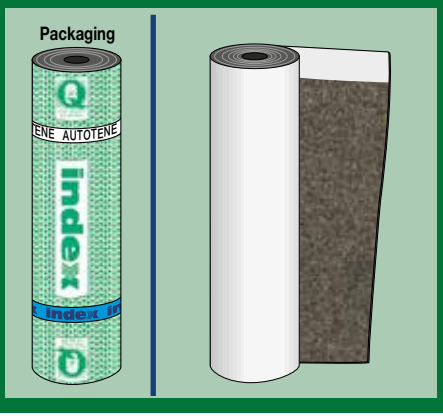
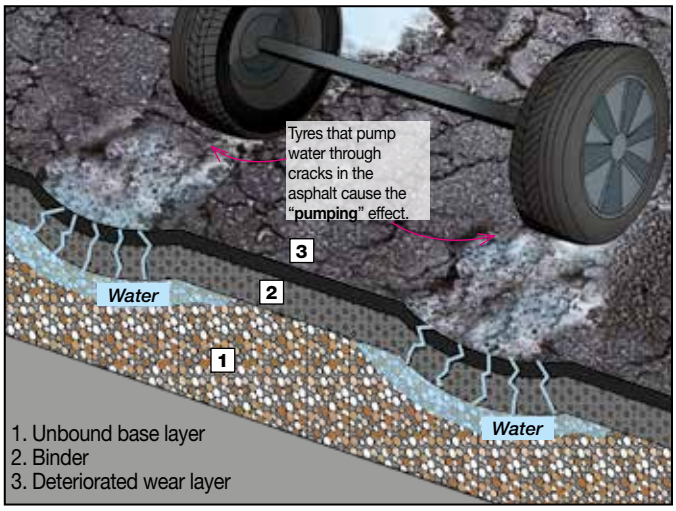


AUTOTENE ASFALTICO ANTIPUMPING HE/TVP

ANTIPUMPING ELASTOMERIC POLYMER BITUMEN THERMALLY-SELF-ADHESIVE MEMBRANE WITH COMPOSITE REINFORCEMENT MADE UP OF A HIGH RESISTANCE GLASS FABRIC AND NON- WOVEN POLYESTER FABRIC FOR THE STRENGTHENING AND WATERPROOFING OF ASPHALT CONCRETE FOR ROADS, TO BE LAID HOT

CATEGORY	CHARACTERISTICS		ENVIRONRMENTAL							METHOD OF USE	
HE S		SUPER ADHESIVE		ASBESTOS FREE	TAR FREE	CHLORINE FREE					
SPECIAL ELASTOMERIC FOR SPECIFIC USES	WATERPROOF	SUPERADHESIVE	ECO GREEN	ASBESTOS FREE	TAR FREE	CHLORINE FREE	RECYCLABLE	NON DANGEROUS WASTE	EXHAUSTED OIL FREE	INDIRECT HEAT APPLICATION	TORCH APPLICATION

1 PROBLEM



HOW TO EXTEND THE EFFECTIVE LIFETIME OF ROAD PAVING

The continuous increase in road traffic leads to the inevitable deterioration process of the road network infrastructure and serious maintenance problems. Cracks in road paving cause rainwater to pass through into the unbound layers of foundation. Due to the pumping phenomenon generated by traffic, the fine grained parts are removed by rainwater, leading to a progressive collapse.
Simple repairs with a new layer of asphalt do not solve the problem, which soon occurs again, hence a useless waste of time and resources. National legislation in force attributes precise personal, civil and criminal responsibility to provincial, municipal and motorway managers regarding accidents that occur on their roads, respectively, due to poor or lack of road maintenance. This leads to a huge increase in insurance costs for the responsible bodies, hence the interest in diluting maintenance costs over longer time periods.
To extend the effective lifetime of the road paving it is necessary to reinforce the bound layers in order to increase the load-bearing capacity and, at the same time, insert a waterproof and watertight layer which prevents water passing through, stopping the consequent pumping phenomenon.

2 SOLUTION

The constant growth in road traffic inevitably leads to the deterioration of road paving. Major maintenance problems caused as a consequence have become a real emergency in view of the associated repercussions in terms of money and road safety.

Mechanisms of deterioration of road paving

The main mechanisms of deterioration of road paving can be summarised as follows:
- **fatigue cracking (often called alligator cracking)**
- **rutting of the asphalt**
- **reflective cracking**

The first of these mechanisms is manifested by a closely spaced crack pattern widespread on the road surface, and appearing when the pavement has been stressed by repetitive load applications.
Rutting of the asphalt is manifested by longitudinal grooves or ruts where the wheels most frequently pass. It is caused by an accumulation of permanent deformations which may derive from a plastic deformation of the bonded layers or from yielding of unbonded layers.
A typical example of reflective cracking is noted when cracks appear on the asphalt concrete paving of airport runways at the joins between the underlying concrete slabs. These cracks are the result of differential yielding of the slabs under the heavy load of aircraft wheels.

Reinstatement of the carrying capacity

Reinstatement of the carrying capacity of existing road overlays is indeed the most common cause for maintenance at all levels, from motorways to town roads managed by local government authorities.
Normally, road paving maintenance is provided by application of one or more layers (generally, asphalt concrete) following removal of the existing deteriorated material by milling.
The need to optimize costs of operations, the difficulties normally encountered in attempting to fully remove overlays, and the need to conform to the existing height of the trafficked surface, have, over time, led to a growing positive interest in application of reinforcement systems in the form of meshes of various kinds.
This is also confirmed by the numerous international research projects currently in progress (e.g. RILEM TC SIB-237/TG4).

