

1. What is the correct way to mix Surface Armor™?

First, Elephant Armor Primer is diluted to a 1:1 ratio with clean water to create the required liquid mixture for Surface Armor™.

The standard mix for most applications ranges from 1:1 to 2:1, meaning 2 parts Surface Armor™ with 1 part EA Primer/water mixture, by volume. Adjust your ratio based on the flow-ability and material consistency required for the specific application.

Mix the dry contents in a clean and dry bucket to 'fluff' the material prior to adding the EA Primer/water mixture. Add the EA Primer/water mixture and mix thoroughly using a ColloMix Xo-55 Duo. For small amounts of material, 10 lbs (4.5kg) or less, a ½" (12mm) drill with an egg beater bit is acceptable.

Mix for approximately 60 seconds or until the Surface Armor™ achieves the consistency desired.

NOTE: Surface Armor™ has a short work-ability period with an initial set time of 15-20 minutes

2. How do I prepare the damaged substrate before applying Surface Armor™?

- Surfaces to be treated with the Surface Armor™ System must be clean, sound and free from contaminants that can act as a bond breaker (such as oil, grease, dirt, curing compounds, acids, etc.) Mechanically roughen or high-pressure water jet (typically 4500 psi minimum water pressure) the existing concrete substrate to an ICRI concrete surface profile (CSP) of CSP4 or higher. This must remove any unsound concrete, oil, grease, curing compounds, coatings, or other materials that may affect proper bonding.
- The surface may require pre-treatment with GST International Degreaser Pro or Pro-Grade Cleaner, followed by power-washing to clean the contaminated surface.
- If the substrate is very porous or powdery, we recommend that you apply a mist coat of Ecobeton®-USA Vetrofluid® at a rate of 250 ft²/gal. to stabilize the surface. Allow 72 hours curing time prior to the placement of Surface Armor™. The contaminants that are displaced by this initial application of the Vetrofluid® SA, should be thoroughly rinsed off (power washed) prior to the Surface Armor™ application. This procedure also displaces moisture and reduces water vapor transmission. This can be used as a final rinse before applying Surface Armor™.
- During the months when the weather is 50°F (10°C) on average or lower, allow a MINIMUM of 5 days after the LIGHT application of the Vetrofluid®, before applying the Surface Armor™.
- On warmer days, allow a minimum of 72 hours (3 days) after a light coat of Vetrofluid® SA is applied for Vetrofluid® to cure.
- After curing, rinse the surface with a power washer to remove any displaced contaminants.
- The concrete substrate must be Saturated Surface DRY (SSD), and free of standing water before applying the Surface Armor™ overlay.

NOTE: Minimum temperatures for application and curing should be 40° F (5°C) during the entire process (Including nights). Freezing temperatures may cause failure. When applying the Surface Armor™ in cooler temperatures, it is recommended to keep the EA Primer and the Surface Armor™ at room temperature. Using a torch to heat the substrate prior to placement may also be done to promote the bonding and curing process.

3. What are the application rates of Vetrolfluid® SA for pre-treatment and post-treatment?

Pre-treatment: Ecobeton®-USA's Vetrolfluid® SA must be applied at a rate of approximately 250-300 sq ft/gal (6-7.3 m/L) as a pre-treatment on the hard-troweled (smooth) concrete surfaces to be repaired.

Application on porous or broom finished concrete should be applied at a rate of approximately 150-250 sq ft/gal (3.7-6 m/L). Any excess or pooling on the surface should be back rolled or removed immediately during application. Using a broom to disperse the material after it is sprayed on the surface will ensure proper dispersion. Excess material left to cure on the surface will be a bond breaker for the Surface Armor™.

Post-treatment: After the Surface Armor™ has been applied and has fully cured, an application of the Vetrolfluid® SA should then be done at a rate of approximately 250-300 sq ft/gal (6-7.3 m/L). Any excess left on the surface after application should be back rolled or removed. Brooming the Vetrolfluid® SA will provide a uniform finish.

4. How is Surface Armor™ applied?

Once the area to be resurfaced has been properly cleaned and the Vetrolfluid® SA has fully cured (see #2 above), mix and apply your first coat of the Surface Armor™ micro-topping following the instructions clearly defined on the bag. Over-application is very common, so keeping your mil build to a minimum is extremely important. Using firm down pressure with the squeegee trowel helps to eliminate over-application of the lifts. Lifts of 1/32"-1/16" (1-2 mm) should be the maximum thickness.

For applications on heavily textured surfaces such as exposed aggregate, a squeegee trowel is not recommended. Using a stiff bristle or concrete broom would be the recommended application tool.

