



# BOSTIK

## GREENFORCE®

### ADVANCED TRI-LINKING™ ADHESIVE, MOISTURE VAPOR CONTROL & SOUND REDUCTION MEMBRANE

TECHNICAL DATA SHEET 09/22/2023

#### SMART ADVANTAGES

- Easy clean before and after cure
- Lifetime warranty for unlimited moisture vapor protection
- Superior bond strength & green grab

#### DESCRIPTION

GreenForce® is a high-performance adhesive, sound reduction membrane, and moisture vapor control membrane all in one. Bostik's breakthrough AXIOS® Tri-Linking™ Polymer Technology used in this formulation maintains the superior long-term durability and moisture vapor protection properties of high-end urethane adhesives. However, it is easier to spread on and clean off of prefinished flooring before and after cure. This adhesive has zero VOCs (as calculated per SCAQMD Rule 1168) and does NOT contain any water. GreenForce® comes with Bostik's BLOCKADE® antimicrobial protection, which inhibits the growth of bacteria, mold, or mildew on the surface of the cured membrane. The cured membrane resists stains caused by mold.

#### SUPERIOR MOISTURE VAPOR PROTECTION

GreenForce® has extremely low moisture-vapor permeability and is not adversely affected by moisture vapor. As a result, costly and time-consuming concrete moisture vapor testing is not required when the slab is properly prepared, dry to the touch, and fully cured.

#### ANTI-FRACTURE PERFORMANCE

GreenForce®'s elastomeric characteristics establish an anti-fracture membrane that can bridge cracks up to 1/8" (3 mm), which can occur in the substrate prior to or after installation. This superior elasticity allows the adhesive to move with the wood as it expands and contracts with changes in humidity and temperature over the life of the floor.

#### ULTIMATE VERSATILITY

This high-performance formulation may be used to adhere all engineered, solid, bamboo, cork, and parquet flooring. GreenForce® has no restrictions on board width or length. It may be used over all properly prepared substrates common to hardwood flooring installations including concrete, plywood, well-bonded vinyl/VCT and ceramic tile, cement backer board, gypsum underlayments (dry, above grade), cement patch/underlayments, radiant-heat flooring, properly prepared terrazzo, and recycled rubber underlayments. This adhesive can also be used to install plywood as described, as well as ceramic tile, marble, and stone inlays for light commercial and/or residential applications.



#### LEED® CONTRIBUTION

This 0-VOC formulation (as calculated per SCAQMD Rule 1168), may contribute toward LEED® v4 EQ Credit – Low-Emitting Materials, Interior Adhesives, and Sealants.

#### DIRECTIONS FOR USE

Read and understand data sheet completely before beginning installation. Follow industry standards, as well as flooring manufacturer's recommendations for acclimation, design, layout, and application of wood flooring material. If jobsite conditions are outside of flooring manufacturer's recommendations, take necessary corrective actions. Whether the moisture content of substrate exceeds or is within the flooring manufacturer's recommendations, to address current or possible future subfloor moisture vapor and cracks (up to 1/8"), apply GreenForce® as directed.

#### SURFACE PREPARATION

Surfaces must be absorptive, clean, free from loose materials, oil, grease, sealers, curing compounds, waxes, silicates, laitance, and all other surface contaminants that may inhibit proper bond. Completely remove cutback adhesive residue or other surface contaminants by diamond grinding or shot blasting to open the pores of the concrete. All surfaces to be treated must have a concrete surface profile (CSP) of 1-3 (similar to a broomed finish), as defined by the International Concrete Repair Institute (ICRI), Guideline No. 03732. Maximum acceptable floor variation is 3/16" in 10 feet. Areas requiring patching

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or leveling must be done using a Portland-cement-based material (e.g., Bostik Webcrete® 95, Webcrete® 98, SL-100™, SL-150™, SL-175™, SL-200™, SL-Rapid™, or UltraFinish™ Pro).

**PLEASE NOTE:** Concrete substrate should **NOT** be smooth and reflective; it must have a concrete surface profile of CSP 1–3 similar to a broomed finish, as defined by ICRI (Guideline No. 03732). It also must be tested in accordance with ASTM F3191 and be found porous, where a ¼" drop of water must absorb into the concrete within 1 minute.

## INSTALLATION

The installation begins with a starter row secured to the subfloor; the starter row provides a stationary point to push against so flooring doesn't move during installation. Once the starter row is secured, apply adhesive/membrane to substrate using the appropriate trowel. See the chart on last page for proper trowel selection. Flooring may be installed using a "wet-lay" method of installation. For wet-lay installations, spread the adhesive and begin to install the flooring immediately. Periodically lift boards immediately after installation to ensure proper slab coverage and transfer to the back of the flooring. If a thin skin forms on the adhesive on the slab prior to installation of the flooring, it may be possible to re-trowel the adhesive and obtain proper coverage and transfer. Re-trowel 90° to the ridges, and if no sign of the original trowel marks remains, install additional flooring and check coverage and transfer. Adhesive that has cured too much prior to installation of the flooring must be mechanically removed and fresh adhesive applied.

