

TECHNICAL DATA SHEET

SUBSURFACE / WATER & SALT RESISTANT HARDENER / COLOR GUARD

GREEN UMBRELLA® SHIELD & ENHANCE

RESISTING SALT & TRANSFORMING COLOR

PRODUCT DESCRIPTION

Green Umbrella® Shield & Enhance™ is an environmentally formulated premium hardener. Shield & Enhance™ is engineered as a colorguard to enhance colored and profiled architectural concrete floors, providing a darker, clarified-gloss appearance. As a unique oxidation inhibitor, Shield & Enhance™, significantly increases a salt pigmented or nano dye's life-cycle, extending colorfastness. Preventing concrete off-dusting and not contributing to alkali-silica reaction, at the same time providing exceptional resistance to water and salt's damaging effects with over ninety-percent chloride prevention. The addition of a chloride screen significantly protects concrete in applications where salt-water and deicers are present. Shield & Enhance™ takes only one S.O.L.O.™¹ application and is packaged R.T.U.², resists and transforms for sustainable concrete.

BASIC USE

For Non GHP (Non Polished Concrete): Green Umbrella™ Shield & Enhance can be used as stand alone concrete hardener and densifier with many added benefits, being used indoors or outdoor. Wherever chloride intrusion or concrete scaling may be an issue. Especially in seawater environments or where concrete deicer is very prevalent. Green Umbrella™ Shield & Enhance darkens the substrate slightly for an enhanced look. Prevents dusting of concrete. Its a superior water proofer.

It can be used on many infrastructure projects: bridges, highways, dams and spillways. It is excellent product in combination with AC1223 Green Umbrella Green Canvas. When used simply as a densifier on floors it can be burnished to semigloss appearance.

For GHP Floors (Ground Honed & Polished): Green Umbrel-

la™ Shield & Enhance is part of the GUEPC System

(described in section below). It is designed to be introduced into the substrate before the last resin cut. Green Umbrella Shield & Enhance has superior water resistance and "sealant" properties. It allows for a darkened appearance to polished concrete.

Green Umbrella™ Shield & Enhance can be use in manufacturing & light assembly plants, warehouse/distribution centers, food service operations, retail stores & show rooms, parking decks, garages, airports, hospitals and any other areas where concrete surfaces are maintained. It can be used for indoor or outdoor concrete.

ARCHITECTURAL APPLICATIONS

Toppings Slabs
Interior/Exterior
Piers Oil/Gas
Arenas/Artificial Skating Rinks
Watertight Construction Walls/Tilt up
Slab on Grade/Slab on Deck
Concrete Storage Tanks
Shotcrete Bridge Decks
Grout
Parking Structures
Integrally Troweled Placed Concrete
Architectural Concrete Floors
Architectural Abrasive Polished Concrete

FEATURES

- Superior chloride intrusion prevention
- Enhances the appearance of dyed or pigmented floors

- Repels water oil and shop chemicals while it darkens and enhances the natural beauty of concrete, can be polished to semigloss
- Breathable surface
- Will not yellow
- Increases hardness 4 inch deep, while reducing porosity
- Requires no rinsing & disposal and will not gel on surface - can be allowed to air dry
- Decreases black tire marking from lift trucks and equipment- improving appearance
- Stands up to heavy abrasion and foot traffic while providing excellent slip resistance
- Resistant to most deicers
- Prevents scaling of concrete

MANUFACTURE & PRODUCT CONSULTING

Green Umbrella
20 Jetview Drive
Rochester, NY 14624
(844) 200-7336

Website & Documents Available At:
GreenUmbrellaSystems.com
CutSheet, Application Sheet, Feature Brochure,
Technical Data Sheet, Safety Data Sheet
Product Consulting Email:
Info@GreenUmbrellaSystems.com

ESTIMATING

Container Sizes: Green Umbrella™ Shield & Enhance is available in containers holding 5, 55 and 275-gallons and only through Green Umbrella. Each container is properly labeled with information including the product name,

description, and condensed application instructions. Dilution: None

Coverage Rates: When applied using a Green Umbrella™ sprayer, Green Umbrella™ Shield & Enhance has a coverage rate of up to 600 sq. ft. per gallon, but on average covers 450 sq. ft. per gallon. Only one coat is necessary. Coverage depends on the porosity of concrete substrate, time, temperature and humidity.

