

# LEVELINE<sup>®</sup> FLAT AND SMOOTH

HIGH-PERFORMANCE, CEMENT-BASED, SMOOTHING & LEVELING UNDERLAYMENT

## DESCRIPTION

LEVELINE<sup>®</sup> FLAT AND SMOOTH is a fast-setting, Calcium Aluminate, cement-based, interior, self-leveling floor underlayment that is used to create a thin, level, flat and smooth durable surface prior to the installation of finished floor coverings. A single application can increase production and lower costs of standard trowel-applied, multi-coat patching methods, while producing a smoother surface.

## APPLICATIONS

Concrete  
Wood  
Well-bonded cutback and adhesive  
Terrazzo, ceramic or quarry tile

For applications to other substrates, contact Penetron Specialty Products Technical Support.

NOTE: It is the responsibility of the installer/applicator to ensure the suitability of the product for its intended use.

## ADVANTAGES

Suitable for use on all residential, commercial, and institutional applications  
Ideal for barrel mixing or pumping applications  
Can be installed from feather edge up to 1/2" (13 mm)  
Maintains healing and pour merging properties for over 25 minutes  
Accepts common floor coverings, installed with water based adhesive, in as little as 16 hours  
No dangerous emissions or irritating fumes  
Will not contribute to the growth of mold or mildew  
Environmentally friendly, may be LEED eligible. Contact Penetron Specialty Products Technical Support for details  
Moisture resistant and non-gypsum based; contains no protein additives  
Lower alkali binder system creates an alkali barrier system from the underlying concrete when installed at  $\geq 1/4"$  (6 mm) thick. This protects organic adhesives and coatings from alkali decomposition and secondary VOC emissions up to 90% RH (water of convenience)

## TECHNICAL DATA

### Compressive strength (ASTM C109):

4 hours	1500 psi (10.3 MPa)
1 day	2500 psi (17.2 MPa)
28 days	4000 psi (27.6 MPa)

### Flammability (ASTM E84):

Flame spread	-0-
Fuel contribution	-0-
Smoke development	-0-

### Approximate coverage (Yield) per 50-lb (22.7-kg) bag:

1/16" (2 mm)	100 ft <sup>2</sup> (9.3 m <sup>2</sup> )
1/8" (3 mm)	50 ft <sup>2</sup> (4.7 m <sup>2</sup> )
1/4" (6 mm)	25 ft <sup>2</sup> (2.3 m <sup>2</sup> )

### Installed weight:

1/16" (2 mm)	0.58 lb/ft <sup>2</sup> (2.8 kg/m <sup>2</sup> )
--------------	--

### Application temperature range:

50-95°F (10-35°C)

NOTE: Above 85°F (29°C), use ACI Hot Weather Application Guidelines.

### Set (ASTM C191):

Flow time	25 minutes
Final set	1 hour 15 minutes

### Accepts coverings (70°F (21°C), 50% RH):

Thinset ceramic tile	4 hours
Water-based adhesives	16 hours
Epoxy/urethane adhesives	1 day
Epoxy coatings up to 20 mils	1 day
Epoxy coatings over 20 mils	3-5 days

NOTE: Cooler temperatures, inadequate ventilation and higher humidity can extend drying times. All data derived from tests under laboratory conditions; field conditions may yield slightly different results.

## SHELF LIFE / STORAGE

12 months from the date of manufacture, when unopened bags are properly stored in a cool, dry place, unexposed to moisture and sunlight.

## PACKAGING

50-lb (22.7-kg) bags; 2000-lb (907-kg) super sacks

# LEVELINE® FLAT AND SMOOTH

## QUALITY CONTROL: The Fail-Safe System

Due to the many variables that can affect consistency and flow in all leveling products, it is recommended that the Penetron Specialty Products Fail-Safe system be incorporated when mixing the LEVELINE® FLAT AND SMOOTH.

Please obtain a Fail-Safe kit from Penetron Specialty Products Technical Support prior to mixing. The Fail-Safe flow test procedure can be viewed on the Penetron Specialty Products website: [www.penetronsp.com](http://www.penetronsp.com) in the Technical & Video Resources section.