Although it is relatively easy to remove GreenForce® adhesive from the face of prefinished hardwood even after cure, it is recommended to clean with a nonabrasive towel as you work prior to cure. After a few rows have been installed, and as you move across the room, tape the boards together using removable 3M #2080 blue tape to prevent boards from sliding and to secure close-fitting joints. Rolling is recommended for most installations. For some sensitive, factory-applied finishes such as oil-based finishes, tape and rolling may not be recommended. Test to ensure that tape removal after rolling does not harm finish. Flooring that is not flat should be weighted or rolled to ensure proper contact between the flooring and substrate.

**Plywood Over Concrete:** Score 4' x 4' or 2' x 8' sheets of 3/4" exterior-grade plywood on the backside every 8" to 10" by using a circular saw and cutting one-half the thickness of the plywood; scoring takes the tension out of the plywood and helps to prevent possible warping or curling. Using a recommended trowel, apply adhesive/membrane to substrate, and then set plywood into the wet adhesive/membrane. For moisture vapor protection, ensure 100% coverage and transfer. Allow the adhesive/membrane to fully cure before nailing or using GreenForce® adhesive/membrane to install flooring. Make sure that nails do not penetrate through the GreenForce® membrane; doing so will void the moisture vapor protection warranty.

## GLUE ASSIST

**GreenForce® in cartridges may be used for glue assist of mechanical fasteners on wood subfloors when suggested or required by wide-plank flooring manufacturers.** Cut the tip of the nozzle at a 45-degree angle to produce a bead of adhesive between 1/4" and 3/8" in diameter. Puncture the foil seal inside nozzle. Gun adhesive onto the back of the plank in an S pattern within 1" (2.5 cm) of long edges and repeating every 6–8" (15–20 cm). Press plank firmly into place, then set mechanical fasteners per the flooring manufacturer or NWFAs guidelines. Average coverage at 1/4" diameter bead produces 85 linear feet per 28 oz. cartridge.

**PLEASE NOTE:** Glue assist is for bond only and offers no moisture vapor protection. As a result, glue assist should only be performed on subfloors that have moisture vapor mitigation or environmental controls beneath that match the temperature and humidity levels of the space above. Do not apply adhesives over asphalt felt papers or other loose-lay underlayments.

## CLEANUP

Whereas GreenForce® bonds tenaciously to concrete and flooring, it is designed not to bond with most finishes on prefinished flooring, making it relatively easy to remove from the finish even after cure. It is recommended to clean with a dry, nonabrasive towel as you work prior to cure. After cure, adhesive may be removed with a plastic scraper and dry, nonabrasive towel, taking care not to damage the finish. Immediately clean all tools and equipment before material cures.

**Trowel Cleanup Tip:** Before beginning, use duct tape or blue tape to cover areas of the trowel that will not be used to spread the adhesive. After use, simply tear off tape before material cures, and clean the remainder of the trowel with a towel.

## STORAGE/SHELF LIFE

Store at temperatures between 50°F (10°C) and 100°F (38°C). Shelf life is one year from date of manufacturing in closed, original packaging.

**Reseal partially used container:** Clean all adhesive residue off of the lip of the pail and the groove around the perimeter of the lid. Plastic (e.g., a trash bag) may be placed into the pail to cover the wet adhesive, especially in high-humidity environments, but do not allow the plastic to extend outside of the pail and interfere with the seal of the pail with the lid. Use a rubber mallet to fully seat the lid on the pail. Do not turn the pail over.

**Reopen partially used container:** Remove the lid. Peel cured material away from pail and discard cured material and plastic from the top of the pail. Any uncured material may be used.

## LIMITATIONS

- Periodically check coverage of adhesive during installation; 100% substrate coverage and adhesive transfer is required to protect against damages from subfloor moisture vapor.
- Due to limitations with solid and bamboo wood flooring (e.g., lack of dimensional stability), "below-grade" installations are limited to engineered hardwood flooring.
- On- or below-grade substrates must have appropriate vapor barrier (6 mil poly or better) properly installed below slab.
- Do not install solid wood flooring over VCT/vinyl.
- Bamboo installations should follow solid hardwood flooring installation recommendations.
- Slab temperature should be between 50°F (10°C) and 95°F (35°C) during installation.
- Do not use on wet, dusty, contaminated, glassy, smooth, or friable substrates; do not use over substrates/slabs treated with sealers or curing compounds; do not use in areas subject to hydrostatic head.
- Completely remove all adhesive residue and other surface contaminants from the slab by diamond grinding, shot blasting, or scarifying.