SPECIFICATIONS

A Green Umbrella Engineered Polished Concrete (GUEPC) floor requires that surfaces must be processed by means of a planetary grinding machine to mechanically remove existing coatings, surface imperfections and flatten concrete floors. To reach the desired surface cut and clarity of reflection additional abrasive steps may be required to grind, hone or polish floors to the specified sheen. When a polished surface is desired, Green Umbrella Shield & Enhance is typically applied in one coat after floors have been polished using a 400 grit Green Umbrella resin (GU) diamond abrasive. The application of this, odorless lithium solution that chemically hardens, seals, densifies and provides chloride protection for ground, honed or polished concrete surfaces. Green Umbrella™ Shield & Enhance is a component of the GUEPC system and should only be installed by certified Green Umbrella™ Craftsman. To find a certified contractor, call (844) 200-7336. A ten-year limited warranty will be issued to the owner upon receipt of a completed and signed job survey form, detailing the steps, cuts and products used in the processing of the floor.

IMPORTANT: FOR A SUCCESSFULLY POLISHED CON

TECHNICAL INFORMATION

| | |
|-------------------------|---|
| Chemical Family..... | Lithium |
| Substrate Location..... | Subsurface |
| Appearance..... | Clear Liquid |
| Odor..... | None |
| Film Forming..... | None |
| Active Ingredients..... | 100% |
| Type..... | Densifier/Hardner |
| pH..... | Approximately 11 |
| Boiling Point..... | 212 F |
| Packaging..... | 5-gal bucket, 55-gal barrel, 275-gal tote |
| Shelf Life..... | 2 years |
| VOC (grams/liters)..... | 0 |
| Freezing Point..... | 32 F |

CRETE FLOOR MORE IS NEEDED THAN SPECIFYING CHEMISTRY. WAYS AND MEANS MAY BE NECESSARY, PLEASE CONSIDER THE FOLLOWING: SPECIFYING GREEN UMBRELLA Engineered Polished Concrete (GUEPC)

Green chemistry; like Green Umbrella™ Shield & Enhance is just one part of a successful specified concrete floor. GUEPC system is a complete concrete polishing system from design to completion it uses our Green Umbrella™ chemistry in the polished concrete market. The GUEPC can be as extensive as from the concrete pour to the maintenance of the floor. It starts, if possible, by designing the canvas, or the slab. Green Umbrella Green Canvas shrink age compensating concrete can be specified within the mix design (ACI 223R-10) to ensure that the surface is ideal for polishing. Moving beyond the canvas, there are four major components to the GUEPCS: the Process, the Equipment, the Chemistry and the Craftsmen. All of its components follow the GP Nine (Fundamentals of Green Polishing) GUEPC is not opening the concrete substrate and applying a polymer sealer. A green mechanical process involves processing the floor wet to avoid silicosis issues affecting either installers themselves or by endangering future inhabitants by contaminating air ducts in the building. The process uses a progression of diamond grits on a machine built for wet concrete processing. The use of water enables a higher quality cut to the floor. The wet grinding system has been well supported in the industry for the best approach to clarity and time savings for exposure of aggregate among other advantages.

GUEPC equipment carries the weight to see the concrete grinding, honing and polishing process through to completion and can even expose aggregate if desired. GUEPC uses alternative fuels to leave a lesser impact on the environment. Meeting GS-24 and other sustainable requirements. Green Umbrella™ grinders (Green Grinder or Stone Extreme) and edger (Green Umbrella™ Low Profile Edger) process the entire floor, with the same profile within 14 inch of walls or under shelving. Green Umbrella™ controls the diamond matrix of all our cutting abrasives, eliminating the inconsistencies often found in the industry and maintaining a consistent look through out the entire floor. Green Umbrella concrete treatments are nonsodium and do not generate hazardous waste. The Green Umbrella™ line of densifiers are not water soluble and do not contribute to alkali-silica reaction.

