

# Spec Data

## Concrete Finishing

LAST UPDATE: ( January 2016)

### 1. PRODUCT NAME

Protec III LSF Chem RX

### 2. MANUFACTURER

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### 3. PRODUCT DESCRIPTION

Protec III LSF Chem RX is a hardener and densifier that goes into the concrete and chemically penetrates and reacts with the top wear surface, producing strong bonds in the concrete called Calcium silicate Hydrate (CHS). These strong bonds permanently change the density of the concrete whereby making it harder, denser and stronger. This stronger concrete resists shaling, pitting, dusting, abrasion, and many corrosive chemicals.

- Curing - Protec III LSF Chem RX is vital to achieve the complete hydration process of curing concrete. When applied to properly placed, structurally sound, freshly finished concrete, Protec III Chem RX will uniformly cure the concrete through a chemical cure and moisture retention process. Protec III Chem RX is a chemical reaction within the concrete that changes the weak bonds (calcium hydroxide) into the strong bonds called calcium silicate hydrate (CSH). This process aids in retaining the necessary moisture to ensure a proper cure. The result is less hairline checking on new concrete because the cure process has been slowed right down. Visually you can see how much longer Protec III Chem RX treated concrete stays darker (retaining that critical moisture for a proper cure) than untreated concrete.

\*\*TESTING 92% greater moisture retention during the critical 24 hour cure period.

- Sealing - Protec III LSF Chem RX does not leave a membrane on the surface of the concrete, if you want the concrete surface to be sealed apply Dual-Tech or Advance C15 Acrylic.

- **Hardening** - Protec III LSF Chem RX increases the hardness and abrasion resistance of new and existing concrete.  
ASTM C418 - 67% increase in the hardness of concrete wear surface.  
ASTM C1353 - 46% increase of abrasion resistance, Taber Abrasion Resistance Test 1000 cycles.  
ASTM C803 - In various tests compression of the top wear layer has been measured and calculated to be up to 50 mpa from a 30 mpa mix design. ASTM C803 is a determination of the hardness and compression values.
- **Dustproofing** - Concrete dusting appears on the surface of the concrete as dust or powdery-chalk. This dust can easily be removed with a broom, but it is a perpetual problem that will not resolve itself. It is actually the top wear layer of the concrete turning to dust. The presence is often indicative of a weakness of the wearing surface. Dusting can be caused by poor finishing techniques used while bleed water is still on the surface, improper curing, excess amount of clay in the concrete or exposure to elements before the concrete was fully cured. Inadequate ventilation can also be a culprit particularly in closed quarters like basements. This environment allows carbon dioxide to build up and create a chemical reaction that affects the surface strength of the concrete called carbonation. Concrete dusting rarely indicates a structural problem with the concrete, but it can be a troublesome problem. Using Protec III Chem RX will substantially strengthen the concrete and virtually eliminate dusting.  
ASTM C1353 - 46% increase in abrasion resistance at 1000 cycles
- **Bonding** - Protec III Chem RX is the ideal product to cure concrete before the installation of flooring adhesives because it eliminates the dusting and efflorescence problems that commonly cause delamination problems with flooring. Surface membranes can interfere with the proper bonding of the adhesive, and must be removed prior to application of the adhesive. Protec III Chem RX does not leave a surface membrane as all other cure and seals do, so there is no costly expense and time intensive labor to remove a surface membrane. Protec III Chem RX prepares the treated surfaces for paints, caulking compounds, adhesives and floor coverings. This product does not contain silicone and is coatable and compatible with any type of covering when standard surface preparation guidelines are followed.  
ASTM D3359 testing shows at least 22% increase in epoxy adhesion. This test evaluations products ability for flooring adhesives, glues, paints, caulking to adhere to concrete.
- **Neutralizing the Effects of Alkali** - Alkali is often referred to in the industry as salts or efflorescence. It is a white powder that will show up on the surface of the concrete that is unsightly. It is brought up to the surface from the ground water by hydrostatic pressure and will migrate through the concrete and destroy it if it sits on the surface because of its alkaline properties.

- Protec III Chem RX will help reduce or completely stop the efflorescence from being carried to the surface because it fills in the pores of the concrete by changing the poor bonds of calcium hydroxide which is the alkali into the strong bonds of calcium silicate hydrate or CSH. It is this process that fills in the voids in the top wear layer and stops the migration of water which also stops the migration of the salt or efflorescence from appearing on the surface.

ASTM C642 - 72% reduction. This test evaluates products ability to reduce absorption.

#### 4. USES

- Use on new or existing interior power trowel concrete, pre-cast concrete, poured in place walls, heavyweight concrete block, exterior broom finish, mortar, plaster, exposed aggregate and any sand aggregate portland cement combination.
- Product is compatible with flooring adhesives, paints, and caulking
- Anywhere a non-toxic low odor cure is needed to meet LEED requirement
- Ideal applications include warehousing, distribution facilities, aviation hangars, office buildings, hospitals, schools, manufacturing plants, food processing and distribution buildings, pulp and paper mills or other type of facilities.

