IntellaPro® Technologies

IntellaTread
IntellaSeal / SafeSeal / **IntellaLoc**

Slip Resistance Sealer Application
IntellaTread / IntellaSeal/ SafeSeal / IntellaLoc, an exclusive IntellaPro Technologies process, is a 2 step concrete sealer process that seals, densifies, and strengthens concrete while creating a shiny, **slip resistant walking surface** that meets ASTM C1028 measuring standards and OSHA & ADA standards for slip resistance. Lithko Restoration Technologies maintains the Concrete Sealing / Polishing phase. IntellaPro Technologies follows up with it's 15 years of floor safety experience to complete the floor safety enhancement phase. IntellaTread is also independently Certified by H.C. Nutting.

IntellaTread's slip resistance is controllable by our trained technicians and can range from a slip coefficient of friction (SCOF) reading of .50 to .90 depending on the requirements of the customer. (Definitions of SCOF, Pg. 2).

IntellaLoc's Silicate Sealers deep penetrating properties minimize water migration through the capillaries minimizing hydraulics and wicking, reducing concrete sweating by 85-95% while increase strength and concrete life (up to 45%) without sacrificing safety.

IntellaLoc works with all concretes, however, for new commercial and industrial concrete floors, a 4,000 psi concrete base is recommended. This allows the chemical reaction between the concrete and the sealer to be optimized for ultimate durability. This durability is realized within the concrete itself. The polishing process used to apply the sealer compresses the top surface while the sealer penetrates the capillaries, turning the sealer into an expanding gel and eventually hardens into a solid mass adding strength.

This is not a coating that can peel off since the sealer has penetrated below the surface and below the level of wear found through daily use. In fact, this sealer becomes a part of the concrete and is harder than the concrete itself.

Process
The concrete must be cured for 28 days prior to sealer application. A staged sealing process is performed to impact the sealer into the surface using #50 and #100 diamond grinding/polishing wheels. Additional polishing using #200, #400, and #800 diamond wheels finish the polishing process to create maximum strength and maximum shine where customer's desire a gloss to high gloss look. Polishing grits of #1200 and higher are not required and even Wal-Mart now uses the #800 as the final finish grade where silicate sealers are now being used.

Non polished (non shiny) industrial surfaces are also compatible with the IntellaTread process.

IntellaTread Application
After a 1- 3 day cure time of the sealer, (1 day for Lithium Silicate and 3 days for Sodium Silicate), a final proprietary slip resistant process, IntellaTread, is performed to create a shiny slip resistant surface that **will meet OSHA and ADA standards for floor slip resistant requirements.**

As all concrete surfaces vary due to factors including Portland Cement, sand quality, aggregate content, temperature during pour, humidity, trowelling techniques, etc., final concrete appearances may vary. *This variance is not caused by our sealer or slip resistant process.*

Dyed concrete during the pour is recommended when color is a prerequisite. Acid dying on cured concrete must be tested for appearance. When dyed or colored concrete is used, subtle variances may occur due to separate batching from cement truck batches and this minor effect is has no effect on Sealer integrity or the IntellaTread effectiveness.

COEFFICIENT OF FRICTION
ACCEPTED INDUSTRY STANDARDS

As adopted by Underwriters Laboratory (UL) and the American Society of Testing and Materials (A.S.T.M)

"A static anti-slip coefficient of friction of .50 or above is considered a safe walkway surface with a dry condition. A reading below .50 is considered an unsafe walkway surface."

Ceramic, Terrazzo, Marble, and most mineral surfaces treated with IntellaTread are actually safer in wet conditions than in a dry untreated surface. All surfaces shall be tested independently for actual results.

.60 or above	-	Very Safe
.50 to .59	-	Relative Safe with Caution
.40 to .49	-	Dangerous
.35 to .39	-	Very Dangerous
.00 to .34	-	Unusually Dangerous

Source: "The Slip and Fall Handbook" by S.I. Rosen, Hanrow Press, Columbia, MD.

IntellaTread note
Ramps require a SCOF of .80 and we achieve higher ratings than recommended on all surfaces treated with the IntellaTread process.