INTENDED USE OF "CE" MARKING SPECIFIED ACCORDING TO SITEB

EN 14695 - REINFORCED BITUMEN MEMBRANES FOR WATERPROOFING CONCRETE BRIDGE STRUCTURES AND OTHER CONCRETE SURFACES SUBJECT TO TRAFFIC
- **Under concrete asphalt**
- AUTOTENE ASFALTICO ANTIPUMPING HE/TVP

All of these initiatives focus on providing a scientific answer concerning the potentials and benefits deriving from the application of reinforcement elements against the main mechanisms of deterioration of road paving.
There is indeed unanimous agreement **that costs can be cut through the correct use of reinforcement systems, because these extend the service life** of road pavings.
Based on experience already acquired and on analysis of the problems referred to, **a high performance geocomposite membrane** has been devised that is able to offer, in addition to the **reinforcement function**

(See following)

(See previous)

conferred by the fibreglass mesh, also **an anti-pumping function (watertightness)** ensured by a geomembrane.
Practically speaking, the cracks in the bonded layers have been seen to quickly deteriorate the pavement due to water seeping into the unbonded layers underneath. Passing traffic then pumps the water and fine grain particles to the top (**Pumping Effect**), causing the load-carrying structure to collapse and consequently also the road surface.
Use of this new generation of high performance geocomposite membranes aims at enabling a new layer arrangement for the road paving in order to save in the thickness of the bonded layers and to create a more efficient and lasting structure.

The research project

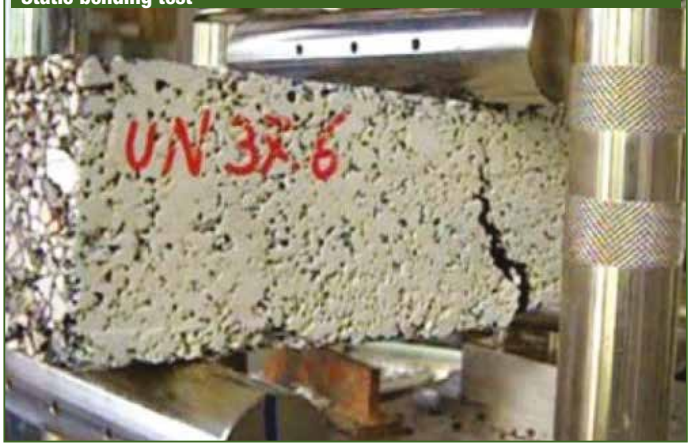
Focusing on developing the characteristics of a high performance geocomposite membrane, INDEX has financed an experimental research project carried out by Prof. Francesco Canestrari from the ***Università Politecnica delle Marche*** (Polytechnic University in Ancona, Italy).
Amidst the various alternatives available, this project investigates the composition of the bitumen-polymer mix of the geomembrane and the type and position of the reinforcement fibreglass mesh.
The laboratory tests focused in particular on characterizing the performance of different geocomposites by analysing the performance of a two-layer system prepared with conventional closed grade asphalt concrete featuring different types of interfaces.
The variables analysed were used to assess the effect of the different types of interfaces (as the physical, geometric and dimensional characteristics of the fibreglass mesh, of the geomembrane and/or of the laying method changed), using advanced test protocols capable of investigating the reaction to shearing and to dynamic and static bending of the two-layer bituminous system.

The purpose of the experiment, which was carried out using the cutting edge equipment referred to, was to assess the benefit offered by the use of a geocomposite membrane in road pavements, by jointly evaluating the following performances:

- Resistance against reflective cracking and tensile stress induced by bending of the overlay;
- Holding of suitable levels of continuity against shear stress of the interface.

Based on the results obtained throughout the experiment, it was possible to foretell the level of performance of the products analysed in the case of true-to-life road applications.

Static bending test



Dynamic bending test

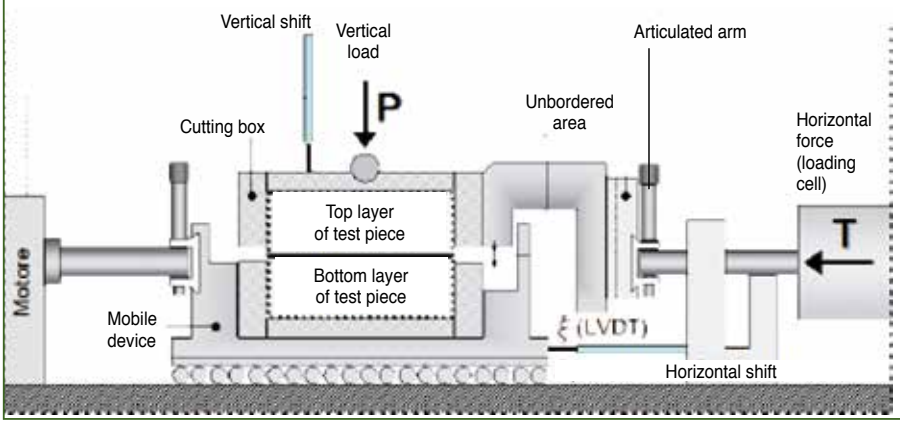
Summary of the main results of the experiment

The geocomposite membrane resulting from research and termed **AUTOTENE ASFALTICO ANTIPUMPING HE/TVP may be considered as, in effect, the synergic union between a geomesh and a SAMI (Stress Absorbing Membrane Interlayer) geomembrane.**
The waterproofing geomembrane protects the layers below from water infiltration, and protects the layers above from the reascent of water and fine grained parts caused by "pumping" due to vehicular traffic.
This geomembrane also inhibits reflective cracking and heat cracking.
In regard to the function of **SAMI**, please note that research in the field conducted by Mr. Monismith, one of the top road experts worldwide, led to the conclusion that a wear layer of 5-cm laid on a 2.5-mm elastomeric SAMI membrane (this thickness corresponding to that of **AUTOTENE ASFALTICO ANTIPUMPING**, laid on old, cracked paving) corresponds to a wear layer of 19-cm.
It has been established that, while a 5-cm wear layer laid without SAMI on old, cracked paving shall lead to reflection of the cracks on the surface in less than 2 years, for the same layer with SAMI we may expert a durability of more than 10 years.
The **reinforcement geomesh** contributes to absorption of stresses and deformations induced within the paving by vehicular loads and environmental stresses, reducing the stress conditions and deformation of the single layers making up the overlay, thus prolonging the service life of the paving.

