

Hard-Cem – FAQ

How does Hard-Cem work?

Hard-Cem works by directly improving the durability and resilience of the cement paste. Hard-Cem has a unique metal-mineral microstructure that, when embedded throughout the cement paste, imparts high durability against abrasion, erosion, and impact. The cement paste is the weakest component of concrete and is weaker than the surrounding aggregates. By improving the performance of the paste, Hard-Cem directly corrects this problem.

How Does Hard-Cem Compare to other Hardeners and Densifiers?

Hard-Cem delivers high performance without the problems and limitations of traditional hardeners and densifiers. Dry shake hardeners are based on hard (but often brittle) aggregates. Dry shakes place limitations on the concrete mix design and greatly complicate concrete finishing. The complex installation of dry shake hardeners can result in delamination. Liquid hardeners/densifiers are easier to apply than dry-shakes, but still require dedicated labor and have only a minor effect on abrasion resistance. They often require a second coat, and regular maintenance, cleaning or reapplication to maintain their performance. Hard-Cem has been extensively tested and shown to outperform both older technologies while being simple and reliable to install.

Is this a new product?

Hard-Cem has been on the market since 2003. It is currently in over 100 million square feet of concrete and has been specified by engineers and architects around the world. Case studies are available from your Kryton representative and at www.kryton.com.

Does Hard-Cem have Health and Environmental Product Declarations (HPD and EPD)?

Yes, the HPD and EPD are available from your Kryton Representative.

How does Hard-Cem help earn LEED credits?

Hard-Cem contributes to LEED credits in several ways. By increasing durability, Hard-Cem reduces the consumption of resources needed for concrete maintenance or replacement, which reduces a project's lifetime carbon emissions. Hard-Cem may also allow for more efficient, environmentally friendly concrete mixes to be used without sacrificing abrasion resistance. Hard-Cem also allows for reductions in jobsite waste and jobsite exposure to harmful dust and emissions. The ability of Hard-Cem to contribute to LEED credits has been verified by a LEED AP consultant. Contact your Kryton Representative for details.

Where can I buy Hard-Cem?

Hard-Cem is sold as an admixture through your local concrete provider. They will add Hard-Cem to the concrete during batching. Concrete producers can contact info@kryton.com for a list of distributors in their area.

How should Hard-Cem concrete be finished?

The appropriate finish will depend on the application and should be specified by the project engineer. Hard-Cem is compatible with all types of concrete finishing methods and there are no restrictions for finishing Hard-Cem treated concrete.

Will Hard-Cem produce a smooth shiny surface?

Sheen is primarily a function of concrete finishing and flatness and is not a result of any single product. Hard-Cem has no direct affect on sheen. Hard-Cem treated concrete can be finished to any desired sheen level and is fully compatible with polishing aids and equipment. In fact, the durability of Hard-Cem allows the concrete to maintain its original appearance, including sheen, much better than other concretes and hardening products.

Does Hard-Cem affect the coefficient of friction?

No, this depends on the finishing methods used for the concrete and does not change when using Hard-Cem. If you require a non-slip surface, discuss your requirements with your engineer and contractor.

Does Hard-Cem change the concrete's color?

You can expect Hard-Cem to have no noticeable effect on the final color. Some users report that concrete with Hard-Cem is slightly darker when freshly batched and before it hardens. After finishing and curing, concrete with Hard-Cem usually looks indistinguishable from an identical mix without Hard-Cem.

How long does Hard-Cem last? Does it require maintenance?

Hard-Cem becomes a permanent part of the concrete matrix. It does not deteriorate or degrade over time and is not affected by weather. Hard-Cem not only lasts the life of the concrete, but actually extends the concrete's service life.

Hard-Cem concrete does not require specific maintenance to maintain its durability. The protective properties of Hard-Cem will allow floors to maintain their original appearance. If desired, Hard-Cem floors may be cleaned using all normal cleaners and equipment during routine maintenance.

How long do I need to wait until Hard-Cem concrete can enter service?

There is no additional waiting period until Hard-Cem concrete can enter service. Like most concrete properties, abrasion resistance will increase with age. Unless otherwise specified, wait until the concrete has reached its specified strength, or has been approved by the project engineer.

Does Hard-Cem improve concrete permeability?

Hard-Cem does not reduce or block pores in concrete and is not used for waterproofing. When waterproofing is required, use Krystol Internal Membrane (KIM) admixture, Kryton's industry leading crystalline waterproofing solution. KIM and Hard-Cem are fully compatible and are often used together in the same mix when the concrete needs waterproofing and resistance to abrasion/erosion.

Can Hard-Cem help with chemical resistance or protect against chlorides/corrosion?

Hard-Cem can increase resistance to aggressive liquids for applications that are also subject to abrasion. Normally, abrasion removes the dense surface finish, opening the pores and allowing aggressive liquids to penetrate and attack the concrete at a much faster rate. Hard-Cem keeps the dense, finished surface intact so it can protect the concrete from aggressive liquids. If the concrete is exposed to liquids containing chlorides, protecting the surface finish from deterioration can help limit chloride penetration, which helps protect against rebar corrosion. Such projects are excellent candidates to use KIM and Hard-Cem together.

Why do traditional hardeners have problems with concrete containing SCM's?

Traditional liquid densifiers and dry shake hardeners place limits on the use of SCM such as fly ash and GGBS (slag) used in concrete.

Liquid hardener/densifiers are an outdated technology that compete with SCM's for free lime (calcium hydroxide) in concrete when they react. This competition reduces the performance of both materials. Hard-Cem does not need free lime, making Hard-Cem an ideal replacement for liquid hardener/densifiers in modern concrete mixes containing any type of SCM.

Dry shake hardeners need a relatively high amount of bleed water so they can be spread and trowelled in during finishing. SCM's can lower bleed water, making it very difficult to install dry shakes correctly. Hard-Cem comes pre-mixed in the concrete, making it much easier and more reliable to install.

Why can't dry shake hardeners be used with air entrained concrete?

Dry shake hardeners need to be sprinkled on fresh concrete and aggressively trowelled to work them in. This level of trowelling can collapse and trap air voids with air entrained concrete, resulting in poor freeze-thaw performance and surface delamination. This makes it impossible to properly install dry

shakes over air entrained concrete. This in turn makes dry shakes unsuitable for exterior concrete exposed to freezing weather and de-icing salts.

Can Hard-Cem cause lumps in the concrete?

No, hard-Cem is a fine, free-flowing powder that disperses very easily through the concrete with normal mixing. Lumps in concrete are usually from cement and indicate inefficient mixing, usually due to worn fins, excessive early slump, or improper loading of materials into the mixer. Review ASTM C94 and ACI 304R for troubleshooting tips for loading and mixing concrete.

Does Hard-Cem concrete protect joints from heavy impact? Do I still need joint armor?

Hard-Cem will protect concrete joints from rubbing, rolling, and grinding wear over time, and will also increase chipping resistance against impact. In cases where the joint impact is expected to be severe, joint armoring technologies may be considered to compliment the Hard-Cem concrete.

Does Hard-Cem protect against heavy tracked equipment?

Hard-Cem is not a replacement for steel wear plates/rails, which are the most prevalent wear mitigation design features used in concrete flatwork directly subjected to tracked machinery. Hard-Cem concrete has been successfully used in several tracked equipment facilities including Caterpillar service centers, military equipment service centers and auto salvage facilities. Those facilities incorporated steel plates into the interior and/or exterior concrete to resist direct wear from the tracked equipment. Hard-Cem was used to protect the surrounding concrete.