Green Umbrella™ treatments that are pH neutral they will not resist color introduction or promote "walk off", which is

common with many hardeners. Green Umbrella™ dyes are a standard in the industry. Green Umbrella™ colorants are micro-pigments (Color Polish or Color Shield), and have superior color fastness compared to traditional stains and dyes. GUEPC floors include accountability through onsite management. Green Umbrella™ Craftsmen are experienced and have many certifications through indepth training. From design to completion, the GUEPC system covers all aspects of the GP Nine. We simply offer the greenest options for grey concrete. FROM DESIGN TO COMPLETION, YOU EXPERIENCE A COMPLETE SYSTEM.

ENVIRONMENTAL RESPONSIBILITY AND LEED CONSIDERATIONS

GUEPC specified process is specially designed to require less labor and downtime while lowering environmental impact. Green Umbrella™ Shield & Enhance is easy to apply, and because the application is simple fewer laborers are required. Green Umbrella™ Shield & Enhance has low VOCs and has a minimal impact on indoor air quality.

Optimize Energy Performance

- Polished concrete allows the advantage of utilizing the thermal mass of concrete in heating and cooling.
- Polished concrete provides the ability to increase the benefit of ambient natural lighting and/or reduce the required lampage.

Building Reuse/Construction Waste Management/Recycled Content

- Existing Buildings - Environmental stewardship through the reuse of existing floor.
- New or Existing Buildings-Not wasting materials or energy required to produce a floor covering or topical coating.

VOC/IAQ/Long-term Maintenance

- Polished concrete has zero VOC content.
- Many studies indicate that indoor air quality is enhanced with properly maintained hard surfaces vs. carpet.
- Polished concrete does not support combustion, nor does it produce smoke or toxic fumes.

Life Cycle Cost

- Sources show polished concrete to be the lowest life-cost flooring option available.

POTENTIAL LEED CREDITS

Polished Concrete is a sustainable floor. The intent of the following credits is to rate output efficiency. Polished concrete reduces energy and material waste, thus reducing environmental impact.

New Construction, Schools, Core and Shell, Commercial Interior.

Material and Resources - MR Credit 1 & 1.1 Building Reuse
 Material and Resources - MR Credit 1.2 Building Reuse
 Material and Resources - MR Credit 3 & 3.1 Material Reuse
 Material and Resources-MR Credit 4 Recycled Content
 Indoor Environmental Quality - IEQ Credit 4.3 Regional Materials

TESTING

For all independent lab testing contact us at

Info@GreenUmbrellaSystems.com

244 NCHRP-Chloride ingress testing ASTM C672-Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals with Green Umbrella™ Max Defense System™ with Shield & Enhance

Tested to ASTM D-1308

Chemical resistance to JP-8+100 fuel - 0.1 % weight gain
 Chemical resistance to 30 wt motor oil 0.007% weight gain
 Chemical resistance to Skydrol 500 B-4-0.05% weight gain

ACI STANDARD 302.1R-89 CHEMICAL CONCRETE HARDENERS CAN BE USED TO INCREASE CONCRETE RESISTANCE TO CHEMICALS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:

| | | |
|-----------------------------------|------------------------------|--------------------------------|
| ALUMINUM SULFATE | LEAD REFINING SOLUTIONS, 10% | POTASSIUM SULFATE |
| AMMONIUM CHLORIDE | LIGNITE OILS | RAPESEED OIL SEA WATER |
| BARIUM HYDROXIDE | MACHINE OILS | SILAGE |
| BEEF FAT | MAGNESIUM CHLORIDE | SODIUM BROMIDE |
| CALCIUM HYDROXIDE CALCIUM NITRATE | MAGNESIUM SULFATE | SODIUM CARBONATE |
| CARBON DIOXIDE | MANGANESE SULFATE MANURE | SODIUM CHLORIDE |
| CARBONIC ACID CASTOR OIL | MASH, FERMENTING | SODIUM DICHROMATE |
| COAL-TAR OILS | MERCURIC CHLORIDE | SODIUM NITRITE |
| COTTONSEED OIL CREOSOTE | MERCUROUS CHLORIDE | SODIUM SULFATE, 10% |
| CRESOL | MINE WATER, WASTE | SODIUM SULFITE, 10% |
| DISTILLERS SLOP | MINERAL OIL MOLASSES | SODIUM THIOSULFATE |
| ETHYLENE GLYCOL | MUSTARD OIL NICKEL | SOYBEAN OIL |
| FERRIC CHLORIDE | SULFATE OLEIC ACID | SUGAR |
| FERRIC SULFATE | 100%OLIVE OIL | SULFITE LIQUOR TALLOW & TALLOW |
| FERROUS CHLORIDE | PARAFFIN | OIL |
| FERROUS SULFATE | PHENOL, 25% | TANNIC ACID |
| FISH OIL FRUIT JUICES | PHOSPHORIC ACID, 85% | TANNING LIQUOR, 10% |
| GLUCOSE | PICKLING BRINE, 10% | TOBACCO |
| GLYCERIN | POPPY SEED OIL POTASSIUM | WALNUT OIL |
| HYDROGEN SULFIDE | ALUMINUM SULFATE, 10% | ZINC CHLORIDE ZINC SULFATE |
| IODINE | POTASSIUM CARBONATE | ZINC NITRATE |
| LACTIC ACID, 25% | POTASSIUM PERSULFATE | |

GRIND HONE & POLISHING EQUIPMENT

Green Umbrella™ equipment meets GS-24 and LEED Maintenance Guidelines. Green Umbrella™ Uses Propane fueled equipment which saves the owner as much as 50 cents a square foot in electrical bills due to three phase and 220 volt equipment that is used by many GHP contractors. Propane in itself is not a direct greenhouse gas and is one of the world's most widely used alternative fuels. In fact, electric power adds 80% more CO2 into our atmosphere than does propane. Propane equipment can be safe, clean, and efficient fuel. However, all Green Umbrella™ propane equipment should have the following to be used in the concrete polishing industry: CARB and EPA certification - the engines are certified annually and independently by CARB and EPA to meet their strict guidelines for low CO2 emissions.

ESDS (emissions shut down system) - machines are manufactured to incorporate a 3-way catalytic muffler to lower CO2 emissions and an ESDS that monitors the engine for irregularities and automatically shuts the machine down if emissions rise.

GHP Equipment:

- High Productivity Rider Grinder-processes larger areas in less time.

- o Heavy duty commercial floor grinder/polisher by Green Umbrella, Stonextreme or equivalent.
- o Minimum 933 pounds head pressure.

- o 77 inch grinding width.

- o Minimum 8000 square feet per hour production rate.

Grinder/Honer/Polisher-grinds, hones, and mechanically polishes floors.

- o Propane powered, heavy duty commercial floor Green Grinder/Polisher by Green Umbrella™.

- o Minimum 785 pounds head pressure.

- o CARB/EPA approved.

- o 30 inch grinding width.

- o 12 diamond, counter clockwise rotation.

- o Minimum 1200 square feet per hour production rate.

- o Provide minimum of two units on site.

Edger-processes floors within a 14 inch of wall.

- o Propane powered Green Edge by GreenUmbrella™ or Productions Team

- o Minimum 165 pounds head pressure.

- o CARB/EPA approved.

- o 1/4 inch cut to wall.

- o Four diamond head, 640 RPM diamond rotatio

- o Provide minimum of two units on site.

- Burnisher- removes un-reacted material and gives high gloss shine.

- o Propane powered, high productivity Green Polisher by Green Umbrella, Pioneer Eclipse or Eagle.

- o CARB/EPA approved.

- o 27 or 39 inch burnishing width.