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An IntellaTread/IntellaLoc Floor Resists:

Moisture,
Mold
Hydraulics (water pressure below the surface),
Wicking of moisture and absorption,
Moisture migration,
Mild acids,
Saponification,
Chipping,
Cracking,
Dusting, and much more.
Plus, concrete will last up to 45% longer with the IntellaLoc sealer

Our slip proof process was tested by Getty Foundation in California for their own use and after a 5 year simulation of foot traffic, no discernable SCOF reduction was found. This test was performed on a Travertine material. Different materials in different environments may have varying results.

Ultraviolet light has shown to have no effect on the appearance, color, shine, strength or slip resistance after 1 full year of outside direct exposure in the Southwest Desert sun.

Our slip proofing techniques and materials have been used for over 15 years in 36 countries with satisfactory results

on

Ceramic, Porcelain, Terrazzo, Travertine, Concrete, Fiberglass, Vinyl Flooring, Metal, Quarry Tile, Painted Surfaces, Glass Flooring, and *many more surfaces*.

How Silicates Work

Sodium, potassium, magnesium, and lithium silicates all react with calcium hydroxide (also referred to as “portlandite”)—a byproduct of cement hydration—to produce calcium silicate hydrate (C-S-H), the same binder that results from adding water to cement and gives concrete much of its strength and hardness. In the hydration process, calcium hydroxide dissolved in water moves to the surface region of a slab where the silicates can react with it. This newly created C-S-H is deposited primarily in the pores and canals on the surface of a slab.

This reaction of soluble silicate with calcium hydroxide in concrete also produces alkali metal hydroxide, lithium hydroxide, potassium hydroxide, or sodium hydroxide, all of which could be detrimental to concrete if reactive aggregates and moisture are present. There is also the potential of the silicate to form efflorescence, which is highest with sodium, lower with potassium, and lowest with lithium. The function of the sodium, potassium, or lithium part of the silicate's function only is to stabilize and solubilize the

silicate so it can remain in solution until it penetrates the concrete and then can react with the abundant calcium hydroxide found in the concrete. Sodium, potassium, or the lithium ions typically do not react in concrete to any degree, so they are incidental to the primary benefits.

Normally when calcium hydroxide comes to the surface of fresh concrete, it reacts with atmospheric carbon dioxide, producing carbonation (calcium carbonate). The reaction is greater when the concrete humidity is high and when bleeding is prolonged. It's also accelerated by construction heaters that produce carbon dioxide..But the hydroxides from sodium, potassium, and magnesium in combination with laitance from the scrubbing process must be removed before they crystallize on the surface. The advantage of lithium—when applied in the correct amount—is it dries to a dust. It also is considerably more alkaline, raising the pH of the surface concrete and reducing the possibility of alkali Silica reaction (ASR).

Increased use

A compelling reason to consider using lithium densifiers instead of sodium is that the application is much easier and proceeds quicker. It's typically mopped lightly on a slab—compared to saturating a floor surface with other silicates—leaving no residue to clean up. If applied excessively sodium must be removed before it crystallizes, just like other silicates. The higher reactivity of lithium compared to sodium also means you don't have to scrub it into concrete to encourage the reaction. The concentration of sodium densifiers must be higher than lithium to achieve the same effect. The Environmental Protection Agency (EPA) rates silicate residues as hazardous materials because pH levels are high (10+) so other silicate residues must be disposed of as hazardous waste, adding to the contractor's expense. When these residues dry on the surface of slabs, they deposit whitish crystal silicates that are difficult to remove.

Lithium ions on a weight basis can stabilize more silicate ions than sodium ones. Lithium silicates generally have a lower viscosity than sodium or potassium silicates of equal solids, so the lithium silicate can penetrate the concrete more effectively. Only about 1/16 to 1/8 of an inch on the top concrete surface can be treated and hardened with normal concrete, whichever form of silicate is used.

There are limitations to silicates' usefulness. It is important to note that silicates are not curing compounds, and the ASTM C 309–07 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, specifically excludes silicates. It makes little sense to apply a silicate to a damp concrete surface that has its pore structure already full of water, which inhibits penetration and wastes the soluble silicate as any excess must be removed after treatment.

