

# what's inside QUIKRETE

## FAST-SETTING CONCRETE MIX

### PORTLAND CEMENT

No, it's not a grunge band—it's a powdery binding agent that mixes with gravel, sand, and water to form the hardened slab we call concrete. It's made by heating limestone, iron, alumina, and silica to 2,700° F, which changes the ingredients into calcium silicates, aluminate, and aluminoferrite. The minerals are then ground into a dust that's just waiting to be mixed with H<sub>2</sub>O. (Contrary to what you might think, the water doesn't evaporate out as the concrete hardens; it reacts with the minerals, lending its Hs and Os to create new compounds that form a rigid matrix.)

### CALCIUM SULFO-ALUMINATE

The "quik" in this version of Quikrete, CSA reacts with water much faster than the minerals in portland cement, so putting this in the bag speeds things up. Where Quikrete's basic product might take eight hours to solidify, Quikrete Fast-Setting Concrete Mix can harden in as little as 40 minutes—meaning fewer handprints in your new driveway!

### ALUMINA AND AMORPHOUS SILICA

The ancient Romans discovered that adding volcanic ash from Mt. Vesuvius made their concrete stronger. The 20th century saw the widespread use of fly ash—particles of alumina, amorphous silica, and other substances from coal-burning smokestacks—to accomplish the same thing.

### LIME

The Romans used lime (calcium hydroxide) as a key ingredient in their cement—the 1,900-year-old Pantheon is held together with just lime and ash. Lime promotes plasticity, keeping the concrete workable for just long enough.

*A dash of lime keeps this stuff from hardening too quickly.*

### LIMESTONE DUST

Limestone (different from lime) is calcium carbonate. In powder form, it's a great fine-grained filler for improving consistency. Of course, it's these fine grains that have OSHA worried: If you're not careful, this nuisance dust gets into everything, including your lungs, where it can cause chemical pneumonitis.

### CALCIUM SULFATE

Even fast-setting concrete shouldn't set too fast. Calcium sulfate, often called gypsum, interferes with the hydration of calcium aluminate present in the portland cement and inhibits what masons call a flash set—a situation where the mix stiffens almost immediately, making it impossible to pour or finish.

—Patrick Di Justo





## Hard Times

Watching concrete harden is only slightly more interesting than watching paint dry. So when photographer Dan Forbes was asked to shoot Quikrete for this month's What's Inside, he went for drama. He dropped a bag of the dry concrete mix from a ladder into a tub of wet Quikrete and captured a bird's-eye view of the impact (above). For another shot, he splattered goopy Quikrete onto a solid concrete cube. The aftermath wasn't pretty. "My studio looks like a miniature sculpture park with chunks of concrete everywhere," says Forbes, who also contributes to *The New York Times Magazine* and *GO*. Fifty bags of Quikrete later, the result can be seen on page 58.