- o Head Pressured

- o Minimum 2000 RPM.

- Auto Scrubber cleans between abrasive steps to prevent contamination. Important: not all floor scrubber are effective in slurry recovery.

- o Auto scrubber by Tomcat, Pioneer Eclipse or Nilfisk-Advance.

- o Minimum 500 pound head pressure. o Water application and minimum 30 gallon recovery tank.

Abrasives-diamond abrasives cut concrete substrate in a sequence of steps.

- o Metal bond abrasives (GUm), resin bond abrasives (GUr), and coating removal metal bond abrasives (GUcr) by Green Umbrella.

- o Match hardness of abrasives to hardness of concrete.

- o 10-segment diamond pad except for coating removal with GUm or Gur matrix.

Prep. Equipment

For non-GHP (Grind, Hone and Polish) or vertical concrete:

- Power Washer on low psi

- . Industrial Water Broom cleans and removes buildup before product application.

- o Heavy duty industrial water broom by WaterMiser Broom or equivalent.

- o Up to 180 PSI of water.

Application Equipment

Hand-Pump Sprayer Applicator - used to apply product evenly and consistently.

- o Industrial CO2 driven hand-pump sprayer applicator by Green Umbrella, Patriot Sprayers, or equivalent.

- o Maximum tip pressure 40 psi.

- o # 8 gray conical tip.

T-bar with blended applicator distributes product sprayed on concrete substrate.

Product Placement/Application

New Concrete: If specifying concrete, preference should be given to ACI 223, concrete using Green Umbrella™ Green Canvas. Before any concrete processing begins, new concrete should be fully cured for seven (7) days and free of all potential contaminants. Green Umbrella™ Shield & Enhance is used neat and does not require any dilution or mixing.

Existing Concrete:

Existing concrete should be thoroughly cleaned and swept of all debris and potential contaminants-including sealers, wax, coatings and oil or food spills-prior to concrete processing. Green Umbrella™ Shield & Enhance is used neat and does not require any dilution or mixing.

GUEPC floors are only available through certified Green

Umbrella™ Craftsmen. Green Umbrella Craftsmen are trained in chemical application, dye application and concrete grinding and carry multiple certifications.

Open Concrete:

1. Apply Green Umbrella™ Shield & Enhance with a Green Umbrella™ solution sprayer or spreader.
2. Distribute product with an exploded tip bristle broom for rough concrete or Green Umbrella™ keeping the surface wet with product for a minimum of 20 minutes.
3. Allow product to air dry. GreenShield & Enhance will not gel on surface and does not require rinsing. Umbrella™

Non-GHP Floor

1. Apply Green Umbrella™ Shield & Enhance with a Green Umbrella solution spreader or sprayer.
2. Distribute product with an exploded-tip bristle broom for rough concrete or Green Umbrella T-bar with blended applicator head for hard-troweled concrete to ensure uniform coverage, keeping the surface wet with product for a minimum of 20 minutes.
3. Allow product to air dry. Green Umbrella™ Shield & Enhance will not gel on surface and does not require rinsing. Do not allow product to puddle.
4. Remove any un-reacted material with a broom after product has dried.
5. If slight gloss is desired burnish floors with a high-speed, head-pressured propane burnisher with non-resin Green Umbrella™ black pads.

GHP Floor

1. Hone floors to 200 grit Green Umbrella resin (GUr) diamond abrasive.
2. Note: If the desired finish includes color, Green Umbrella™ ColorDeep to harden and color at same time OR Green Umbrella™ Dye should be applied before proceeding to the next step.
3. Apply Green Umbrella™ Shield & Enhance with a Green Umbrella™ recommended solution spreader or sprayer.

4. Distribute product with an exploded-tip bristle broom for rough concrete or Green Umbrella™ T-bar with blended applicator head for hard troweled concrete to ensure uniform coverage, keeping the surface wet for a minimum of 20 minutes. Do not allow product to puddle.