- Do not use over perimeter-bonded flooring material.
- Use over gypsum-based/underlayment is limited to dry, "above-grade" installations where the gypsum has dried hard (not dusty/powdery), with a minimum compressive strength >2,000 psi for engineered hardwood installations, or minimum compressive strength >2,500 psi for solid hardwood installations.
- Please refer to flooring manufacturer's recommendations and NWFAs specifications for proper acclimation, verification of moisture vapor content of flooring with a moisture meter, and expansion relief around perimeter throughout installation.
- Do not use vinyl-backed cork flooring or foam-backed parquet.
- This membrane does **NOT** reduce/affect issues originating from the sides, ends, or top of flooring (i.e., puddles, water, leaks, wet mopping, hydrostatic head, etc.).
- This membrane does **NOT** eliminate all possible moisture-related or installation-related issues (i.e., improper acclimation of flooring, jobsite temperature/relative humidity, etc.).
- This membrane is designed to prevent excessive variance of moisture between the top, middle, and bottom of flooring that originates from the substrate.

#### PACKAGING

Available in 4-gallon plastic pails (36 pails/pallet) and 28-ounce cartridges (12/case, 60 cases/pallet).

#### CAUTION

IRRITANT. MAY IRRITATE EYES, SKIN, OR RESPIRATORY TRACT. CONTENTS MAY BE HARMFUL IF SWALLOWED OR INHALED. Methanol may form during curing. Do not breathe fumes. Do not get in eyes, on skin, or on clothing. Do not swallow. Handle with care. Use only in a well-ventilated area or wear a mask. Wear protective clothing including gloves. Wash thoroughly after handling. Store in a cool, dry area. Do not reuse container.

**KEEP OUT OF REACH OF CHILDREN**

#### FIRST AID TREATMENT

Contains quartz silica inextricably bound in a polymer matrix. clothes, remove clothing. If breathed in, move person to fresh air. If swallowed, call a Poison Control Center or doctor immediately. Do not induce vomiting.

**SEE SAFETY DATA SHEET**

**Chemical Emergency:** 800-424-9300 (USA), 703-527-3887 (International)

**Medical Emergency:** 866-767-5089

#### OPEN-TIME CHART

	Humidity		
	40%	60%	80%
60°F (16°C)	2.3 Hours	2.0 Hours	1.0 Hours
70°F (21°C)	2.0 Hours	1.0 Hours	45 Minutes
80°F (27°C)	1.0 Hours	45 Minutes	30 Minutes

Note: This chart is for reference only; actual jobsite times may vary.

CHEMICAL & PHYSICAL PROPERTIES				
<b>Use Environments</b>	Residential	Yes		
	Offices/Light Commercial	Yes		
	Heavy Commercial	Yes		
	Offices	Yes		
	Hospital	Yes		
	Exterior	No		
	Wet Areas	No		
<b>Substrates</b>	Concrete	Yes		
	Plywood	Yes		
	OSB	Yes		
	Recycled Rubber Underlayment	Yes		
	Well-Bonded Vinyl	Yes		
	Terrazzo	Yes		
	Ceramic Tile	Yes		
	Cement Backer Board	Yes		
	Gypsum Underlayments <sup>1</sup>	Yes		
	Cement Patch/Underlayment	Yes		
<b>Flooring Types</b>	Solid Hardwood	Yes		
	Engineered Hardwood	Yes		
	Bamboo	Yes		
	Cork	Yes		
	Parquet	Yes		
	Plywood	Yes		
	Ceramic Tile, Marble, Stone Inlays <sup>2</sup>	Yes		
	<b>Cured Physical Properties</b>	<b>Cure Time<sup>3</sup></b>		
Light foot traffic		8 to 12 hours		
Normal foot traffic		12 to 24 hours		
Water Vapor Permeability <sup>4</sup>		<0.4		
<b>Concrete Moisture Vapor Limits for subfloor moisture vapor protection:</b>				
ASTM 1869 Calcium Chloride Method		None, Dry to the Touch		
ASTM 2170 Relative Humidity Test		None, Dry to the Touch		
Elongation	>100%			
Service Temperature	-40°F to 150°F (-40°C to 66°C)			
<b>Sound Reduction Performance</b>	<b>ASTM E492-09 IIC</b>			
	8" concrete slab with no ceiling	51 dB		
	8" concrete slab with 1 layer 5/8" gypsum board ceiling	66 dB		
	<b>ASTM E90-09 STC</b>			
	8" concrete slab with no ceiling	57 dB		
8" concrete slab with 1 layer 5/8" gypsum board ceiling	61 dB			
<b>Application Properties</b>	Application Temperature	50°F to 100°F (10°C to 38°C)		
	Ease of Troweling	Excellent		
	Odor	Mild		
	Open/Working Time <sup>5</sup>	60 min		
	Color	Beige		
	Density (lbs/gallon)	14.25		
	Percentage of Water <sup>6</sup>	0%		
	Percentage of Adhesive Coverage Required:	For Moisture vapor Protection	For Bond	
	Engineered	100%	>80%	
	Solid	100%	>95%	
<b>Chemical Properties</b>	Chemistry Type	1-Part AXIOS® Tri-Linking™ Polymer		
	Adhesive Type	Moisture Cure		
	VOC Compliant (calculated per SCAQMD Rule 1168)	Yes (0 g/L)		
	Flash Point	>200°F (>93.3°C)		
<b>LEED® Contribution</b>	IEQ Credit – Low-Emitting Materials, Interior Adhesives, and Sealants.	Up to 3 points <sup>7</sup>		

