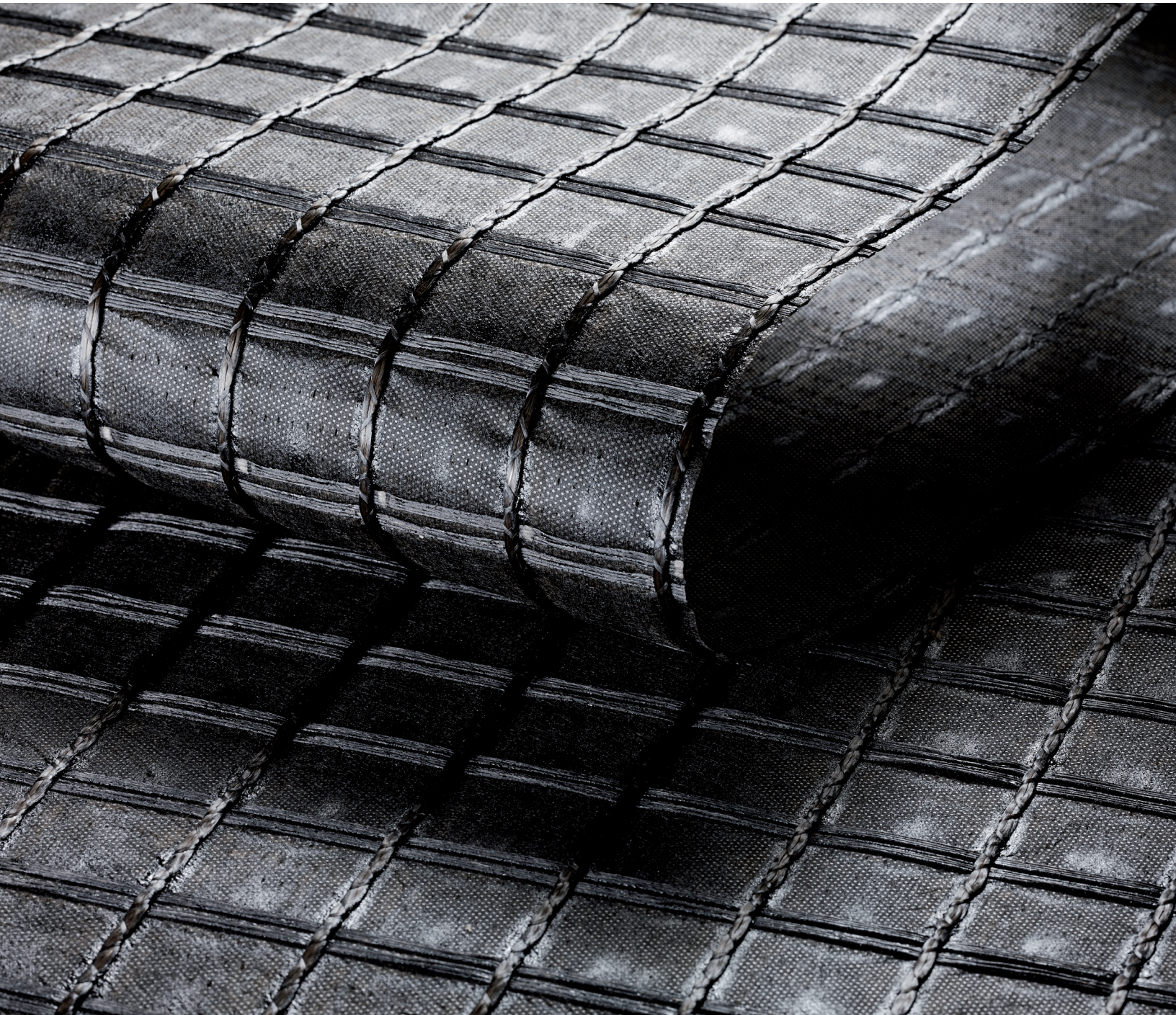


APPENDIX 'D'

HATELIT "C" AND HATELIT "BL" PRODUCT INFORMATION



HaTelit® Asphalt Reinforcement Grid

North American Installation Guidelines for
HaTelit® C, HaTelit® XP, HaTelit® G and SamiGrid®

North American Installation Guidelines for HaTelit® C, HaTelit® XP, HaTelit® G and SamiGrid®

Transportation and Storage

HaTelit® asphalt reinforcement grids are supplied in roll form and packaged to protect against damage during shipping and handling, as well as ultraviolet (UV) exposure. The rolls should be checked upon arrival for any damage caused in transit, and if so noted, contact HUESKER, Inc. or the material representative.

