



## SCP Products vs. Dry-Shake Surface Hardeners

Abrasion resistance is a property of concrete that is important in structures that are subjected to repeated traffic from vehicles or repeated scouring from the movement of water or other liquids containing particulate matter. Although not normally a structural concern, abrasion of concrete can cause dusting, and may reduce the expected lifespan of the concrete member. Floor slabs, exterior pavements, dams, spillways, and other structures can all be affected by abrasion.

In general, abrasion resistance is proportional to the compressive strength of the concrete under consideration. In other words, as compressive strength increases, the concrete's ability to resist abrasive forces increases. Other factors that influence abrasion other than the compressive strength include finishing and curing operations. If inadequate curing or improper finishing techniques are used, the concrete's abrasion resistance may be only a small percentage of what is indicated by its compressive strength.

Among other recommendations, ACI 201.2R-16 *Guide to Durable Concrete* recommends using special dry shakes or topping mixtures when severe wear is anticipated. Dry shake hardeners rely on hard aggregates combined with portland cement or other binders to provide their resistance to abrasion and are generally divided into metallic aggregate and non-metallic aggregate categories. ACI 302.1R-15 *Guide to Concrete Floor and Slab Construction* provides recommendations for specialized finishing procedures when using dry shakes. The ACI 302 document also references that "experience is necessary to determine proper timing for the required procedures."

While dry shake hardeners have a place in construction, their use requires specialized procedures with trained personnel. Cements have changed in recent years to a finer grind than in decades past, producing less bleed water. Bleed water is essential for shake on hardeners to work properly, and in many cases the mix design must be adjusted, requiring coordination between the contractor and the concrete supplier. A project-by-project evaluation of the projected benefits provided by dry shake hardeners versus other methods is advised.

A direct comparison between Spray-Lock Concrete Protection (SCP) product performance and various dry shake hardeners has not been performed, but an analysis of SCP product improvements to abrasion resistance is provided for review. A general product comparison is provided below:

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	Dry-Shake Hardeners	SCP Technology
Increased Abrasion Resistance	YES	YES
Provides Curing Equal to Moist Curing	NO	YES
Decreases Drying Shrinkage	NO	YES
Provides Water Penetration Resistance	NO	YES
Decreases Chloride Diffusion Rate	NO	YES

SCP products may be used to increase abrasion resistance of concrete and may replace some dry shake hardeners at the discretion of the design professional. SCP products provide many other benefits to concrete that dry shake hardeners cannot. There are a few applications where shake-on hardeners cannot be replaced by SCP products, including but not limited to:

- If the dry shake hardener provides a pigmented surface.
- If the shake on is an iron-based hardener with metal aggregate fines – specific to the intended use.
- If a high shine polish is required for reflectivity unless the option is given to polish later in the process.

SCP products may provide further advantages over dry shake hardeners including:

- Less intensive labor demands.
- Greater depth of reaction and more consistent coverage.
- Reduced impact on health & environmental concerns.
- Improved chances of overall success by the finisher by reducing the variables and timing demands of the process.