<sup>1</sup>Dry, above grade. <sup>2</sup>Residential or light commercial only. <sup>3</sup>Humidity affects cure to a greater degree than temperature; the higher the humidity, the faster the cure. Under normal conditions, light foot traffic is acceptable after 6-8 hours; normal traffic after 12-16 hours. <sup>4</sup>Per ASTM E-96 Standard Test Methods for Water Vapor Transmission of materials. Ratings are g/m<sup>2</sup>-24 hour-mmHG. <sup>5</sup>Please refer to the Open-Time Chart. <sup>6</sup>Per ASTM E203-01, Standard Test Method for water using Volumetric Karl Fischer Titration Method. Results rounded to the nearest tenth. Test Method has error range of +/- 0.2%. <sup>7</sup>Per LEED® BD+C point rating system, taking into account all other interior adhesives and sealants used on site.

## TROWEL SELECTION

In order to form a membrane that functions properly for moisture vapor protection and/or sound reduction, the right trowel needs to be selected to achieve both 100% coverage of the substrate and 100% transfer to the back of the flooring. Jobsite conditions, profile of the substrate, depth of back channeling in the flooring, and other factors affect the amount of adhesive that must be applied to achieve proper coverage and transfer. Always pull a board at the beginning of and during the installation process to confirm adequate coverage and transfer. Trowel size may need to be changed to achieve the required coverage and transfer. See trowel suggestions below.

## ADHESIVE, MOISTURE VAPOR MEMBRANE, & SOUND INSTALLATION METHOD

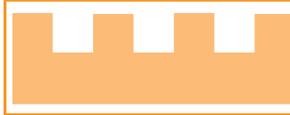
### Suggested Notched Trowel (For use as an adhesive only, refer to adhesive-only installation method.)

Solid, engineered, or bamboo wood flooring up to 5/8" thick.  
Coverage: 30-35 sq ft per gallon

Solid, engineered, or bamboo wood flooring >5/8" thick, or plywood.  
Coverage: 20 sq ft per gallon



1/4" x 1/4" V-Notch



1/4" x 1/4" x 1/4" Square Notch



1/2" x 15/32" V-Notch



1/4" x 3/8" x 1/4" Square Notch

Trowel size is suggested to maximize coverage of adhesive. Periodically lift a board to ensure the following conditions are being met: 100% coverage of concrete substrate and 100% transfer to the back of the flooring product. Uneven subflooring may require the use of either a leveling/patching material, or a larger V-notched trowel for proper coverage of adhesive.

## ADHESIVE-ONLY INSTALLATION METHOD

### Suggested Notched Trowel (For use as an adhesive, sound, and moisture vapor control membrane, refer to chart above.)

Engineered hardwood flooring ≤1/2" thick.  
Coverage: 50 sq ft/gallon

≤1/2" Parquet, or cork underlayment.  
Coverage: 80 sq ft/gallon

Engineered hardwood flooring >1/2" thick, solid wood or bamboo flooring ≤1/2" thick, and parquet ≤3/4" thick.  
Coverage: 40 sq ft/gallon

Solid wood or bamboo flooring >1/2" thick, or plywood.  
Coverage: 35 sq ft/gallon



3/16" x 5/32" V-Notch



1/8" x 1/8" x 1/8" Square Notch



1/4" x 1/4" x 1/8" Square Notch



1/4" x 1/4" x 1/4" Square Notch

Trowel size is suggested to maximize coverage of adhesive. Periodically check coverage of adhesive during installation: >80% coverage and transfer to the back of the flooring is required for all engineered wood flooring; >95% coverage and transfer is required for all solid wood flooring or bamboo flooring products.

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