The material should be stored on a clean and level base and protected from ground moisture and rain by covering the material. The material should be carefully moved being careful not to drop during handling as this may cause the core to crack or fracture making installation difficult.

Surface Preparation

The surface must be dry and free from dirt, oil and or loose stones prior to the tack coat application. Cracks in excess of 1/8" (3 mm) in width should be cleaned and sealed with an approved pavement crack sealer. It is advised that sealing cracks be done well in advance of the material installation as this can help in minimizing the effects of bump formation on the new surface caused by expansion of the filler material.

The surface should be prepared in accordance with "best practice" and or project specifications as required. All failed pavement areas should be removed and replaced for the best results prior to installation. A leveling course or scratch course may be required to establish proper surface conditions, i.e. cross-slope and grade and surface corrections. The surface should be smooth and even to ensure that the material will have full contact with the underlying pavement layer and no voids or faulting conditions are present.



Figure 1 Smooth Installation Surface

Milled Surfaces: Milled surfaces should not present grooves or channels or high ridges in excess of 3/8" (~10 mm) in height. The surface shall be cleaned of all residual dust and

dirt and must be dry prior to the installation of the material. Should high ridges and or very deep grooves exist in the milled surface, a leveling or scratch course may be placed to smooth the surface. Note: The high resistance of HaTelit® to mechanical damage allows an installation directly onto milled surfaces, however the above guidance is suggested.



Figure 2 Smooth Milled Surface

Tack Application

The prepared surface may be sprayed with an emulsion or neat performance grade asphalt. The minimum application rate should be applied at a rate of 0.11 gal/ yd² or (0.60 l/m²) using an emulsion at 70% solids content. If a neat PG grade asphalt is used the rate shall be no less than 0.07-0.08 gal/ yd² or (0.40 l/ m²). On rough or open-textured surfaces, highly oxidized and raveled pavements, the application rate will need to be increased to overcome the potential for penetration into the existing surface (see tack application table 1). The application rate will need to be increased if an emulsion containing less than 70% solids is used. The PG tack coat should be sprayed evenly and at a temperature not exceeding 325° F (163° C) for best results.

It is recommended that when installing in warm to hot ambient air and pavement temperatures, the emulsion shall be cured ("break") or have all water evaporated before placing the material into the tack. When installing in cool temperatures, the material may be placed into the emulsion prior to full cure ("breaking") so as to promote saturation and adhesion bonding to the underlying pavement. In warm and or hot ambient air and or pavement conditions, it is recommended that a minimum PG 70 grade asphalt or greater be used as these bitumen grades have a higher softening point, and are therefore more resistant to bleed-through.

The emulsion break can be recognized by a color change from brown to black. Ensure all spraying conditions of the tack coat are followed. Cutbacks and or solvent based tack coats shall never be used.



SamiGrid® Tack Application

The prepared surface may be sprayed with an emulsion or neat performance grade asphalt. The nominal application rate should be applied at a rate of 0.40 gal/ yd² or (1.80 l/ m²) using an emulsion at 70% solids content. If a neat PG grade asphalt is used, the rate shall be 0.28 gal/ yd² or (1.26 l/ m²). On rough or open-textured surfaces, highly oxidized and raveled pavements, the application rate will need to be increased to overcome the potential for penetration into the existing surface (see tack application rate for SamiGrid®). For rough milled surfaces the application rate may require up to 0.51 gal/sy or (2.3 l/m²), using an emulsion at 70% solids. The application rate will need to be increased if an emulsion containing less than 70% solids is used. The PG tack coat should be sprayed evenly and at a temperature not exceeding 325° F (163° C) for best results.