After the first lift has fully cured (changed color), apply a second lift if necessary, following the same procedure. Mixing ratios with the Elephant Armor® Primer can vary based on how much "fill" needs to be achieved on the first coat. If spalling or cracking is prevalent, mixing at a higher ratio of Surface Armor™ may be required. A 3:1 ratio would be recommended for the initial coat, followed by a 2:1 ratio (more fluid) on the second and final coat. For extremely thin cracks or micro-fractures of less than 1/8" (4mm), a 2:1 ratio (highly flowable), is recommended. Surface Armor™ MUST be fully cured prior to the final LIGHT coat of the Vetrolfluid® SA product.



To avoid application failure, ensure these steps are followed:

- Surface preparation is very important. See Surface Armor™ Substrate Preparation #2 of page 1.
- Over-application is very common. Lifts of 1/32"-1/16" (1-2 mm) should be the maximum thickness.
- Surface Armor™ MUST be fully cured prior to the final LIGHT coat of Vetrolfluid® SA.
- Minimum temperature for application and curing should be 40°F (4°C) during the entire process (including nights).

NOTE: When mixing ratios are shown for Surface Armor™, it is imperative to understand the first number listed is the Surface Armor™ powder and the second number listed is the Elephant Armor® Liquid Primer. These measurements are by volume, not weight.

5. What is Saturated Surface Dry (SSD)?

Saturated Surface Dry (SSD) is a term used in the field of concrete construction to describe a specific moisture condition of a concrete surface. SSD refers to a state in which the surface of concrete is moist, but not saturated, and does not have any standing water on it.

When applying a concrete overlay to an existing concrete surface, ensuring proper bonding between the overlay and the substrate is crucial for long-term performance. SSD conditions play a significant role in achieving this bond. Here's how it improves bonding:

- 1. Moisture balance:** SSD helps establish a moisture equilibrium between the overlay and the existing concrete surface. This balance ensures that both materials have a similar moisture content, which is essential for the overlay to bond effectively.
- 2. Reduced water competition:** When the existing concrete surface is dry, it can rapidly absorb water from the overlay mix, leading to premature drying and reduced bonding. By saturating the surface and allowing it to reach an SSD condition, the potential for water competition is minimized. This allows the overlay to retain sufficient moisture needed for proper hydration and bonding.
- 3. Enhanced interfacial contact:** A moist surface promotes better contact and adhesion between the overlay and the existing concrete. The presence of moisture can facilitate the formation of chemical bonds and interlocking between the two layers, improving the overall strength and durability of the bond.
- 4. Reduced surface porosity:** SSD conditions help reduce the surface porosity of the existing concrete, limiting the absorption of water from the overlay. This mitigates the risk of excessive water loss or plastic shrinkage cracks in the overlay, which can weaken the bond.

To achieve SSD conditions, the existing concrete surface is typically saturated with water and allowed to reach a state where the surface appears damp but does not have any standing water. This can be accomplished through various methods, such as wetting the surface with a misting spray, using wet burlap or polyethylene sheets, or employing other moisture-retaining techniques.

By optimizing the moisture condition through SSD, the bonding between the concrete overlay and the existing surface is enhanced, leading to a more reliable and durable composite structure.

6. Are there any special instructions for vertical surface applications?

The mixing ratio of Surface Armor™ applications on vertical surfaces should be at 3:1 to limit the potential of runs or streaks. Working the material from the bottom to the top using a GST Squeegee Trowel is the preferred method. If applying Surface Armor™ to stair treads and risers, it is advisable to complete the vertical application prior to the horizontal application. A paint brush or a damp sponge should be used to blend the transition areas together and should be done once the material is in place. Misting the Surface Armor™ with water and using a sponge, brush or smooth roller is an acceptable technique for achieving your desired finish.

7. What are some application tools and equipment used by professionals?

While the primary application tool for applying the Surface Armor™ has been the GST Squeegee Trowel, using a stiff bristle concrete broom has become the preferred method. There are a multitude of other tools and equipment that can be used during the application process, such as: nap rollers, sponges, paint brushes, chip brushes, microfiber pads, steel trowels, etc.

Spray equipment is highly recommended for larger scale vertical applications such as CMU block walls. Multiple types of spray equipment can be used but should be tested prior to full scale application. A ratio of 3:1 is the desired consistency for spraying vertical applications. Once the material has been applied on the vertical surface, finishing tools will be required to achieve the desired results.