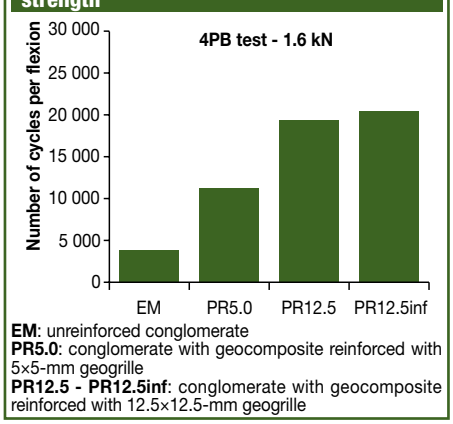
ANTI-REFLECTIVE CRACKING TEST

This test demonstrates the resistance of **AUTOTENE ANTIPUMPING** to the spread of reflective cracking. The test is conducted on a specimen made up of two layers of con-

ASTRA direct shear test

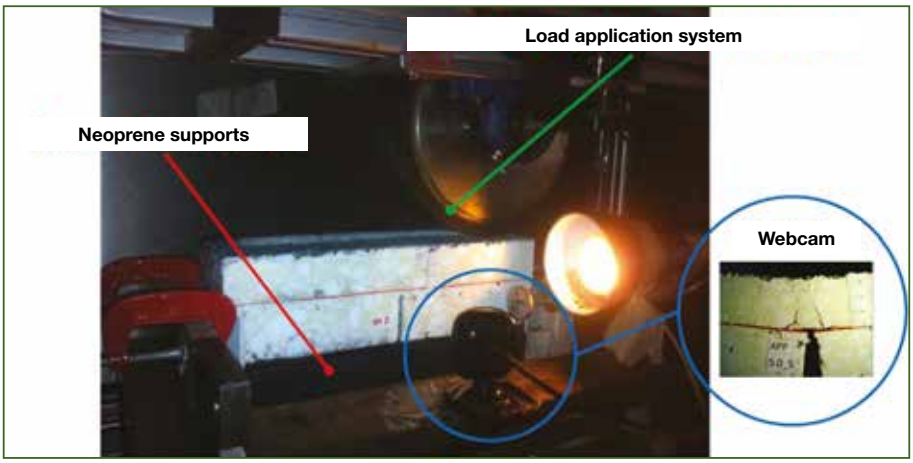


Dynamic bending strength

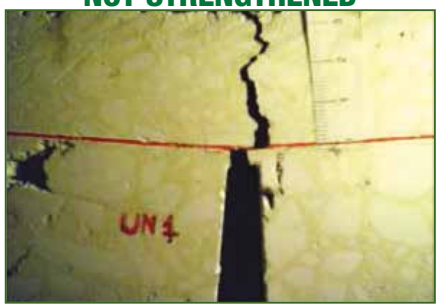


EM: unreinforced conglomerate
PR5.0: conglomerate with geocomposite reinforced with 5×5-mm geogrille
PR12.5 - PR12.5inf: conglomerate with geocomposite reinforced with 12.5×12.5-mm geogrille

Anti-reflective Cracking Test



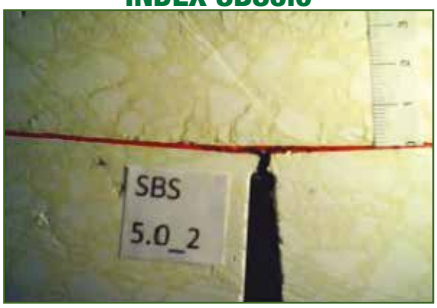
NOT STRENGTHENED



1.000 Cycles

Unreinforced paving after 1 000 load cycles

INDEX SBS5.0



12.600 Cycles

Paving reinforced with AUTOTENE ASFALTICO ANTIPUMPING HE/TVP still fully intact after 12 600 load cycles

glomerate, separated by the geocomposite membrane, which are placed in a neoprene rubber mat of known hardness.
The lower layer of conglomerate is pre-incised with a groove which comes close to the membrane. In cycles, a loaded wheel which induces the pre-determined bending passes over the upper layer of conglomerate.

DESCRIPTION

AUTOTENE ASFALTICO ANTIPUMPING HE/TVP is the self-heat-adhesive membrane for reinforcing asphalt concrete for roads which prevents the formation of potholes and cracks with the added benefit of waterproofing the layers below and protecting the layer above from the reascent of water and fine grained parts, hence stopping the pumping phenomenon.
AUTOTENE ASFALTICO ANTIPUMPING is self-adhesive, and the adhesion strength increases with the heat of the bitumen paving laid over it. Its adhesion continues over time and is reinforced by the action of traffic and the sun's rays.
The membrane is laid dry and, after removing the silicone-coated sheet protecting the lower face, definitive bonding to the laying surface takes place due to the subsequent heat from the laying and compacting of the asphalt concrete paving.
The heat of the paving layer further activates the adhesive properties of the special mix which covers the lower face of the membrane in contact with the laying surface, automatically ensuring it is bonded.
AUTOTENE ASFALTICO ANTIPUMPING EP/TVP is a waterproofing and reinforcement membrane made up of a distilled bitumen-based continuous phase polymeric mixture, selected for industrial use, which is hard wearing and resistant to the heat of the asphalt concrete laid hot.

The membrane is reinforced with a special composite reinforcement made up of a glass fabric which, due to small deformations, immediately develops very high mechanical resistance, stopping transmission of the cracks in the layers below. It has the job of distributing the strain induced by traffic on the asphalt paving layer, hence extending its durability. The impact-resistant non-woven polyester fabric has the role of ensuring watertightness.
The lower face of **AUTOTENE ASFALTICO ANTIPUMPING** is spread with an elastomeric and tackifying resin-based self-heat-adhesive mixture, also elastic at low temperatures, which is protected by a peel-off silicone-coated film.
The upper face of the membrane is protected with a fine mineral layer which, during laying, allows optimal site traffic but which, when the hot asphalt is laid above, is incorporated into the membrane guaranteeing complete adhesion between the layers.
On the upper face, across a width of about 60-mm near the edge, there is an overlapping strip protected by plastic film.
AUTOTENE ASFALTICO ANTIPUMPING can be totally recycled in the processing cycle of the concrete asphalt itself and is easy to remove during milling operations.