In addition, it is also recommended that a light application of tack be applied at a rate of 0.06 gal/sy (0.30 l/m²) to seal and control any residual dust or fine particulates that may be in the milled pavement grooves using an emulsion at 70% solids content.



It is recommended that when installing SamiGrid® in warm to hot ambient air and pavement temperatures, the emulsion shall be cured (“break”) or have all water evaporated before placing the material into the tack. When installing in cool temperatures, the material may be placed into the emulsion prior to full cure (“breaking”) so as to promote saturation and adhesion bonding to the underlying pavement. In warm and or hot ambient air and or pavement conditions, it is recommended that a minimum PG 70 grade asphalt or greater be used as these bitumen grades have a higher softening point, and are therefore more resistant to bleed-through.

The emulsion break can be recognized by a color change from brown to black. Ensure all spraying conditions of the tack coat are followed. Cutbacks and or solvent based tack coats shall never be used.

In the event of bleed-through for any of the above materials, in warm or hot weather conditions, asphalt mix or blotting sand may be used to broadcast onto the material to alleviate “sticking” of construction tires to the interlayer material.



Figure 3 Emulsion Tack Applications

Recommended Tack Coat Application Table

Material	Tack Type	Minimum ¹		Nominal ²		Milled Surface ³	
HaTelit C 40/17; HaTelit XP; HaTelit G	Emulsion*	0.60 - 0.80 l/sq. m		0.80 - 1.0 l/sq. m		1.0 l/sq. m - 1.2 l/sq. m	
	Performance Grade (Neat)	0.11 -0.12 gal/sy	0.42 - 0.56 l/m ²	0.12 - 0.15 gal /sy	0.56 - 0.70 l/m ²	0.15 - 0.19 gal /sy	0.68 - 0.86 l/m ²
SamiGrid®	Emulsion*	n/a		0.40 gal/sy.	1.80 l/m ²	Up to 0.51 gal/sy	2.30 l/m ²
	Performance Grade (Neat)	n/a		0.28 gal/sy.	1.26 l/m ²	0.35 gal/sy	1.60 l/m ²

*Note Emulsion at 70% solids residual

1 Minimum Tack Applications for Smooth Pavement (leveling course) of low severity pavement distresses

2 Nominal Tack Application for pavements exhibiting fatigue, raveling, oxidation distresses

3 Application Rates for milled surfaces



North American Installation Guidelines for HaTelit® C, HaTelit® XP, HaTelit® G and SamiGrid®



Material Installation

The material shall be laid flat and wrinkle free, with the nonwoven fabric placed into the tack (grid up). If a wrinkle occurs, the material may be slit and over-lapped in the direction of the paving operation using a sharp utility knife.

Every effort should be made to pull a wrinkle out before cutting the material. Material can be installed using mechanical means and methods or by hand placement. Hand brooms should be used to “seat” the material into the tack and smooth the material. It is recommended that a core reinforcement insert pipe of adequate diameter and length be used to reinforce the core during the installation process. If necessary, HaTelit® may be rolled to ensure contact adhesion by using a lightweight roller, preferably a pneumatic tire roller, so as to minimize any damage to the reinforcement material.

The material may be cut around structures in order to “fit” the material properly. In addition, the material may be cut into shorter lengths to install around curves.

Driving on the material is not recommended. The material should only be driven on by construction equipment and not be allowed to carry normal vehicular traffic until the hot mix overlay has been placed and opened to vehicular traffic.