8. Can Surface Armor™ be colored with pigments or stains?

Surface Armor™ readily accepts most types of color systems, including Liquid Pigments, Powder Pigments, Acid Stains, Latex Stains, Dyes and Paints. The only coloring system that is NOT compatible is Granular Pigments. Both liquid color and powder color should be added to the Surface Armor™ during the mixing process with the GST Elephant Armor® Primer. It is critical to keep your mixing ratios consistent as color will vary based on the powder to liquid ratio.

9. Can I use a grinder to prepare the substrate before applying Surface Armor™?

The use of aggressive grinding equipment should only be used for the preparation of the area to be treated with the Surface Armor™ System. Any major spalls, cracks or displaced concrete should be filled with GST's Elephant Armor® DOT Mortar, allowed to fully cure, and then ground back to its original elevation prior to the placement of Surface Armor™.



Remove any loose material from the cracks with an angle grinder and leaf blower.



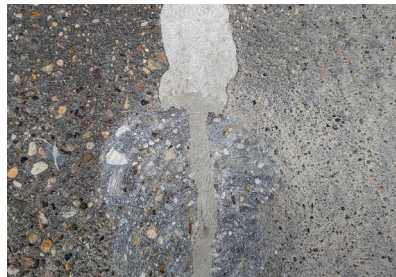
Fill cracks with Elephant Armor® DOT Mortar using a trowel.



Push and flatten the DOT Mortar into cracks with a roller.



Grind the filled cracks to remove any feathered edge.



This photo shows the properly filled and ground crack.



Apply a 1/32" - 1/16" (1-2 mm) coat of Surface Armor™ to the substrate followed by a second coat after curing.

10. Can textured finishes be applied to Surface Armor™?

Surface Armor™ can be finished with multiple textures, including smooth, broomed, and stamped.

A smooth finish can also be achieved using the Surface Armor™ System utilizing a GST Squeegee Trowel and if necessary, a sanding wheel. Apply the Surface Armor™ to the properly prepared concrete using the squeegee trowel, while being careful to limit any ridges, lines or displacements. Two coats are mandatory to achieve a smooth finish and will allow for more aggressive sanding of the Surface Armor™, once fully cured. It is important to use the proper diamond sanding pads. The higher the grit, the smoother the finish that can be attained. Once the desired smoothness has been achieved, the area should be properly cleaned, be dust free and the final LIGHT application of the Vetrofluid® SA should be applied.

Applying a broom finish should be done only on the final coat of Surface Armor™. Once the product has been squeegeed into place, the brooming must be performed immediately. It is best to utilize multiple personnel in order to perform the brooming as the material is being applied. If the finish is not to its desired quality, it can quickly be re-sanded once cured, and another coat can be applied.

Light textured stone stamps or rollers may be used to give texture to the Surface Armor™ on both vertical and horizontal applications. It is mandatory that the mil build of the coat to be stamped be thicker than the standard application and only be done on the final coat being applied. A 3:1 mix will give the desired consistency for stamping or artistic texturing. A standard liquid release (bubblegum release) should be used as is done with traditional stamping. If the stamp finish is going to be stained, do NOT apply the final coat of Vetrofluid® SA. Once the stain has been applied and has cured, traditional film forming protective sealers should be used to protect the finish and achieve the desired look.



A broom finish provides a non-slip surface.



A trowel can be used to match existing surfaces.



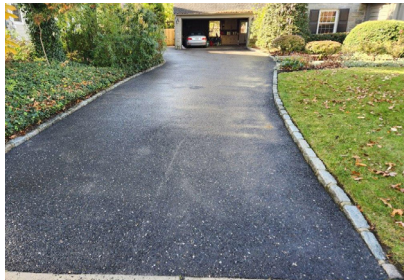
Textured rollers can also be used for a decorative finish.



11. Can Surface Armor™ be used on asphalt and other substrates?

Surface Armor™ is not limited to just concrete restoration and is highly effective as an asphalt resurfacer. Make sure that the asphalt to be resurfaced does not have any coating or sealer on it prior to applying Surface Armor™. The asphalt surface must be properly cleaned and free of any contaminants, dirt, or debris. Surface Armor™ is highly effective on aging asphalt that has minor cracking, however it should not be used on asphalt that is severely degraded or has a heavily alligatored texture.

Once the surface had been properly prepped and is clean and dry, follow the standard application methods shown on the Surface Armor™ label. SSD (Surface Saturated Dry) is NOT recommended or required on asphalt.



It is important that over-application is avoided, so using sufficient downforce with the squeegee trowel is mandatory. Vetrofluid® SA is NOT to be used on asphalt as a preparation product. After the second coat of Surface Armor™ has been applied and is fully cured, apply a light coat of the Vetrofluid® SA to ensure a long lasting finish.