#### 5. COMPOSITION & MATERIALS

- Protec III Chem RX complies with all USDA regulations and is nontoxic, noncombustible and nonflammable. When applied properly it is not harmful to lungs or hands. It contains no volatile organic compounds (VOCs).

#### 6. PACKAGING

- Protec III Chem RX is available in 55 US gallon (205 Litre) Drums and 5 US gallon (18.9 Litre) Pails and Totes (1000 Litre)

#### 7. COLOR AND FINISH

- Protec III Chem RX is transparent and will not change the natural appearance of masonry or concrete. On smooth steel-trowelled concrete surfaces, a natural shine will appear between 6-12 months after treatment. This can be accelerated by burnishing after curing. The shine is caused by the hardening and densifying effects of Protec III as well as by the abrasion from cleaning and use of the floor. A routine cleaning program using a floor scrubber with abrasive type brushes will accelerate and enhance the shine. The shine will last the lifetime of the surface.

#### 8. PHYSICAL CHARACTERISTICS

- Dilution: None, use as supplied
- Odor: Mild
- VOC's: 0

- Clean-up: Water
- Freezing Point: -6C

9. SHELF LIFE: 3 yrs in original unopened container

10. CLEAN-UP: water

#### 11. BENEFITS

- Reduces or eliminates hairline cracking in new concrete.
- Stops concrete popping and shaling that is associated with membrane cure and seals
- Hardens and strengthens within the concrete top wear layer, protects against deterioration and produces a floor that is resistant to traffic. Rather than eroding, the floor surface actually polishes with use. ASTM C418 - 67% Increase in Hardness of the Concrete Wear Surface
- Treated surface resists dust, oils, greases and other surface contaminants, such as tire marks. Reduces tire squeel.
- More Effective than Water Curing when applied immediately after the finishing operation; stabilizes and significantly enhances abrasion resistance and durability of surface. Tested to have a 92% greater moisture retention during the critical 24 hour cure period.
- Eliminates dusting which enhances surface bonding of adhesives and floor coverings, also paints and caulking compounds. Compatible with any type of covering and flooring adhesives when standard surface preparation guidelines are followed.
- Restricts water migration through the concrete eliminating efflorescence problems
- Reduces Vapor Transmission and Reduces Radon Gas Emissions
- Compatible with Dry Shake Hardeners
- VOC's - Zero
- Environmentally Safe and Permanent
- Food Safe Approved
- Equipment is cleaned using water only.

#### 12. LIMITATIONS

- Additional yearly maintenance of this product is required where heavy use of de-icer/road salts are allowed to accumulate.
- All curing agents and sealers must be removed before the application of Protec III Chem RX.
- Where the concrete is abnormally soft and porous, pre-treatment with Protec III Restore is required before the application of Protec III Chem RX. Numerous coats of Protec III Chem RX may be required in poorly finished, poorly cured, broom finish, or scarified floors.

- In cases of excessive moisture, and/or extremely hydrostatic pressure from beneath the slab, this reaction does not prevent excessive salt migration.
- Protec III Chem RX is not to be used to seal lightweight block or other extremely porous masonry that contains actual holes and air pockets.

### 13. ASTM TESTING

ASTM	Name of Test	Uses of Test	Results
<b>ASTM C418</b>	Standard Test Method for Abrasion Resistance of Concrete	Increase in hardness	67% increase
<b>ASTM C1353</b>	Taber Abrasion	Abrasion Resistance	46% increase abrasion resistance at 1000 cycles
<b>ASTM C642</b>	Test Method for Density Absorption and Voids in Hardened Concrete	Evaluate products ability to reduce absorption	72% reduction
<b>ASTM C803</b>	Penetration Resistance	Determination of hardness and compression values	Increase from 30 mpa to 50 mpa in compression strength
<b>ASTM B117</b>	Standard Method of Salt Spray	Used as a chloride ion permeability test	57% decrease in permeability to Salt Spray
<b>ASTM D3359</b>	Surface Adhesion	Evaluates products ability for flooring adhesives, glues, paints, caulking to adhere to concrete.	At least 22% increase in epoxy adhesion; no change to polyurethane adhesion
<b>ASTM G23</b>	Weathering Treated Samples		Ultraviolet light and water spray exposure had no adverse effect on treated samples