There are two things that occur in concrete with soluble silicate treatments. First, upon drying the silicate forms a glassy material that adds to the strength of the concrete surface. More importantly, after the silicate is deposited inside the concrete's pores, it reacts with

calcium hydroxide slowly to form the C-S-H as discussed earlier. This chemical hardening and densifying takes place over the course of one to two weeks, not in a matter of hours. (Lithium Silicate is 95% cured in 24 hours and completely cured in 5 days). The C-S-H provides most of the concrete's surface strength, and is useful particularly when applied to concrete that is porous or otherwise less than ideal.
Several manufactured lithium silicate densifier products are on the market. They are sold as just lithium silicate, silicate with a surfactant to facilitate absorption into the concrete, or with the addition of siliconates that also produce calcium silicate over time and improve gloss. Concrete surfaces are reactive with 10 to 12 pH ratings and this isn't changed with densifying. Therefore, substances used in the maintenance process with a lower pH can dull, haze, or damage floor surfaces. Whichever silicate product is used, owners should be informed they must institute spot maintenance programs to immediately remove accidental spills of acidic material, water, or other stains. Remember, silicates are classified as penetrating sealers not coatings. Spot maintenance programs on these are less costly and complicated than maintenance on other surfaces.

How silicate concrete hardeners differ
Lithium, potassium, magnesium, and sodium silicates are available in the marketplace. Lithium silicate products are the most costly. Sodium silicate in solution is an inexpensive commodity chemical that is widely used in industry laundry detergents, for example. Some soluble silicates are formulated products and some have wetting agents. Others can have sodium or potassium methyl-siliconate, which reacts slowly with atmospheric carbon dioxide present in air at around 300 to 400 ppm, to form the water-repellent methyl-silicone resin in the concrete's pores, inhibiting waterborne stains from penetrating the concrete and causing discoloration.

Using liquid hardeners to enhance the diamond polishing process
Many, or perhaps most, companies who diamond polish concrete use silicate hardening products to help them produce better looking surfaces. Several generic materials may be used for this purpose: sodium, potassium, and lithium silicates, and magnesium fluorosilicates. In addition, a number of proprietary silicate/siliconates are being sold. Manufacturers may add wetting agents and other substances (including acid) to their silicate products.
No matter which product you use, they all have one thing in common: They chemically react with calcium hydroxide (also referred to as "portlandite") to produce calcium silicate hydrate (C-S-H), the same material that results from the reaction between portland cement and water, giving concrete much of its strength.

Sodium silicate, the most common liquid hardener, is the least expensive. It also goes by the old name "water glass." Potassium silicate is probably next in terms of popularity. Lithium silicates are beginning to be marketed more because they can counter the effects of reactive aggregates when they are present in concrete. (Remember, for surface

applications they affect only the surface regions of the concrete.) It's claimed that potassium and lithium products produce less "bloom" or whitening than does sodium. It is proposed that Lithium will surpass all others for most applications.

Coating Costco
Installers turn to lithium silicates to finish retail concrete floors.
Source: CONCRETE SURFACES MAGAZINE
Publication date: 2007-03-01

Sodium and potassium silicates must be rinsed with water after application, or the residue will turn crusty white and mar the floor's appearance. This rinse water is very alkaline and some municipalities are requiring it to be put into barrels and disposed of as hazardous waste. Lithium silicates do not need to be rinsed off after application, saving labor and waste disposal fees.This grinding process can create anything from a matte to a brilliant glass-like sheen, depending on the customer's preferences and budget.

Moving toward diamonds
Diamond polished concrete has also become a strong player in this area the last five or six years. This process usually involves densifying the concrete with sodium potassium, or lithium silicate and then grinding the concrete with metal-bonded diamonds followed by resin-bonded diamonds
Lithium -Guard is very hard and provides good stain protection with none of the environmental issues. This material is a maintenance product that needs to be periodically re-applied. It acts as a good sacrificial coat to protect finely polished concrete, and is rapidly gaining acceptance in the marketplace.

The IntellaTread process is moving toward infectious due to flawless delivery and growing customer awareness and wisdom.

Additional information is available from the manufacture

888-942-5091