AUTOTENE ASFALTICO ANTIPUMPING/SCAVI is the version produced for bridging chases for optic fibre cables under road surfaces. Here, the geocomposite membrane, the charcateristics of which remain unchanged, is produced with heights of 100-cm and 50-cm, and it has no lateral overlapping selvage.

ADVANTAGES

It extends the useful lifetime of the road paving because:
- **it stops the transmission of cracks**
- **it increases the fatigue resistance;**
- **it reduces deformation of the asphalt;**
- **it cancels out the "pumping" phenomenon.**

APPLICATION FIELDS

AUTOTENE ASFALTICO ANTIPUMPING is used for road reconstruction and new roadworks. It also bears the **EN 14695** EC conformity mark as a waterproofing membrane on concrete bridge decks.
While the upper face of the geocomposite membrane is compatible with all types of hot-laid asphalt concrete, the lower face of this material adheres:
- on new asphalt concrete surfaces
- on old asphalt concrete surfaces
- on milled asphalt concrete surfaces
- on recycled and correctly cured cold-laid conglomerate surfaces (*);
- on cement surfaces

(*) *Solution to be assessed case by case.*

The surface and laying conditions

While the laying operations for new roads or for roads subjected to considerable upgrading are simpler, the geomembrane is always laid at least under the binder layer at a depth of >70-mm on layers of smoothed, fresh conglomerate where the primer and new paving are not required, if correctly designed for the traffic to be received. The geomembrane constitutes a solid base for road surface reconstruction. Before proceeding, assessments are required, including visual inspections (valid backup may be provided by the images in Annex C of the special ANAS contract specifications of 2011 "representing the breakings, the cracks defined heavy, and the cracks defined light, as these present themselves most frequently in deteriorated road pavings"). However, in some cases, it is appropriate also to conduct working tests to analyse the composition and conditions of the old paving.
The basic, essential requirements for laying are provided below. However, these requirements do not dispense with the requirement that the designer should carry out more in-depth analysis and design work based on the state of the road to be upgraded, the road's layer arrangement and the traffic load for which the road is designed.

General use conditions

A necessity for optimal conditions for laying geocomposite membrane, both for new pavings and for maintenance work, is that the product be installed above a layer of newly produced asphalt concrete without application of a priming coat.

(See following)

(See previous)

AUTOTENE ASFALTICO ANTIPUMPING can in any case be directly applied over the milled surface or the old road surface in asphalt concrete, where use of the primer is assessed case by case (see Notes), on condition that:

- the laying surface is perfectly dry and clean (absence of pollutants such as oil, dust, debris etc.); hence wet brushing is to be avoided; the operation requires dryness;

Laying surface defects (dampness) rendering this surface unsuitable for geocomposite membrane laying

- the laying surface temperature is appropriate (optimal T. >20°C; in any case, T. >10°C);
- the remaining old layers of asphalt concrete (also following milling) are at least 4-cm thick;
- the remaining paving is sufficiently "stable" (the paving must display no excessive deflection under the action of loads), and it also displays no pumping phenomena;

Structurally unsatisfactory laying surface

- the laying surface presents no irregularities and is uniform (absence of rutting and depressions, no missing paving etc.). Defects of this kind must be repaired (sealing cracks, patching etc.) before laying the geocomposite membrane;
- the grooves which may be produced during milling operations are not too deep.

Heat-sealing of laying surface cracks

If the conditions listed above cannot be met (even quite simply by removing and replacing and/or modifying any non-conforming zones with hot-laid asphalt concrete), the geocomposite membrane can be applied **only** after addition of a new re-shaping layer (D_{max} = 10-mm) in asphalt concrete of a thickness of at least 2-cm if this is sufficient to restore a minimum thickness of 4-cm, or a 4-cm layer of conglomerate, with greater particle size, if the remaining thickness is insufficient.

For correct anchoring of the product to the laying surface, the asphalt concrete above the geocomposite membrane must be applied at a temperature preferably higher than 150°C and, in any case, no lower than 140°C, in order to guarantee adequate melting of the membrane and consequent activation of the special (elastomeric and tackifying resins-based) self-heat-adhesive layer positioned under the geocomposite membrane.
Positioning of the geocomposite membrane below the layer of the binder provides the minimum solution that must always be attained, not only because it optimally ensures the function of resistance to bending loads (without the risk of the geocomposite membrane slipping from the laying surface due to high levels of tangential stress next to the rolling surface) but also because it protects the geocomposite membrane from later milling of the wear layer.
Positioning of the geocomposite membrane immediately below the wear layer (especially when the membrane is laid on a milled surface) is to be assessed with all due care and attention, and is to be conducted very carefully and in favourable weather conditions. In any case, the conglomerate above (following compacting) must be at least 4-cm thick. In fact, the membrane should not be applied in the outer zones where the covering layer is found to be less than 4-cm thick.
The minimum 4-cm thickness requirement, of course, applies to situations in which minimal potential criticalities emerge. Instead, where more problems emerge (in terms of traffic load, speed, conditions of paving etc.) the thickness must be accordingly increased (reinforcement positioned under the binder layer).

PRECAUTIONS

Milling operation frequently mask the dampness of the sub-base. The sheet should therefore not be laid immediately after the sunny weather returns following prolonged rain. It is best to wait for a few days of sunny weather to go by, in particular when the sheet is to be covered with only 4-cm and when the sub-base is unable to drain off the dampness accumulated (as may be the case when upgrading road surfaces on concrete bridge decks).

