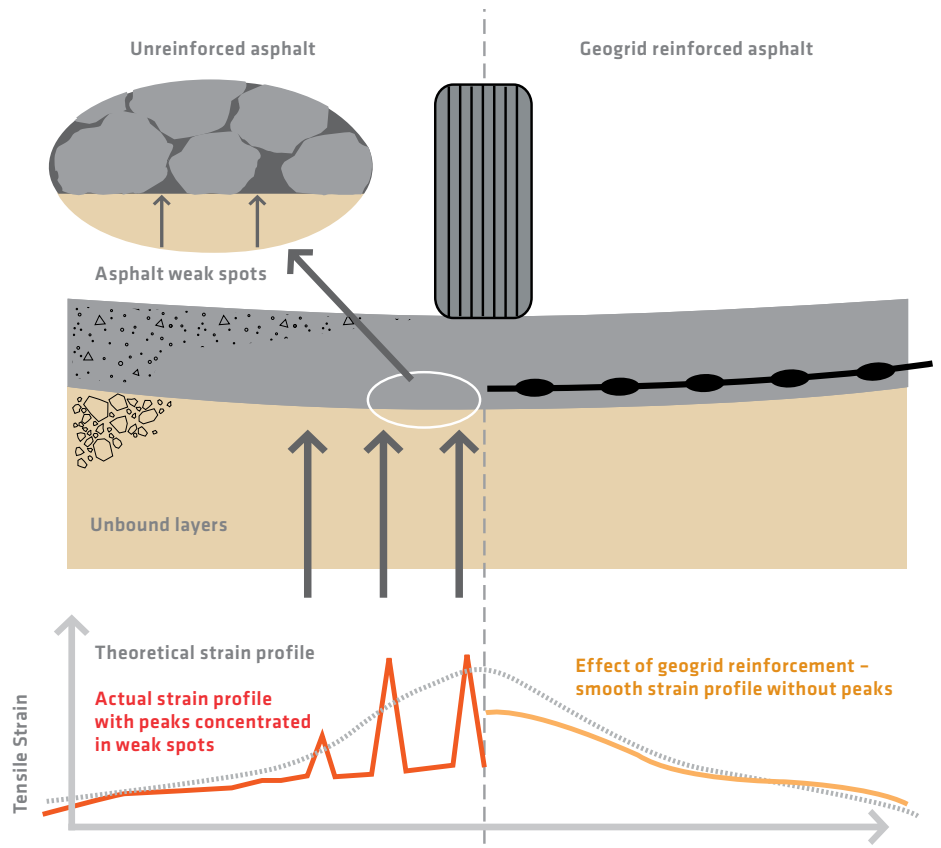
➤ Tensor asphalt reinforcement products provide long-term cost savings compared with traditional methods to improve crack mitigation and fatigue life performance.

Reinforced Asphalt Overlay Applications

FATIGUE LIFE EXTENSION

In a reinforced asphalt layer, the Tensor AR geogrid interlayer will delay the development of fatigue microcracking by absorbing traffic induced strain. The geogrid interlayer will either increase the fatigue life performance of the asphalt layer, or will allow the asphalt thickness to be reduced to achieve equivalent performance.

Geogrids help control the development of peaks in strain at the bottom of the asphalt layer.

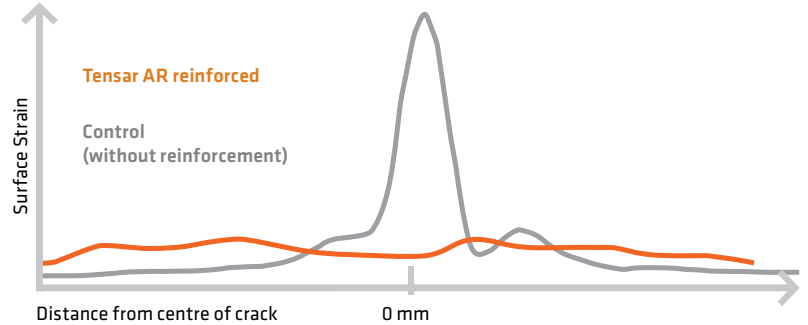
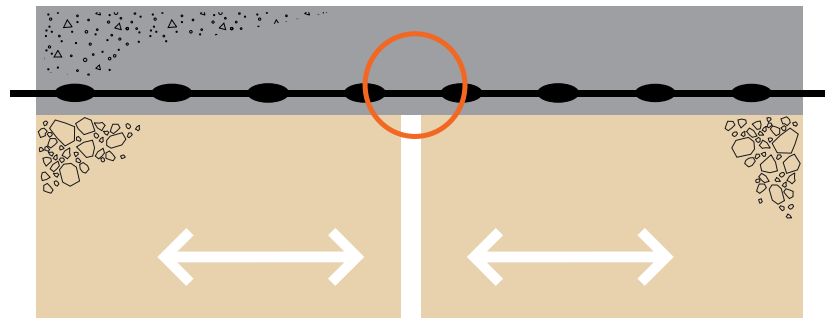