- To ensure proper consistency and performance, the flow of the material using the Fail-Safe ring should never exceed 12.25" (31 cm).
- As a baseline, mix a 2-bag batch. For each bag, start with 6.5 qt (6.2 l) of water per bag, holding 0.5 qt (0.47 l) per bag in reserve.
- Mix to a smooth, lump free consistency and check flow with the Fail-Safe ring. If more flow is desired, slowly add reserve water until the desired flow is achieved, never to exceed 12.25" (31 cm) of flow or the water to exceed 7 qt (6.6 l) per bag.
- Determine the water required to get the desired flow and monitor batches using the Fail-Safe method, making adjustments as necessary to achieve the desired flow, not to exceed 12.25" (31 cm).
- For pumping installations, the mixed material at the end of the hose should produce the same result as the baseline test.

## DIRECTIONS FOR USE

LEVELINE® FLAT AND SMOOTH is not a vapor barrier. Penetron Specialty Products recommends testing per ASTM F1869 for Moisture Vapor Emission Rate (MVER) and ASTM F2170 for RH. If the substrate exceeds 8 lb (3.6 kg) MVER or 95% RH or the readings exceed those of a coating, adhesive or flooring manufacturer's product that will be applied (whichever is stricter), use VB 225™ prior to installation.

### Surface preparation:

**All surfaces:** Using foam tape or caulking, isolate at all perimeters and sharp corners, such as column bases, pedestals, supports, etc. Surfaces must be clean, sound, dry, minimum 50°F (10°C) and free of oil, gypsum compounds, wax, grease, sealers, coatings, curing compounds, urethane, paint, asphalt, dirt, loose surface material or any contaminant that will act as a bond breaker. Never use acid or mastic removers on any surface to which a Penetron Specialty Products flooring product will be applied. Honor all existing expansion joints, control joints and moving cracks. Failure to do so could result in delamination or cracking of the LEVELINE® FLAT AND SMOOTH.

**Concrete:** Weak surfaces must be cleaned to solid, sound concrete by mechanical means, such as chipping, shot-blasting, grinding or scarifying; remove all dust prior to priming. Reference the International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) standards of #2 to #3 for acceptable profile height.

**Non-porous:** Substrate must be sound and fully bonded. Shot-blast ceramic and quarry tile substrates. Grind or shot-blast terrazzo and epoxy coatings; remove all dust prior to priming. Reference the International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) standards of #2 to #3 for acceptable profile height.

**Wood:** Prepare by sanding to clean bare wood. Secure loose boards with deck screws and fill open seams with SURFIX™

FEP. Subfloors must be minimum 3/4" (19 mm) solid hardwood, untreated, APA rated, tongue & groove, type 1, exterior grade plywood, OSB or equal. The subfloor must be free of deflection (minimum L/360), considering both live and dead loads. Use an approved anti-fracture membrane over LEVELINE® FLAT AND SMOOTH in areas where ceramic tile or stone are being installed. After priming, install flat diamond expanded metal lath, weighing 3.4 lb/yd<sup>2</sup> (1.8 kg/m<sup>2</sup>), over the entire area, overlap seams 1" (2.5 cm) and fasten every 6" (15 cm). Be sure to keep the application of LEVELINE® FLAT AND SMOOTH within the 24 hour open time of the PRIMER STX 100™ coat. For best results, apply a 3/8" (10 mm) minimum of LEVELINE® FLAT AND SMOOTH.

**Metal:** Contact Penetron Specialty Products Technical Support for specific recommendations for application over metal.

**Adhesive residue:** LEVELINE® FLAT AND SMOOTH can be installed over thin (translucent), sound, non-water soluble adhesive residues that are free of tack and well-bonded to the substrate. The adhesive cutback needs to be prepared using the wet scrape method, as outlined in the Resilient Floor Covering Institute booklet, "Recommended Work Practices for the Removal of Resilient Floor Coverings." Remove all patching materials below the adhesive and avoid applications where heat or excessive moisture will soften or degrade the adhesive.

### Priming:

**All surfaces:** Allow primer to dry for a minimum of 1 hour and a maximum of 24 hours.

**Concrete:** Dilute PRIMER STX 50™ or PRIMER STX 100™ 1:1 with clean water and apply evenly using a clean push broom. Apply a thin coat and work into the surface; leave no bare spots or puddles. Broom out puddles that may form while primer is drying.