The **primers used as accessory for the purpose of laying** the geocomposite membrane are **ECOVER ANTIPUMPING** and **INDEVER PRIMER E**. **ECOVER ANTIPUMPING** is made up of a bitumen emulsion modified with elastomers. **INDEVER PRIMER E** is made up of a bitumen solution in a solvent modified with elastomers and with additives consisting in adhesion agents for damp surfaces. When environmental conditions are favourable, with marked exposure to sunlight and temperatures in excess of 25°C, the minimum drying time for **INDEVER PRIMER E** is 30', while the drying time for **ECOVER ANTIPUMPING** is 3 h. Consumption levels, for both, come to approx. 250 g/m².
Where appropriate, the emulsion is generally used during the warmer months of the year. When the temperatures are lower, approaching the limit applying to laying operations, the primer with solvent is used.

AUTOTENE ASFALTICO ANTIPUMPING is laid on new conglomerate surfaces without using the primer. It is also laid on correctly cured cold-laid recycled conglomerate surfaces.
The cement surfaces, which must be without curing agent and which must have been cured for at least 3 weeks, are **always** treated with a coat of **INDEVER PRIMER E** primer with solvent.
Use of the primer on old asphalt cement surfaces and on milled asphalt cement surfaces must be assessed case by case on the basis of climatic conditions, of the area for laying, and of the thickness of the conglomerate which shall cover the geocomposite membrane. For existing paving, if not too old, after careful cleaning, the primer may not be required. In cases of doubt, it should be used.
In the case of milled surfaces, where adhesion less readily takes place, depending on the milling profile and the care with which cleaning was conducted, more attention must be paid to environmental working conditions, especially when the thickness of the conglomerate which is to be laid over the geocomposite membrane is not in excess of 4-cm. In these cases, laying should always be conducted with an ambient temperature in excess of 20°C, in very sunny weather.
The laboratory trials, using test specimens constructed in the laboratory or using field-sampled test specimens **after application under favourable temperature conditions (>30°C),** conducted on **AUTOTENE ASFALTICO ANTIPUMPING** demonstrated that the Shear Rates for two layers of conglomerate separated by **AUTOTENE** with and without emulsion primer, after a drying time of 3 h, are similar, and are the same if the conglomerate below is milled. Indeed, if other primers are used, as opposed to the specific primers indicated by INDEX, the risk is that the foreseen Shear Rate values shall not be obtained.
As indicated in the laying recommendation of AIA (Asphalt Interlayer Association, an American body), the primer is useful for increasing adhesion of membranes in "marginal conditions" (i.e. when environmental conditions are not favourable and when these conditions tend to decrease the adhesive properties of the geocomposite membrane).
Typical cases are when laying takes place at temperatures approaching the prescribed limits, when, furthermore, one must consider the fact that, given the cold, the primer cannot be **ECOVER ANTIPUMPING**, which, since it is a water emulsion, does not dry within the planned laying times at work sites (and hence the need to change to the type with solvent, **INDEVER PRIMER E**).
Rolling the geocomposite membrane before

laying the conglomerate prevents the formation of folds. Please note that, as with all PSAs (Pressure Sensitive Adhesives), adhesion to the sub-base depends on the pressure exerted on the sheet, and note also that the membrane must be rolled with a rubber-tyre roller before the conglomerate is laid, especially when working on milled surfaces. Correct pressing of the asphalt concrete, if conducted immediately after laying, also strengthens adhesion.

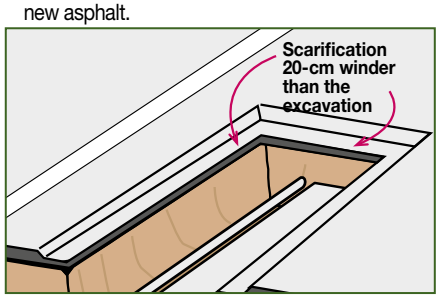
Conglomerate **laying** must take place at a temperature of no less than 140°C, and preferably in excess of 150°C. Compacting must be performed very carefully to attain correct conglomerate densification and in order to further contribute to geocomposite membrane adhesion. At low temperatures, adhesion of the membrane shall depend also on the laying temperature for the conglomerate above, as well as correct and immediate pressing of the conglomerate.

Compacting incorrectly performed to save on conglomerate shall not only lead to early deterioration of the conglomerate but shall also lead to insufficient adhesion of the geocomposite membrane.

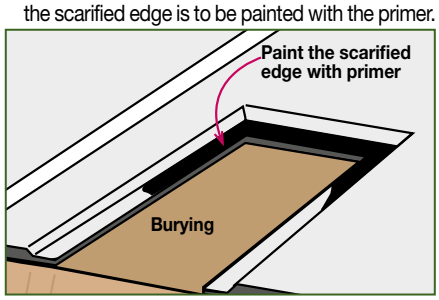
Heat-sealing of laying surface cracks

The membrane is also appropriate for use in repairing asphalt above road excavations for repair of pipes and drains.
In order to repair the road correctly, the following actions are required:

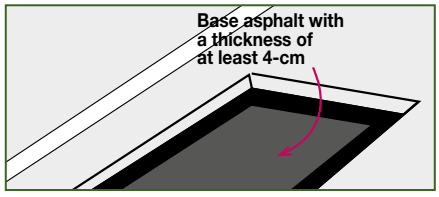
- first, scarifying the asphalt to a depth of at least 7-cm and across a stretch at least 20-cm wider than the excavation, which will then be used to leave an asphalted edge at least 4-cm thick, to which **AUTOTENE ASFALTICO ANTIPUMPING** can be connected. On excavations made without leaving this edge, the new asphalt will quickly crack along the join between the old and new asphalt.



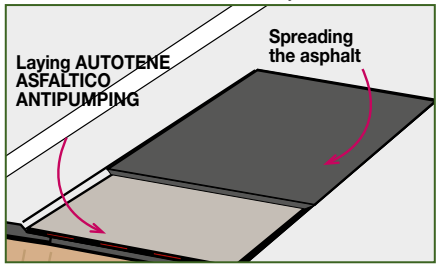
- After filling in holes made for pipes and duly compacting, and before laying the membrane, the scarified edge is to be painted with the primer.