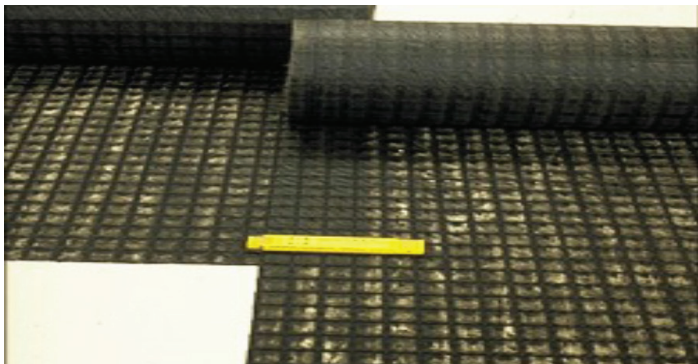


Figure 4 Longitudinal Overlap

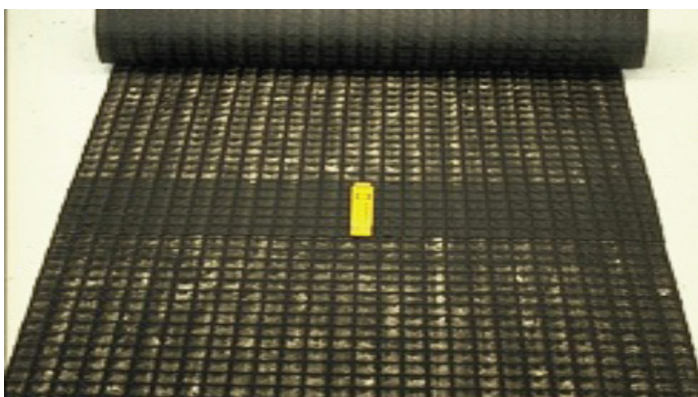


Figure 5 Transverse Overlap

Overlapping material: The overlap in the roll or longitudinal direction shall be no more than 6” (15 cm) and not less than 4” (10 cm). The cross direction overlap or transverse lap shall be 10” (25 cm) and not less than 6” (15cm). The transverse lap shall be constructed in the direction of the paving operation. All overlaps shall be properly tacked in order to insure adhesion of the material.

Asphalt Installation

Follow plans and specification for hot mix asphalt overlay installation. All HaTelit® paving materials are to be installed with not less than 1.5” (approx. 40mm) compacted hot mix asphalt. Before placing the asphalt mix, ensure that the tack is completely broken, with all water having been evaporated if an emulsion is used for the tack coat. In the event of rain, the reinforcement surface should be dry prior to paving, following best practice methods in hot mix paving installation and construction.

It is recommended that construction vehicles do not park on the material, as heat from the engine and tires may cause a “softening effect” of the tack and cause the tires to stick to the material. In the event of bleed-through of the tack in warm or hot weather conditions, asphalt mix may be broadcast onto the material or blotting sand may be broadcast to alleviate the condition.

The paver and delivery vehicles should move carefully over the grid-covered surface to avoid grid displacement. Sharp turns, rapid changes in speed and hard braking should be avoided. The asphalt truck and transfer equipment (if used) in front of the paver should be driven and not pushed.

Note: No additional tack is required on top of the reinforcement material prior to the installation of the new hot mix asphalt surface course.



Figure 6 Paving Operation



HaTelit® Installation Summary

It is recommended that these guidelines be followed. These instructions are for guidance as field conditions may dictate changes in the actual construction process, means and methods. HUESKER reserves the right to introduce changes and improvements to the product and installation guidelines. No warranty claims can be derived from these instructions.

1. Surface preparation

Ensure the surface is clean, dry and free of any loose material.

2. Tack-coat application

The use of emulsions is permitted. The emulsion should have a minimum 60% solids content for best results. PG grade bitumen is also suggested, when available.

3. Tack-coat “break”

HaTelit® may be placed in partially broken (cooler-cold weather) – or, in warm to hot weather conditions, on the broken – emulsion (observed color change from brown to black). When installing SamiGrid® it is recommended that the material be placed into the wet and or partially cured emulsion to ensure saturation and that bonding is achieved.

4. Installation of the Grid

The grid shall be installed by use of mechanical or hand methods. To ensure proper adhesion, HaTelit® may be rolled as needed. The minimum compacted overlay thickness shall be 1.5” or (approx. 40mm). If it rains causing the material to become wet and saturated, follow best practice for hot mix asphalt installation construction...it is recommended that the surface be completely dry prior to installing the asphalt mix.