On very porous concrete, do an initial primer application diluted 3:1 water to PRIMER STX 50™ or PRIMER STX 100™ in the same manner. Allow to dry before applying a second coat at 1:1.

# LEVELINE® FLAT AND SMOOTH

**Non-porous, wood & adhesive residue:** Apply 1 coat of undiluted PRIMER STX 100™ using a 3/8" nap roller. Apply a thin film; leave no puddles or bare spots.

**1:1:1 priming option:** Mix equal parts by volume of PRIMER STX 100™, water and LEVELINE® FLAT AND SMOOTH. While continuously mixing to maintain a homogenous consistency, pour onto substrate and brush (open bristle push broom) out as thin as possible, leaving no thick build-ups. Allow PRIMER STX 100™ to dry.

**Metal:** Contact Penetron Specialty Products Technical Support for specific priming recommendations.

For coverage rates and additional priming details, refer to the PRIMER STX 50™ or PRIMER STX 100™ Product Data Sheets. LEVELINE® FLAT AND SMOOTH must be applied within 24 hours of priming to ensure a good bond is achieved between primer and substrate.

## Mixing:

**Concrete, non-porous & adhesive residue:** Mix 2-bag batches of LEVELINE® FLAT AND SMOOTH. For each bag, add 6.5 qt (6.2 l) to a maximum 7 qt (6.6 l) of clean water into a mixing barrel. Then, add bags of LEVELINE® FLAT AND SMOOTH while mixing at full speed with an egg-beater type mixing paddle attached to a heavy duty 1/2" drill (min. 650 rpm). Mix for 2 minutes or until lump free. Add NO additional water and keep the mixing paddle immersed in the material to avoid entraining excess air.

Refer to the QUALITY CONTROL: The Fail-Safe System section (on top of Page 2) for proper consistency, flow and water addition limits. The amount of water used is dependent on the maximum flow of 12.25" (31 cm).

**Wood & metal:** The addition of ACRYLIC BONDCRETE is required to increase the resiliency of LEVELINE® FLAT AND SMOOTH for applications over wood and metal. Mix in the same manner, but for each bag of LEVELINE® FLAT AND SMOOTH, combine 2 qt (1.9 l) ACRYLIC BONDCRETE and between 4.5 qt (4.3 l) to a maximum of 5 qt (4.7 l) of clean cold water, observing the same maximum flow of 12.25" (31 cm), as described in the QUALITY CONTROL: The Fail-Safe System procedures.

## Installation:

Prior to starting the installation, close all doors, windows and protect work area from direct sunlight. These variables can cause uneven curing patterns. It is also recommended to set up a mixing station where all product mixing takes place. Dusting usually occurs in the mixing area and could have a negative effect on the product's bond to the substrate. Limiting the areas where mixing occurs will help keep the floor clean and contaminant free.

**Barrel mixing:** Pour the blended LEVELINE® FLAT AND SMOOTH on the floor immediately and disperse with a gauge rake followed by finishing with a flat blade smoother. Plastic

athletic type cleats should be worn when using the smoother to avoid leaving marks. LEVELINE® FLAT AND SMOOTH will maintain its workability and healing properties for up to 25 minutes.

**Pumping:** LEVELINE® FLAT AND SMOOTH can be mechanically mixed using either an in-line continuous mixer and pump or a batch mixer. Most important is calibrating and adjusting the pumps water to powder ratio. The Fail-Safe flow test is critical when pumping and should be utilized periodically throughout the pour to ensure proper mixing. The minimum required hose length is 100 ft (31 m) for in-line mixers.

**NOTE:** For horizontal applications greater than 300 ft (91.4 m) and vertical applications greater than 40 ft (12.2 m), contact Penetron Specialty Products Technical Support for assistance.

Prior to starting, make sure the mixer and pump are completely clean and in good working order. Refer to the manufacturer instructions for specific maintenance and cleaning.

Prior to installation, adjust the pump to ensure proper mixing and uniform distribution of material are achieved throughout the mix. Do not overwater, as this will lower the strength, create dusting and may cause cracking.

To avoid segregation and overwatering during installation, the water settings may periodically require adjusting. Check the product consistency to ensure a uniform distribution of material during the pumping process.

On the end of the hose, attach a mesh-screen sock to trap any foreign or unmixed material. Always test the pump using the actual maximum hose length and conditions before installation to ensure proper application and appearance are achieved.