- Then the basic asphalt is laid on the filled-in excavation, at least 4-cm thick. There is no need to apply primer on this as the fresh asphalt constitutes a secure surface for adhesion of **AUTOTENE ASFALTICO ANTIPUMPING**.



- Finally, **AUTOTENE ASFALTICO ANTIPUMPING** and the binder and wear layers are laid.



BETON MELT&STOP for rapid restoration of optic fibre cable or drain piping chases under road pavements

The geocomposite membrane, **AUTOTENE ASFALTICO ANTIPUMPING HE/TVP** in the **AUTOTENE ASFALTICO ANTIPUMPING/SCAVI** version (produced with heights 50 and 100-cm) may be used for bridging the chases for laying optic fibre cables or drain piping under road pavements in order to reinforce the new layer of asphalt concrete which is laid to restore the pavement above the chase filled in with INDEX's special BETON MELT&STOP mortars.
BETON MELT&STOP is a ready-to-use quick setting and quick hardening semi-fluid mortar with controlled shrinkage to be mixed with water. It is endowed with anti-shrinkage properties and is capable of bonding perfectly to the support, forming a single body with the structure. A red version is also available.
The setting time can be adjusted according to needs (range: from a few seconds to a number of hours). It sets immediately, and it also dries immediately through a chemical reaction which binds the water in the mixture, with a residual humidity which after 24 h is less than 3%. Users can also adjust fluidity as a function of the gradient of the road to be repaired. Users can include, as an additive, steel fibre to obtain higher resistance to bending loads.
Generally speaking, the breadths of the chases to be filled in range from 12 to 30-cm. The depth may range from 1-m to 1.5-m, according to the road in question.
The work stages can be summarised as follows:
1. Mill the existing paving over the breadth of at least 50-cm until the wear layer and binder layer are both reached, and, in any case, to a depth of no less than 7-cm. The excavation for housing the cable must be positioned at the centre of the milled zone with no less than 15-cm of milled asphalt either side. If these specifications cannot be attained, milling of a breadth of at least 100-cm shall be required with the geocomposite membrane (full height) laid.
2. After positioning the piping or cable, the mortar must be poured in. BETON MELT&STOP is provided in bags and is ready for use. It can be poured into large spaces and can fill cavities of a depth of up to 150-cm. For large-scale projects, the ADDITIVE MELT&STOP is also available. This product is an additive used to modify the concrete, produced by a centralised concrete mixing unit and transported for use at the site by tankers. BETON MELT&STOP may be prepared at the site in units equipped with mixing vessel. It can be readily dosed to the requested quantitites for each task.

The product, in powder form, is mixed with water. Adjust the quantities of water for workability of the material on the basis of the specific task at hand.

3. Mortar is poured into the excavation from the mixing vessel. The material can be readily compacted using a vibrator.

The mortar is levelled off with a straight edge, and the surface is smoothed with a trowel.

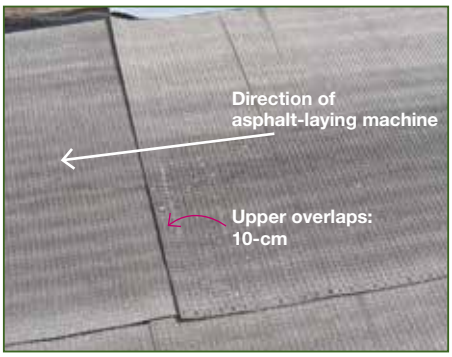
4. After the excavation has been filled with the mortar, a strip of the geocomposite membrane, **AUTOTENE ASFALTICO ANTIPUMPING/SCAVI** is to be laid. The membrane is of a breadth of 50 or 100-cm (the breadth is that of the scarified zone). The membrane should not be applied in the outer zones where the covering layer is found to be less than 7-cm thick. The minimum waiting time before laying the geocomposite membrane and before hot-laying the asphalt concrete is 24 h. Laying is preceded by application of a coat of the primer, INDEVER PRIMER E (on the mortar and also on the entire milled zone).
5. The asphalt concrete shall then be hot-laid on the milled zone and shall be pressed until it is level with the existing paving.

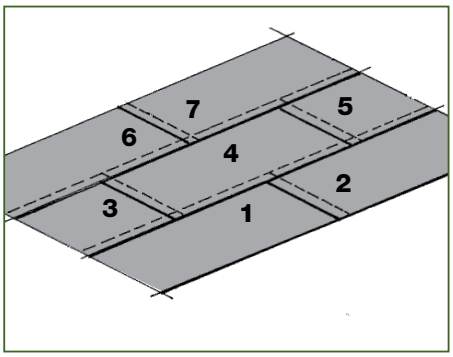
METHOD OF USE

For correct laying, operators must always bear it in mind that the main factors inhibiting adhesion of self-adhesive sheets are dust, damp and lack of pressure on the sheet to ensure closer contact with the surface to be covered.
The operations for laying the geocomposite membrane entail:

1. Dry application of the geocomposite membrane by handling the sheets in such a manner as to ensure that these sheets are aligned and are smooth

Application must be carried out by at least two operators, one at each end of the sheet. The operators alternate in tugging the sheet while laying it smoothly.





A longitudinal overlapping zone between adjacent sheets (at least 7-cm) is recommended, with the heads of the successive sheets covered (at least 10-cm). The upper edge must be oriented in the direction of movement of the finisher.
To avoid accumulation of upper overlaps, when laying, stagger the rolls by at least 50-cm from the very start.