THERMALLY INDUCED REFLECTIVE CRACKING

Thermal reflective cracking in pavements is caused by daily or seasonally peak tensile strains that occur over existing thermal cracks in the underlying layers. Independent research at the University of Nottingham has demonstrated that Tensar geogrid reinforcement protects the tensile weak asphalt layer from the thermally induced tensile strains, controlling thermally induced reflective cracking.

The University of Nottingham* thermal crack simulation apparatus was used in this investigation. Two concrete slabs, each 1 metre long by 200 mm wide, mounted on a mechanical device allowing for variable displacement between the slabs were used to perform the tests. The asphalt layer to be tested is built directly on the concrete frame. Thermal cracking is simulated by driving the two slabs apart from each other, therefore inducing tensile stress into the overlying asphalt. In this test, strain gauges were positioned with or without Tensar AR reinforcement.

Thermally induced reflective crack testing was carried out at -5°C and a crack movement amplitude of 2 mm.



Peak strains in the asphalt overlay are mitigated by the inclusion of Tensar AR geogrid, resisting the development of thermally induced reflective cracking.

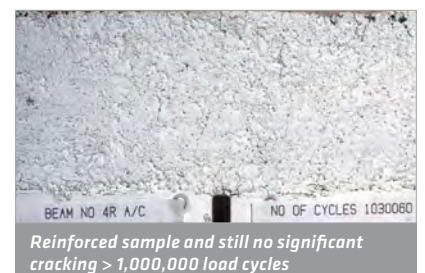
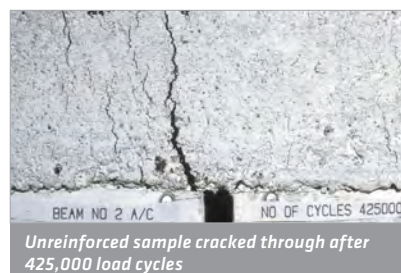
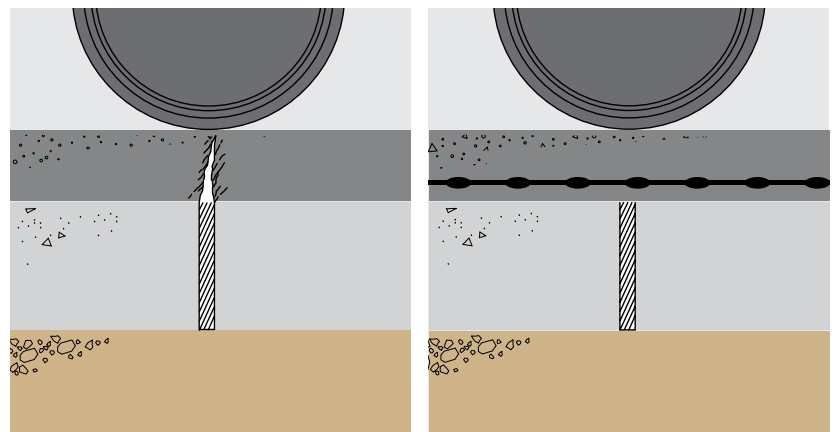
INDEPENDENT VALIDATION

Tensar AR and Tensar Glasstex have been tested and rated as “very effective” by the Autun LRPC (Laboratoire Régional des Ponts et Chaussées) laboratory, France.