14. CHEMICAL RESISTANCE TESTS

<p><u>Acids</u></p> <p>Acetic Acid &lt;10%</p> <p>Acid Waters</p> <p>pH&lt;6.5 Boric Acid</p> <p>Carbolic</p> <p>Carbonic</p> <p>Chromic 5%</p> <p>Formic 10% &amp; 90%Humic</p> <p>Hydrochloric 10%</p> <p>Phosphoric 10%&amp;85%Tannic</p> <p><u>Solvents and Alcohols</u></p> <p>Carbon tetrachloride</p> <p>Ethyl alcohol</p> <p>Methyl alcohol</p> <p>t-Butyl alcohol</p> <p>Trichloroethylene Acetone</p> <p>Carbon disulfide</p> <p>Glycerin</p> <p>Ethylene glycol</p>	<p><u>Salts</u></p> <p>Bromid</p> <p>sodium</p> <p>Dichromate</p> <p>sodium</p> <p>Potassium</p> <p>Nitrate</p> <p>Nitrite</p> <p>Persulfate</p> <p>Sulfite, sodium</p> <p>Thiosulfate, sodium</p> <p><u>Petroleum Oils</u></p> <p>35 Baume</p> <p>Gasoline</p> <p>Light oil above</p>	<p><u>Miscellaneous</u></p> <p>Buttermilk</p> <p>Chlorine gas</p> <p>Cider</p> <p>Coal</p> <p>Coke</p> <p>Cold Ashes</p> <p>Corn Syrup</p> <p>Fermenting Fruits</p> <p>Formaldehyde</p> <p>Hydrogen sulfide</p> <p>Iodine</p> <p>Lignite Oils</p> <p>Manure</p> <p>Mine water, waste</p> <p>Molasses</p> <p>Nickel plating solutions</p> <p>Ores</p> <p>Sauerkraut</p> <p>Sea water</p> <p>Silage</p> <p>Sugar</p> <p>Sulfite Liquor</p> <p>Sulfur Dioxide</p> <p>Tanning Bark</p> <p>Tanning Liquor</p> <p>Water</p> <p>(soft &lt;75 ppm carbonate)</p> <p>Wine</p>

15. COVERAGE:

- EXISTING BROOM FINISH – Approx. 200 ft<sup>2</sup>/gal (4.9 m<sup>2</sup>/litre)
- CURE-BROOM FINISH - Approx. 300 ft<sup>2</sup>/gal (7.4 m<sup>2</sup>/litre)
- EXISTING POWER TROWEL - Approx. 300 ft<sup>2</sup>/gal (7.4 m<sup>2</sup>/litre)
- CURE-POWER TROWEL - Approx. 400 ft<sup>2</sup>/gal (9.8 m<sup>2</sup>/litre)

16. SURFACE PREPARATION

- New and old dirty concrete should be cleaned and then rinsed with clean water if necessary. After washing allow the surface to dry before application of product.

17. CAUTIONS

- Protect surrounding area from over-spray. In case of accidental contact, rinse thoroughly with water immediately.
- Do not apply to frozen surfaces.
- Do not apply to colored concrete for a minimum of 3 days after finishing operations
- For surfaces not specified or where concrete may have been previously sealed, we recommend testing a small area to observe for possible adverse reactions.
- Freeze Harm: 5 Cycles No Damage
- For cool temperatures applications on power trowel surfaces, apply at 400 ft<sup>2</sup>/gal (9.8 m<sup>2</sup>/litre) minimum, specifically take caution to roll out any puddles that form. Dry time is slower in cool temperatures, which may cause more puddling. If heavy puddles dry, they can leave a white residue on the surface of the concrete, which is very difficult to remove.
- FOR HEAVY ABRASION FLOORS (ie. Tracked in gravel and dirt that is being ground into the floor by vehicles) FOLLOW THESE INSTRUCTIONS: Use 2 coats of Protec III LSF Chem RX making sure the 1<sup>st</sup> coat dries before applying the 2<sup>nd</sup> coat. Normal wear and tear does not include heavy abrasion from gravel and dirt, therefore it is highly recommended to keep your floors clean to avoid unnecessary excessive wear.

## 18. APPLICATION

- For concrete exposed to freeze-thaw cycles 2 coats are required.
- Apply product with a low pressure sprayer or roller.
- Apply at recommended square foot coverage.
- Saw cuts need to be coated thoroughly.
- Apply 2-3 coats to high traffic floors or floors exposed to high corrosion.
- Apply the 2nd concrete one hour after the 1<sup>st</sup> coat has dried.
- Roll out any puddles that form.
- For concrete that will be exposed to a variety of harsh chemicals, you will need to apply 3 to 4 coats depending on the porosity of the concrete.