**NOTE:** The conditions that can affect the overall performance are, but not limited to, length of hose, water temperature, water pressure, substrate, ambient air temperature and powder temperature.

**Deep placements and large projects:** Can be efficiently installed with the use of a pump. As the material is pumped on the floor, follow the "Barrel Mixing" procedures for placement.

Contact Penetron Specialty Products Technical Support for additional instructions, recommended pumping procedures and approved equipment.

## Extension:

Contact Penetron Specialty Products Technical Support for applications over 1/2" (13 mm).

## Curing:

LEVELINE® FLAT AND SMOOTH is self-curing. Do not use damp curing methods or curing and sealing compounds. Protect from excessive heat, cold, direct sunlight and forced air movement conditions during its initial curing stage and for the first 24 hours. These variables can cause uneven curing patterns, a false set, and cracking.

# LEVELINE® FLAT AND SMOOTH

## APPLICATION TOOLS

Mixing barrel, mixing paddle (egg-beater type), gauge rake spreader, flat blade smoother, cleats and 1/2" heavy duty drill (minimum 650 rpm). Penetron Specialty Products has mixing kits and Fail-Safe kits available for purchase.

## CLEAN UP

Clean all tools and equipment with water immediately after use, prior to material hardening.

## SPECIAL CONSIDERATIONS

- Penetron Specialty Products recommends installing a test area, ensuring suitability of LEVELINE® FLAT AND SMOOTH for intended use
- Substrate must have a minimum direct tensile bond test reading of 72 psi per ASTM C1583
- Do not install over gypsum underlayment. Contact Penetron Specialty Products Technical Support for specific recommendations over gypsum underlayments
- This product is ready to use with the addition of water. DO NOT add any materials or additives to mixture other than those described above

## JOB MOCKUPS

Penetron Specialty Products recommends that when our products are used in any application or as part of any system that includes other manufacturers' products, the installer and/or design professional shall test all the system components collectively for compatibility, performance and long-term intended use in accordance with pertinent and accepted industry standards prior to any installation. Written documentation of the tests performed shall be satisfactory to the design professional and installer. Test results must include the means and methods of application, products used, project specific conditions being addressed, and standardized tests performed for each proposed system or variation.

## SAFE HANDLING INFORMATION

Before using this product, review the LEVELINE® FLAT AND SMOOTH Safety Data Sheet (SDS) that can be found on the Penetron Specialty Products website: [www.penetronsp.com](http://www.penetronsp.com). Avoid contact with eyes and wear suitable protective eyewear. Avoid prolonged or repeated contact with skin. Wear gloves and suitable protective clothing. Do not breathe dust. In case of insufficient ventilation, wear respiratory equipment. For additional information regarding first aid and emergency procedures, refer to the product Safety Data Sheet (SDS).

## Waste disposal:

This product, when discarded or disposed of, is not listed as a hazardous waste in federal regulations. Dispose in a landfill in accordance with local regulations.

KEEP OUT OF REACH OF CHILDREN

**WARRANTY:** PENETRON SPECIALTY PRODUCTS INC. warrants that the products manufactured by it shall be free from material defects and will conform to formulation standards and contain all components in their proper proportion. Should any of the products be proven defective, the liability to PENETRON SPECIALTY PRODUCTS INC. shall be limited to replacement of the material proven to be defective and PENETRON SPECIALTY PRODUCTS INC. shall in no case be liable otherwise or for incidental or consequential damages. **PENETRON SPECIALTY PRODUCTS INC. MAKES NO WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED.** User shall determine the suitability of the product for its intended use and assume all risks and liability in connection therewith.

This Product Data Sheet has been prepared in good faith on the basis of information available at the time of publication. It is intended to provide users with information about and guidelines for the proper use and application of Penetron Specialty Products under normal environmental and working conditions. Because each project is different, PENETRON SPECIALTY PRODUCTS INC. cannot be responsible for the consequences of variations in such conditions, or for unforeseen conditions.

**PENETRON SPECIALTY PRODUCTS INC.**  
45 Research Way, Suite 203, East Setauket, NY 11733  
(631) 941-9700 • [info@penetronsp.com](mailto:info@penetronsp.com) • [penetronsp.com](http://penetronsp.com)