TRAFFIC INDUCED REFLECTIVE CRACKING

Asphalt overlays over cracked surfaces will fail prematurely due to traffic induced reflective cracking. Tests conducted at the University of Nottingham* showed that Tensar AR geogrids control traffic induced reflective cracking, greatly extending the life of the pavement.

A cyclic composite beam test was used to measure the performance of an asphalt layer subjected to cyclic loading on a cracked substrate. The crack was simulated by mounting the asphalt slab onto two plywood boards, which rest on a rubber pad. A cyclic load is then applied on the top of the asphalt layer and crack development recorded versus the number of loading cycles.



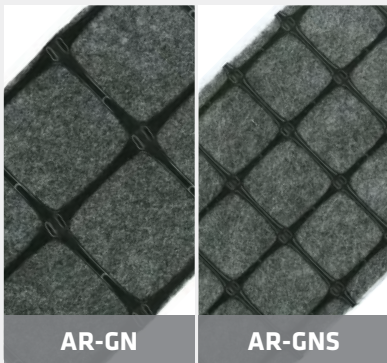
Inclusion of Tensar AR geogrid inhibits the development of reflective cracking.

*Source: Brown et al, The Use of Polymer Grids for Improved Asphalt Performance and Brown et al, Polymer Grid Reinforcement of Asphalt.

Tensor Asphalt Reinforcement Products

Tensor provides products within three categories of asphalt reinforcement:

Composite Grid Interlayers

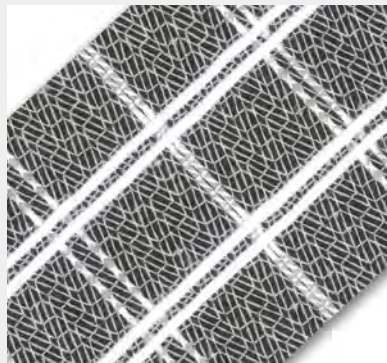


TENSAR AR-G

AR-G is a composite interlayer comprising a punched and stretched polypropylene geogrid thermally bonded to a fabric backing. The fabric backing facilitates installation and provides a long-term sealing effect -once saturated with bitumen. Owing to the 3-dimensional geometry of the geogrid, the new asphalt layer is mechanically interlocked into the geogrid's wide apertures, thus providing reinforcement, stress relief and sealing functions.

AR-GN is a large aperture composite, typically used at a lower structural level, under base course and binder course layers.

AR-GNS is a standard aperture composite, typically used at a higher structural level, under binder course and surface course layers.



TENSAR GLASSTEX®

Glasstex is a composite interlayer comprising a grid of glass filament bundles stitch bonded to a non-woven fabric. The high modulus glass filaments provide high absorption of stress at low strains. After being saturated with bitumen the fabric performs a sealing function. Glasstex provides reinforcement, stress relief and sealing functions.



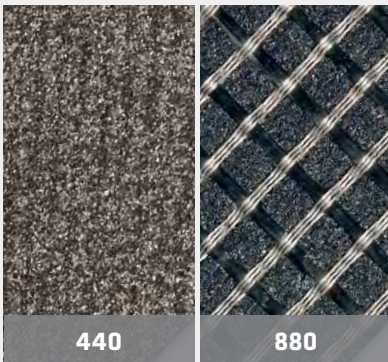
TENSAR GLASSTEX® GRID RN

GlasstexGrid RN is a composite interlayer comprising a glass yarn grid stitch bonded to a lightweight backing fabric. The high modulus glass filaments provide high absorption of stress at low strains. The lightweight backing fabric is only present to assist with adhesion during installation and subsequently permits intimate contact between overlying asphalt and the underlying surface.