5. Joints/Overlaps

Follow the recommendations for proper overlapping of material in the longitudinal and transverse directions; making sure to apply tack between each grid interface for proper adhesion and bonding.

6. Bends and Curves

On curves HaTelit® may be cut in shorter lengths and installed with overlaps. The length of the pieces depends on the radius of the curve.

7. Driving on the Grid

The grid-covered surface should not carry normal road traffic. If damage to the grid occurs, it must be repaired prior to the wearing course installation. During construction, sharp turning, rapid changes in speed and hard braking must be avoided.

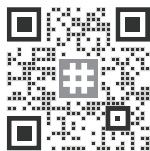
HaTelit® and SamiGrid® are registered trademarks of HUESKER Synthetic GmbH.



HUESKER, Inc.

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Further Information:





Installation Guidelines

HaTelit® BL

1. Transportation and storage

HaTelit® BL is packaged to protect it against normal weather conditions and transportation damage. Upon receipt, check the materials for any damage that may have occurred during shipping and handling. Do not drop rolls.

Store the rolls in an upright position on a dry, clean base. To prevent deformation, e.g. due to excessively high air temperatures, protect the rolls from direct sunlight, especially in warm weather ...70° F (~20°C) and higher.

2. Surface Preparation

Ensure that the base pavement surface is prepared in accordance with good practice such that all conditions are met for proper installation. The surface shall be dry, clean and free from loose matter. The surface should have all necessary repairs made, i.e., potholes, irregularities, sharp transitions etc. Surfaces produced by milling shall not exhibit any milling grooves or high ridges greater than 3/8" (~10 mm).

After cleaning, it may be necessary to fill cracks and or expansion joints and larger cracks in excess of 1/8" (~ 3 mm) with a bituminous compound.

3. Installation of HaTelit® BL

Once the surface preparation is complete, unroll the material removing the release backing during the process. A light application of tack may be required in cooler temperatures to ensure bonding with the underlying pavement. Tack must be cured before placement of the BL. Only install HaTelit® BL in dry weather on a dry base.

The material shall be installed without laps, i.e. with end joints butted and adjacent rolled butted together. After unrolling, applying broom pressure or a small roller may be used to ensure proper bonding.

Do not drive over HaTelit® BL prior to placing the pavement mix.

Note: During the paving operation, the product can be blinded with paving mix or sand to prevent the tires from sticking or pick-up.

4. Placement of pavement mix

Where HaTelit® BL is driven over by asphalt trucks, avoid sudden steering movements as well as heavy acceleration or braking that may cause damage to the membrane.

Minimum overlay thickness shall be at least 1.5" (40 mm) compacted thickness. Placement and compaction of the pavement mix shall follow best practice and construction methods. If possible, the installed HaTelit® BL shall be overlaid on the same day.

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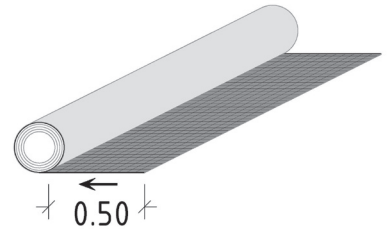


Installation Guidelines

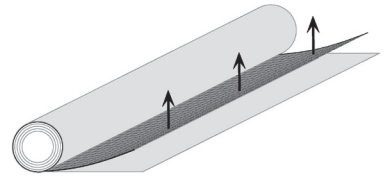
HaTelit® BL

Installation procedure at a glance:

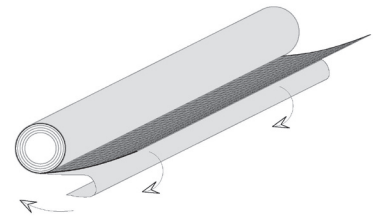
1. Place roll in correct position for unrolling (over middle of crack or joint).



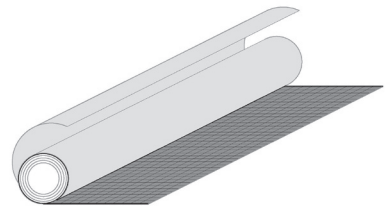
2. Unroll approx. 10" or (25 cm) of the sheet and carefully peel off release film. Ensure that asphalt bitumen backing does not come into contact with itself, as they will stick together and be difficult to pull apart.



