PROTECRETE®
CONCRETE'S BEST SOLUTION

Why Densifier works and sodium silicates do not

A technical explanation of how PROTECRETE's Densifier is very different from sodium silicate products

All look-alike products do not perform alike even though they are making similar claims. How can you tell which one to believe?

We will explain in the following paragraphs how our product, PROTECRETE Densifier, a silicate, is different from the current popular sealers on the market (which are **sodium** silicates). Because it *is* different, it also *acts* differently, and that's why Densifier is able to penetrate 4 to 6 inches or more when the look-alikes can only sit on the surface.

About silicates

Silicates are plentiful in nature, constituting the greater number of the minerals that compose the crust of the Earth. They are compounds containing silicon (next to oxygen, Earth's most abundant element) with oxygen and a metal. Man-made silicates are used for a wide variety of purposes, from glass making to water treatment, plus the major ingredients of Portland cement are silicates.

Silicate materials are used as waterproofing agents in concrete because of their solubility in water. The waterproofing concept ideally is: water soluble silicates contact and react with certain common ingredients which are always available inside Portland cement concrete (such as one or all of the available hydroxide materials, soluble calcium compounds or free and unused alkalis) to form insoluble precipitates. This process allows the Densifier to densify and waterproof the concrete at the same time with a single application.

The fact is, with the exception of the Densifier, most, *if not all*, silicate products formulated and marketed to date, begin to react with the ever present calcium hydroxide residue immediately upon contact with the concrete's surface. This generates a thixotropic, sparsely distributed crystalline precipitate gel, which very much hinders or prevents further silicate solution penetration. The resultant hydroxide precipitated gel is not of uniform composition. It consists of variable-sized pores, ranging from very small to very large. This causes the precipitate to only be temporary at best. As water migrates through the gel's larger pores, the gel erodes and eventually will fail. How quick will depend on the volume of water and its driving force passing through the concrete. The silicate solution's immediate surface reaction can also cause ineffective, incomplete thixotropic gel to be generated. Since the reaction begins immediately upon contact with the concrete's surface, there is a tendency for there to be more silicate solution available in the application than there is hydroxide material in the concrete to react with. This causes varying portions of the thixotropic gel deposited inside the concrete to not be completely reacted, becoming what is considered an incomplete gel. Incomplete gel contains reaction sites that remain available for reactions. These unfulfilled reaction sites will eventually react with atmospheric carbon dioxide and form carbonates. The carbonates then can eventually migrate to the surface and cause damage to the concrete that it was meant to protect.

There are some silicate solutions, such as Densifier, that are able to penetrate very deeply into concrete and form precipitate, a gel-like compound, in the pores upon contact with the always present free unused alkalis. However, type and uniformity of this internally produced compound can vary greatly, and can be the most important factor as to whether the silicate solution became beneficial to concrete or not, and to what degree. Unlike Densifier, some silicate products form gel that will absorb internal moisture and begin swelling and continue swelling whenever moisture becomes available. This can produce extreme internal pressures and stresses, even to a point where concrete's integrity could be damaged quite severely (similar to an alkali-aggregate reaction).

PROTECRETE Densifier is successful in overcoming such problems and is a superior product very beneficial to concrete. Since Densifier goes into concrete as a unique precision-blended colloidal liquid, its internally generated compound or precipitate, is designed to be very superior when compared to other existing look-alike products. The precipitate packing density is very precise and creates pore networks of extremely uniform-sized porosity with pore sizes smaller than a molecule of water, or free moisture. As Densifier's precipitate is being formed, it involves special ingredients to cause polymer cross linking and branching, encouraging polymer particle and strand connection. It creates extraordinarily strong polymer chains, which provide the extra strength and durability to truly become permanent and insoluble. Furthermore, the polymer chain and pore configuration cause Densifier gel compound's residual water or free moisture to remain in a stretched position with a density similar to that of ice. Should a hard freeze occur, this water or moisture does not expand further to cause freeze-thaw cycle damage, as does the gel compounds of some look-alike products. Look-alike products, making similar claims, usually only form shallow, weakly linked short chain gel polymer compounds. They may or may not hold up for an appreciable length of time. They are entirely dependent on the harshness of the concrete installation's surrounding environment. Plus, there is always the possibility that incomplete gel may migrate back to the surface, creating surface traction problems in products other than PROTECRETE Densifier.