Asphalt Reinforcement Product Selection Guide

	BS EN 15381:2008 Reinforcement function only Asphalt bonds directly through the grid apertures with the pavement layer below (lightweight fabric for installation only)	BS EN 15381:2008 Reinforcement, stress relief and interlayer barrier Grid is augmented by fabric/bitumen membrane interlayer as water barrier and/or stress relief
High profile products For absorption of stress at high strains. Stretched polypropylene grids have deep ribs and stiff integral junctions for optimal mechanical interlock.		AR-GN & AR-GNS
Low profile products For absorption of stress at low strain and ease of installation under surfacing.	GlasstexGrid RN	Glasstex® P50, P100 & P200 Glasstex®Patch™ 440 & 880
Paving fabric Providing an interlayer barrier and absorption of stress relief at low strain, for use under surfacing and in conjunction with double surface dressing systems.		PF1.1

Mastic Interlayers



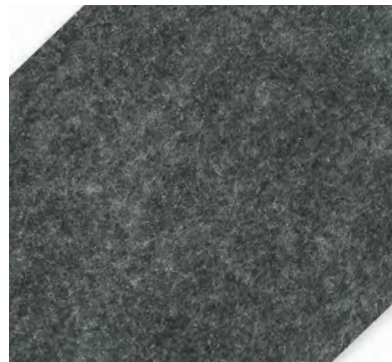
TENSAR GLASSTEX®PATCH™

GlasstexPatch 880 consists of a glass yarn grid combined with a polymer modified bitumen membrane. The underside of the GlasstexPatch 880 includes an adhesive coating, while the upper side is treated with a protective layer of quartz sand. The adhesive layer is protected during storage by a peel-off release film.

GlasstexPatch 440 consists of a polymer modified bitumen membrane that is treated on the surface with a quartz sand, and the underside is coated to protect the product for storage and handling.

GlasstexPatch does not require specialist installation and can be affixed to most sound substrates using the adhesive coating on the GlasstexPatch 880 product, or alternatively can be installed by heat activating the GlasstexPatch 440 product using a flame torch.

Paving Fabric Interlayers



TENSAR PAVING FABRIC PF1.1

Tensar Paving Fabric is a high-quality needle-punched non-woven polypropylene geotextile that, when installed on a bituminous bond coat, performs as a stress absorbing membrane interlayer (SAMI) and therefore due to its ability to absorb crack movement without itself cracking, will be an effective moisture barrier.

Tensar Paving Fabric has a high elongation and therefore easily follows the contours of the underlying surface. This enables the fabric to be installed on milled surfaces and for roads with difficult alignments.

Need guidance on product selection? Please contact Tensar to request our most recent Product Selection Guide. We will be happy to discuss your project and provide application suggestions.



Installation of GlasstexGrid RN is straightforward.

Tensar asphalt reinforcement can be installed either manually or using a dedicated mechanical installation device.



Tensar AR-GN bonds well on to the underlying surface to allow paving directly over the grid.



GlasstexPatch 880 can be applied to most sound substrates utilising the adhesive coating.



A simple overlap joint for Tensar Glasstex. Refer to installation guidelines for specific overlap instructions.



Mechanical installation of Tensar Glasstex is fast and efficient – an experienced crew can install up to 12,000m² per day, per tanker.



Paving takes place directly over the Tensar AR-GN



GlasstexPatch 880 can be applied where localised treatment is needed for the control of reflective and fatigue cracking.



Tensar AR-GN can provide resistance to fatigue cracking and minimise fracturing due to long-term differential movements in the subgrade.



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EMS 86463
ISO 14001:2004

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Contact Tensar or your local distributor to receive further literature covering Tensar products and applications.

Also available on request are product specifications, installation guides and specification notes.

The complete range of Tensar literature consists of:

- ▶ **Tensar® Geosynthetics in Civil Engineering**
A guide to products, systems and services
- ▶ **Subgrade Stabilisation**
Stabilising unbound layers in roads and trafficked areas with a Tensar MSL
- ▶ **Pavement Optimisation System**
Improving the structural performance of whole pavements with a Tensar MSL
- ▶ **Asphalt Pavements**
Reinforcing asphalt layers in roads and trafficked areas
- ▶ **TensarTech® Earth Retaining Systems**
Bridge abutments, retaining walls and steep slopes
- ▶ **Railways**
Mechanical stabilisation of track and sub-ballast
- ▶ **TensarTech® Plateau™**
Load transfer platform system over piled foundations
- ▶ **Basal Reinforcement**
Basetex high-strength geotextiles
- ▶ **TensarTech® Stratum™**
Cellular foundation mattress system for foundations with controlled settlement
- ▶ **Tensar® Erosion Control**
A guide to products and systems