2. Cutting the geocomposite membrane, where required, at the access points for buried or underground services

3. Peeling off the silicone-coated film protecting the lower face of the geocomposite membrane

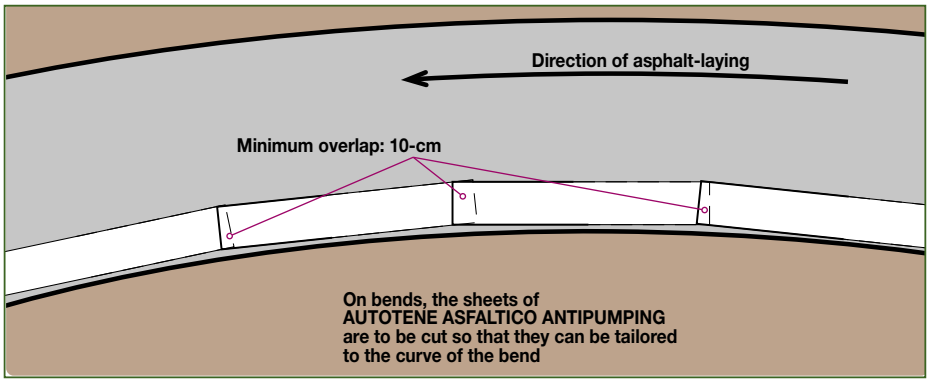
Users should have plastic bags on hand for the silicone-coated polyethylene sheets (both to avoid the sheets being blown into trafficked lanes and to faciliate waste collection).

4. Rolling the entire surface

Preferably with a rubber-tyre roller or rubber-tyre site vehicle, above all in cases of application to laying surfaces not consisting in newly produced asphalt concrete.

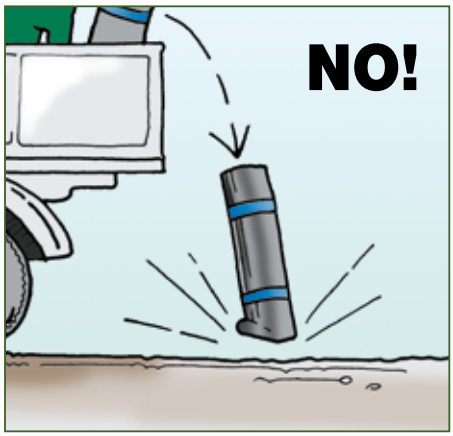
5. Construction of the upper layer of heat-laid asphalt concrete

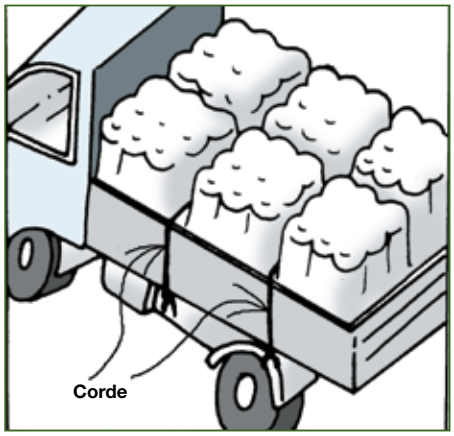
Users must remember that, in the case of road bends, it may be necessary to cut the sheets down in order to optimally follow the curves of the bends, while preventing the formation of folds and also ensuring that the minimum required overlapping zones are provided for.

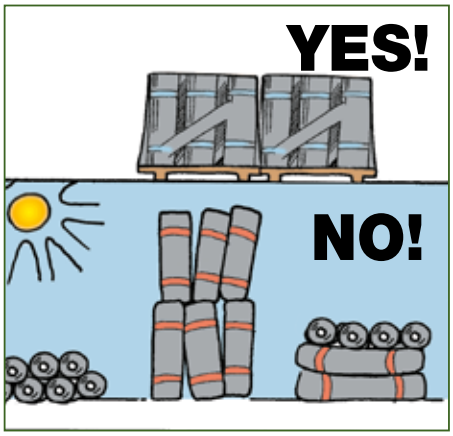


Transport and storage of the rolls

The rolls are laid over wooden pallets which are wrapped in a thick sheet of heat shrinkable polyethylene. However, during long journeys over rough roads, or sharp braking, especially in the summer, and when using lorries with long bodies, the rolls may tip over.
You can place ropes between the rows of pallets, across the body of the lorry, in order to tackle this problem.
The ropes must be taut and suitably protected so that they do not mark the rolls. The membranes are produced to withstand the mechanical strain that may be exerted during use.
However, during movement, the material must be handled with care in order to prevent the rolls being crushed, and in order to prevent all contact with sharp or pointed surfaces. The rolls unfastened and removed from the pallets must be positioned vertically and placed on a smooth, flat surface in a dry place.
The pallets should not be stored, exposed to the sunlight, at the site for prolonged periods.
In summer, the pallets covered in heat shrinkable film exposed to the sun quickly reach a temperature on the top of around 70°C due to a “greenhouse effect”, which causes progressive blackening of the sand-treated surfaces on the rolls from the top downwards, and which causes the wound materials to stick to each other or in any case renders unwinding of the rolls difficult.
When the temperatures are low, the rolls must not be left lying outside overnight. A good rule is always to “rotate” the warehouse and not to keep the rolls for more than 12 months.