5. Allow product to air dry. Green Umbrella™ Shield & Enhance will not gel on surface and does not require rinsing.
6. Auto-scrub to remove any un-reacted material after product has dried.
7. Either burnish floors with a high-speed, head pressured propane burnisher with non-resin GU black pads or polish floors with previous grit or next GUr diamond abrasives.
8. For superior oil and chemical resistance, apply Green Umbrella Microfilm to treated surface.

Note: Time, Temperature & Humidity: For a chemical reaction to take place successfully, time

must be allocated for reactants to fully react. Likewise, when applying Green Umbrella™ Shield & Enhance to concrete, there must be adequate amount of dwell time for the reaction to take place. Doing so will help to achieve the best result. For Green Umbrella™ Shield & Enhance to effectively penetrate the substrate, the temperature should not be less than 40° F. If temperatures are lower than is recommended, the chemistry may take much longer to react with and penetrate the concrete substrate. If the temperature exceeds 95° F or conditions are windy, the chemistry may react and dry before penetrating the substrate. In such circumstances, keep floors hydrated with water for recommended dwell time. Humidity also plays a role in the dry time. Product applied to a dry slab of concrete in an arid climate will dry faster than to a dry slab of concrete in a humid climate due to the amount of humidity present in the air. In dry climates with low humidity it may be necessary to hydrate the slab in order to allow for proper dwell time. Please consult a Green Umbrella representative if you have any questions. Please consult a Green Umbrella representative if you have any questions.

For Best Results: Light foot traffic Until dry or 1 hour
Wheeled traffic 3 hours

MAINTENANCE

IMPORTANT: Only use pH neutral cleaner. Non-GHP Floors (GHP)

- Regularly sweep away debris
- Regularly use a water broom to remove dirt build up from treated concrete surfaces

GHP Floors

- Regularly sweep away debris
- Regularly auto-scrub or mop with water or Green Umbrella Green Clean
- Use Green Umbrella Degreaser as needed
- For GHP floors periodically burnish with a weighted, high speed propane burnisher using Green Umbrella™ black pad to remove dirt build up and restore gloss

WARRANTY & LIMITATIONS

For a period of ten (10) years beginning the date on which the concrete surface described is treated with Green Umbrella products, Green Umbrella warrants to the owner that after the specified completed installation, the treated surface will remain water resistant, dust proof, hardened, and abrasion resistant. In the event the surface fails to perform, Green Umbrella™ will at its own expense and its own discretion, supply either sufficient product(s) to repair any such failure, or provide materials cost reimbursement. A manufacturer's representative must be on site to supervise installation.

It is the responsibility of the contractor to follow all directions and requirements as outlined in the Green Umbrella™ installation specifications. A completed Job Survey form must accompany this warranty request.

Green Umbrella™ Companies (GU) solely and expressly warrants that its products shall be free from defects in materials and workmanship for six months from the date of purchase. Unless authorized in writing by an officer of Green Umbrella, no other representations or statements made by Green Umbrella™ or its representatives, in writing or orally, shall alter this warranty. GREEN UMBRELLA™ MAKES NO WARRANTIES, IMPLIED OR OTHERWISE, AS TO THE MERCHANTABILITY OR FITNESS FOR ORDINARY OR PARTICULAR PURPOSES OF ITS

PRODUCTS AND EXCLUDES THE SAME. GREEN UMBRELLA™ APPLIED TO SUBSTANDARD CONCRETE IS EXCLUDED FROM ANY KIND OF WARRANTY. If any Green Umbrella product fails to conform to this warranty, Green Umbrella will replace Green Umbrella™ product at no cost to the Buyer. Replacement of any product shall be the sole and exclusive remedy available and the buyer shall have no claim for incidental or consequential damages. Any installation of Green Umbrella products that fails to conform to such installation information and instructions shall void this warranty. Product demonstrations, if any are done for illustrative purposes only and do not constitute a warranty or warranty alteration of any kind. Buyer shall be solely responsible for determining suitability of Green Umbrella™ products for the Buyers intended purposes.

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