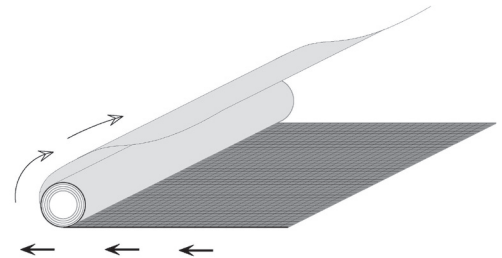
3. Fold back peeled release film under roll and apply exposed bitumen backing to base. Slightly press down contact surface of HaTelit® BL and then roll sheet back.



4. Pull release film upwards and unroll HaTelit® BL. Finally apply pressure using broom or small roller.



5. BL can be carefully cut using a sharp knife...



Further Information:

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 **HUESKER**
Ideas. Engineers. Innovations.

HaTelit® BL

HaTelit® BL IS AN ASPHALT REINFORCEMENT COMPRISED OF OUR HIGH STRENGTH HaTelit® C 40/17 PAVING INTERLAYER, LAMINATED WITH A HIGHLY FLEXIBLE POLYMER MODIFIED ELASTOMERIC BITUMEN. THE PEEL AND STICK MEMBRANE IS SPECIFICALLY DESIGNED FOR TREATMENT OF LONGITUDINAL, TRANSVERSE AND RANDOM-MEANDERING JOINTS IN BOTH CONCRETE AND FLEXIBLE PAVEMENTS PRIOR TO A NEW HOT MIX ASPHALT OVERLAY. **HaTelit® BL** MAY ALSO BE USED IN THE TREATMENT OF BRIDGE DECK PAVEMENTS TO PROVIDE REINFORCEMENT AND PROTECTION AGAINST WATER INTRUSION. THE POLYMERIZED BITUMEN COATING WILL PROVIDE VIRTUALLY A WATERPROOF MEMBRANE OVER THE AFFECTED AREA MITIGATING THE INTRUSION OF WATER WHILE PROVIDING HIGH STRENGTH REINFORCEMENT AGAINST REFLECTIVE CRACKING IN THE NEW OVERLAY. DURABLE AND STRONG, **HaTelit® BL** PAVEMENT REINFORCEMENT IS EASY TO INSTALL WITHOUT THE NEED FOR SPECIALIZED EQUIPMENT AND HAS EXCELLENT RESISTANCE TO DEICING CHEMICALS. (REFERENCE HUESKER'S **HaTelit® BL** INSTALLATION GUIDELINES).

Physical Properties of HaTelit® BL

PROPERTY	TEST METHOD	ENGLISH units ¹	SI units ¹
Mass/Unit Area	EN ISO9864	37.13 oz/yd ²	1,250 g/m ²
Aperture Size (composite reinforcement)	Measured	1.57 x 1.57 inch	40 x 40 mm
Ultimate Tensile Strength (filament reinforcement)			
Machine Direction (MD)	ASTM D-6637	3,425 lb/ft	>50 kN/m
Cross-Machine Direction (CMD)	ASTM D-6637	3,425 lb/ft	>50 kN/m
Elongation at Break (@ NOMINAL)	ASTM D-6637	< 12 %	<12 %
FIBER IDENTIFICATION of Fiber Reinforcement	ASTM D 276	>490 ° F	>255 °C

¹ MARV - Minimum average roll values are based on a 95% confidence level.

Standard Roll Size: 3.28 ft. (1.00 m) wide x 49.21 ft (15 m) long = 18 yd² (15 m²)
Weight: 42 lb./roll (19 kg)

Each roll of HaTelit® delivered to the project site is labeled by HUESKER with a roll label that indicates manufacturer's name, product identification, lot number, roll number and roll dimensions. All rolls of HaTelit® are encased in a sturdy polyethylene wrap to shield the product from rain, dirt, dust and ultraviolet light. Contact HUESKER for information on our material warranty.