## 19. MAINTENANCE

Use a neutral to high pH detergent with no sulfates and hydroxides (caustic soda) to clean the floor. Acidic cleaners or sweeping compounds will dull the appearance of the surface. Scrub the floor often. The abrasion polishes the floor and enhances the shine. Ample water used with routine detergent and scrubbing will accelerate the process of getting a shine. Use caution to protect the floor as stains may still occur during the first 6 to 12 months. Clean spills quickly. Highly concentrated acid may etch the surface if left in contact with the floor. Foods such as mustard and grape juice may leave a residual stain if not removed immediately. Using a good maintenance program, after a year the floor should have an attractive low satin shine. The surface should be hardened and densified. Most foods and liquids should not penetrate the surface.

Areas with tracked in gravel and dirt will need to be kept clean, as forklift/equipment traffic in conjunction with gravel and dirt will produce heavy abrasion to the floor and may unnecessarily damage the floor.

Floors with broomed or rough textured finishes will not produce a shine due to the textured surface.

Use a good oil emulsifier to clean up oil, grease, or fats.

FOR PROTEC III CHEM RX - Painting the floor or striping of the floor can be done at any time.

Consult the paint manufacturer or the recommended preparation of the floor.

Using waxes or other coatings on the floor is not necessary or recommended.



### YEARLY MAINTENANCE

For Exterior Broom Finish Concrete exposed to freeze thaw cycles, we recommend applying one coat at approximately 200 ft<sup>2</sup>/gallon (19 m<sup>2</sup>/litre) every one to two years as part of your regular maintenance program.

For interior concrete, we recommend applying one coat in high traffic, high abrasion areas. For example, in front of overhead doors, apply at a rate of 300 ft<sup>2</sup>/gallon (28 m<sup>2</sup>/litre) every one to two years as part of your regular maintenance program.

### 20. APPLICATION FOR CURING CONCRETE

- As a cure, apply the product with a low pressure sprayer or roller at a rate of approximately 400 ft<sup>2</sup>/gallon (9.8 m<sup>2</sup>/litre) right after the final pass of the power trowel.
- On broom finish concrete expect 300 ft<sup>2</sup>/ gallon (7.4 m<sup>2</sup>/litre).
- Be careful not to leave puddles. If puddles do form, they should be broomed or rolled out. In cooler temperatures greater care has to be taken in regard to puddling.
- All saw cuts need to be coated thoroughly.
- If the product is not applied properly there is the possibility of staining on colored concrete where the product puddles.
- Special care should be taken on colored concrete floors. If product is applied to plain grey concrete this is not a problem.

### CAUTIONS

- Take special care when applying product in cold temperature applications. Dry times is slowed and puddling can form, therefore all puddles need to be brushed out.
- Special care is required for colored concrete, do not let the product puddle.

*for more information see: Protec III Chem RX Used as a Curing Aid*

### 21. APPLICATION FOR BROOM FINISH CONCRETE EXTERIOR

- Apply once the bleed water has dissipated.
- Apply a 2<sup>nd</sup> coat after the 1st coat has dried.

FOR BADLY DUSTING/CARBONATED CONCRETE: *see Protec III Restore Strengthens and Hardens Concrete - Section 4 (8-9)*

## 22. APPLICATION FOR FLOORING INDUSTRY/VAPOR TRANSMISSION/RADON GAS

- Moisten the surface with Protec III Chem RX by sprayer or microfiber pad. When spraying use a spray nozzle that produces a flow of .25 gpm under 40 psi is recommended.
- Spray in a fine fog pattern. Make sure concrete stays wet for 30 minutes by re-applying more Protec III Chem RX or by re-distributing the existing product using a micro-fiber pad.
- Do not allow the product to form puddles.
- After 30 minutes let the surface dry, no water flushing is needed.
- After 1<sup>st</sup> coat has dried for 4 hours apply the 2<sup>nd</sup> coat of Protec III Chem RX. Follow the same procedure as the 1<sup>st</sup> coat.
- Typically 2 coats is all that is needed.

## 23. MAINTENANCE

- For Exterior Broom Finish Concrete exposed to freeze thaw cycles, we recommend applying one coat at approximately 200 ft<sup>2</sup>/gal (4.9 m<sup>2</sup>/litre) every two years as part of your regular maintenance program.
- For Interior Concrete, we recommend applying one coat in high traffic, high abrasion areas. For example, in front of overhead doors, apply at a rate of 300 ft<sup>2</sup>/gal (7.4 m<sup>2</sup>/litre) every 2 years as part of your regular maintenance program.

## 24. WARRANTY

- We warrant our products to be of good quality and will replace any products proved defective. Satisfactory results depend not only upon quality products, but also upon many factors beyond our control. The user shall determine the suitability of the product for the intended use and assume all risks and liability in connection therewith. Therefore, except for such replacement of product, Cornerstone Coatings makes no warranty or guarantee express or implied including warranties of fitness for a particular purpose or merchantability, respecting its products, and Cornerstone Coatings shall have no other liability with respect thereto. This warranty supersedes all other warranties express or implied.