



## Technical Bulletin: Apply Vibration to Maximize Bond

Phoscrete forms both a chemical and a mechanical bond to clean, sound, dry concrete that stays strong and lasts long with no cold joints.

When fresh conventional concrete is originally installed, calcium hydroxide in the cement reacts with CO<sub>2</sub> from the atmosphere to create calcium carbonate. This process, known as *carbonation*, penetrates the concrete surface to a depth of approximately 1 mm per year. Over time, carbonation can be a factor in accelerating corrosion of the reinforcing steel (rebar), leading to concrete spalling.

When wet Phoscrete is installed on a carbonated surface, the CO<sub>2</sub> is released, causing bubbles to form at the interface between the substrate and Phoscrete. Left alone, these bubbles can interfere with the Phoscrete bond. A weak bond between the substrate and Phoscrete can cause delamination. Independent movement of the repair and the adjacent substrate when subjected to load transfers from heavy duty vehicular traffic can result in cracks in the repair material, further delamination, and subsequent spalling. Delamination due to bubbling typically occurs in the first 30 days following installation of Phoscrete. *Perform a hammer sounding test or chain drag to verify the Phoscrete bond 30 minutes following initial set.*

**Proper site preparation** is the first step to mitigate the deleterious effects of carbonation on concrete repairs. Use a saw, a chipping hammer, and/or a needle gun to remove the surface layer exposed to air.

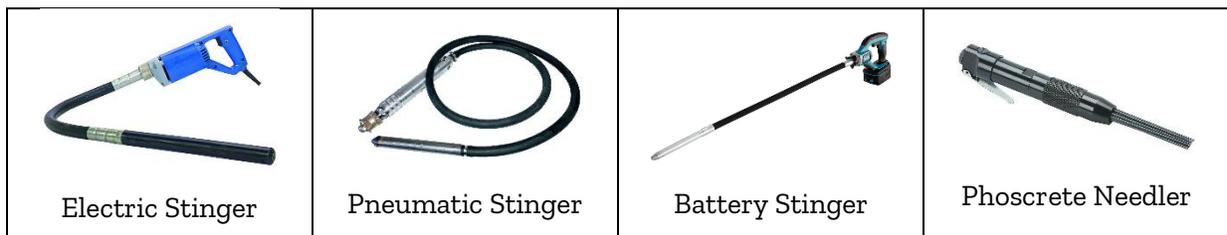
When **heat from a propane torch** (grass burner) is applied to a carbonated concrete surface, CO<sub>2</sub> is released. Be careful to only "kiss" the surface with the torch to warm the substrate and release the CO<sub>2</sub>. Prolonged exposure to temperatures of 1,000°F (500°C) will weaken the compressive strength of the concrete.

**Apply vibration to wet Phoscrete** during installation to allow the bubbles to move away from the interface and escape into the air. Vibration can be as simple as aggressively working the material by banging the float or trowel on the wet surface and moving and pushing the repair material up against the sawcut edges.

Powered vibrators (electric or air) are highly recommended to accelerate escape of the bubbles. Because Phoscrete is *thixotropic*, applying vibration allows Phoscrete to flow and consolidate better. Poking a pencil vibrator into and across the wet Phoscrete patch is fast and easy and is recommended even on shallow repairs such as expansion joint headers.

Please note that in cold temperatures, the bubbles travel more slowly through the wet repair material and therefore the use of vibration is even more important to ensure these bubbles move away from the Phoscrete-substrate bond line and are released into the air.

Phoscrete offers three styles of pencil vibrators for our installers. The needle gun is also shown here:



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