P.O. Box 411529, Charlotte, NC 28241-1529 • (800) 942-9418 • FAX (704) 588-5988
www.HUESKER.com



Installation Guidelines

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2. Surface Preparation

Ensure that the base pavement surface is prepared in accordance with good practice such that all conditions are met for proper installation. The surface shall be dry, clean and free from loose matter. The surface should have all necessary repairs made, i.e., potholes, irregularities, sharp transitions etc. Surfaces produced by milling shall not exhibit any milling grooves or high ridges greater than 3/8" (~10 mm).

After cleaning, it may be necessary to fill cracks and or expansion joints and larger cracks in excess of 1/8" (~ 3 mm) with a bituminous compound.

3. Installation of HaTelit® BL

Once the surface preparation is complete, unroll the material removing the release backing during the process. A light application of tack may be required in cooler temperatures to ensure bonding with the underlying pavement. Tack must be cured before placement of the BL. Only install HaTelit® BL in dry weather on a dry base.

The material shall be installed without laps, i.e. with end joints butted and adjacent rolled butted together. After unrolling, applying broom pressure or a small roller may be used to ensure proper bonding.

Do not drive over HaTelit® BL prior to placing the pavement mix.

Note: During the paving operation, the product can be blinded with paving mix or sand to prevent the tires from sticking or pick-up.

4. Placement of pavement mix

Where HaTelit® BL is driven over by asphalt trucks, avoid sudden steering movements as well as heavy acceleration or braking that may cause damage to the membrane.

Minimum overlay thickness shall be at least 1.5" (40 mm) compacted thickness. Placement and compaction of the pavement mix shall follow best practice and construction methods. If possible, the installed HaTelit® BL shall be overlaid on the same day.

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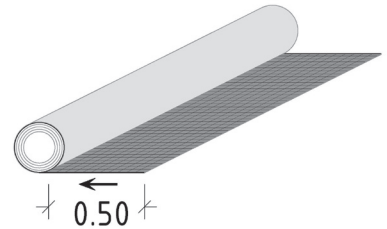


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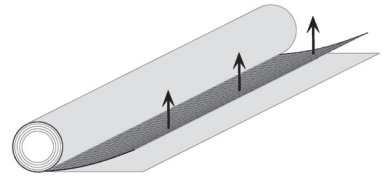
HaTelit® BL

Installation procedure at a glance:

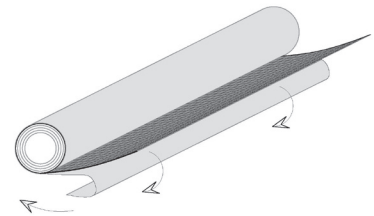
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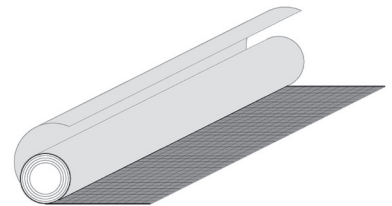
2. Unroll approx. 10" or (25 cm) of the sheet and carefully peel off release film. Ensure that asphalt bitumen backing does not come into contact with itself, as they will stick together and be difficult to pull apart.



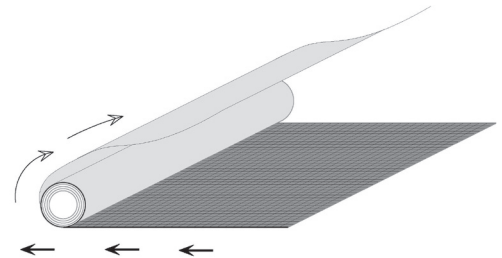
3. Fold back peeled release film under roll and apply exposed bitumen backing to base. Slightly press down contact surface of HaTelit® BL and then roll sheet back.



4. Pull release film upwards and unroll HaTelit® BL. Finally apply pressure using broom or small roller.



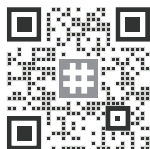
5. BL can be carefully cut using a sharp knife...




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