TESTING

Test method ASTRA

Performance and cutting of the interfaces

UNI/TS 11214/2007 at 20°C and σ = 0,2 MPa

$\tau_{peak} \geq 0{,}30$ MPa

TECHNICAL CHARACTERISTICS

	Standard	T	AUTOTENE ASFALTICO ANTIPUMPING HE/TVP	AUTOTENE ASFALTICO ANTIPUMPING/SCAVI	
Reinforcement			Glass fabric and non-woven polyester fabric	Glass fabric and non-woven polyester fabric	
Thickness	**EN 1849-1**	±0,2	2.5 mm	2.5 mm	2.5 mm
Roll size	**EN 1848-1**	≥	1.05×15 m	0.50×15 m	1.00×15 m
Watertightness	**EN 1928 – B**	≥	60 kPa	60 kPa	
Maximum tensile force L/T	**EN 12311-1**	-20%	40/40 kN/m	40/40 kN/m	
Elongation L/T	**EN 12311-1**	-15% V.A.	4/4%	4/4%	
Resistance to static loading	**EN 12730 – B**		20 kg	20 kg	
Flexibility to low temp. • after ageing	**EN 1109** **EN 1296-1109**	≤ +15°C	-25°C -15°C	-25°C -15°C	
Flow resist. at elevated temp. • after ageing	**EN 1110** **EN 1296-1110**	≥ -10°C	100°C 90°C	100°C 90°C	
Reaction to fire Euroclass	**EN 13501-1**		E	E	
Technical specification for waterproofing of concrete bridge decks and other trafficked areas (**EN 14695**)					
Resistance to dynamic water pressure	**EN 14694**	≥	500 kPa	500 kPa	
Compatibility by heat conditioning	**EN 14691**	≥	80%	80%	
Bond strenght	**EN 13596**	≥	0.4 N/mm²	0.4 N/mm²	
Shear strenght (pn concrete)	**EN 13653**	>	0.15 N/mm²	0.15 N/mm²	
Resistance to compaction	**EN 14692**		Test passed	Test passed	
Performance characteristics after thermal conditioning at 160° with a cooling curve similar to that experimentally measured by SITEB on the bitumen conglomerate					
Airtightness of end and side joints	**Vacuum test EN 12730**	≥	15 kPa	15 kPa	
Dynamic watertightness of end and side joints	**EN 14694**	≥	500 kPa	500 kPa	
Peel test on steel	**UEAtc technical guide**	≥	120 N/5 cm	120 N/5 cm	
Performance features properties between two layers of conglomerate, anti-reflective cracking test (Polytechnic University of Marche).					
Anti-reflective Cracking Test	(520 N a 30°C)		> 12 600 cycles	> 12 600 cycles	
Performance features include two layers of concrete, permanent deformation and damage associated with crack propagation - New concrete asphalt (Polytechnic University of Marche) Dynamic flexural strength - four point bending test (4PB)					
Frequency 1 Hz - Temp. 20°C and max load 0.8 KN			32 685 cycles	32 685 cycles	
Frequency 1 Hz - Temp. 20°C and max load 1.6 KN			24 803 cycles	24 803 cycles	
Peak shear strength at the interface on conglomerate measured with the ASTRA test	**UNI/TS 11214/2007**		τ_{peak} ≥0,30 MPa (T = 20°C; normal strain σ = 0,2 MPa)	τ_{peak} ≥0,30 MPa (T = 20°C; normal strain σ = 0,2 MPa)	

TECHNICAL SPECIFICATIONS

Reinforcement and waterproofing for road paving by applying a reinforced geocomposite membrane to the interface between layers of bitumen conglomerate. The membrane is a prefabricated elastomeric self-heat-adhesive antipumping geomembrane, whose adhesion is activated by the heat of the upper layer of hot-laid asphalt concrete, based on distilled bitumen and SBS-elastomeric-polymers, with composite reinforcement comprising a fibreglass geogrid (mesh 12.5 x 12.5 mm) and highly resistant non-woven polyester fabric, with a lower face spreaded with a further elastomeric and tackifying resin-based self-heat-adhesive mixture protected by silicone-coated film and with its upper face covered in a fine mineral layer, except for a side overlapping strip protected by silicone-coated film. The 2.5 mm thick geocomposite membrane (EN 1849-1) can withstand the asphalt compaction (EN 14692), must pass the dynamic watertightness test at a pressure of 500 kPa (EN 14694), will have L/T tensile strength of 40 kN/m (EN 12311-1), L/T ultimate elongation of 4% (EN 12311-1), will be resistant to sliding at 100°C (EN 1110), will have cold flexibility of –25°C (EN 1109); peak shear strength at the interface on conglomerate measured with the ASTRA test (UNI/TS 11214/2007) τ_{peak} ≥0,30 MPa (T = 20°C; normal strain σ = 0,2 MPa) and anti-reflective cracking test (520 N at 30 °C) > 12,600 cycles and dynamic bending strength on 4 points (4PB) of over 32600 cycles, under a load of 0.8 KN. The geocomposite, after thermal conditioning of the samples at 160° with cooling curve compliant with that of the bitumen conglomerate (ref. SITEB), will have a resistance to peeling on steel foil (UEAtc technical guide) ≥120 N/5 cm, must pass the dynamic watertightness test at a pressure of 500 kPa (EN 14694) both on the side and the end joints, and this latter must be airtight to the Vacuum Test (EN 12730).

ECOVER ANTIPUMPING - Attaching coat in the event of laying geocomposite reinforcement on milled and dusty surfaces comprising a bitumen emulsion, containing elastomeric resins and additives, suitable for applying the antipumping membrane, such as ECOVER ANTIPUMPING, with dry residue (UNI EN ISO 3251) of 35% and viscosity measured with a DIN/4 cup at 20°C (UNI EN ISO 2431) of 20÷30 s, spread onto a dry surface using 0.5 kg/m², after cleaning by mechanical brushing.

INDEVER PRIMER E - Quick drying bituminous elastomer adhesion primer in solvent suitable for the preparation of milled and dusty surfaces for applying the antipumping membrane, such as INDEVER PRIMER E, with dry residue (UNI EN ISO 3251) of 50% and viscosity measured with a DIN/4 cup at 23°C (UNI EN ISO 2431) of 18÷25 s.

FINITURE PRODOTTO

MINERAL FINISH. It is made for hot adhesion of mineral sand without free crystalline silica. It avoids the bonding of the wound rolls and acts as an adhesion intermediary.

REMOVABLE SILICONE-COATED FILM. *The lower face of the membrane is covered in a silicone-coated film which preserves the adhesive mix.*

See the laying video on your Smartphone

• FOR ANY FURTHER INFORMATION OR ADVICE ON PARTICULAR APPLICATIONS, CONTACT OUR TECHNICAL OFFICE • IN ORDER TO CORRECTLY USE OUR PRODUCTS, REFER TO INDEX TECHNICAL SPECIFICATIONS •

index
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