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# Wachuwannano

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A.K.A. MR. WACHUWANNANO



*The plastering code in my area—San Francisco—asks that two days elapse between application of scratch and brown coat plaster. My understanding of cement mechanics is that the stucco hardens by formation of crystals called “Kober-Morite Crystals.” The interlocking of these crystalline structures makes the strong bond and the two days may be to allow for shrinkage or cracking. Please expand upon or explain this two-day waiting period*

—J.W from California

We assume the code you make reference to is the Uniform Building Code. Table 25-F of the 1997 edition of the code does require a minimum application interval between first and second coats of plaster of 48 hours.

**Wachuwannano** believes that the crystals you are referring to are actually called “tobermorite.” Creating the portland cement used in stucco is a process that involves grinding up and blending a combination of raw materials—limestone, rock, oyster shells and the like—into a powder. The powder, sometimes after being mixed with water to form a slurry and sometimes still as a blended powder, is fed through a kiln and burned to form cement clinker. The dry clinker is mixed with a bit of raw gypsum and shipped as portland cement.

To be used in construction, the portland cement and necessary aggregate are mixed with water in a process known as hydration. During hydration, the water mixes with the four principal compounds of the clinker, two of which—tricalcium silicate and dicalcium silicate—re-form as calcium hydroxide and calcium silicate hydrate. The latter compound, calcium silicate hydrate, is better known as tobermorite gel and typically makes up approximately 50 percent of the weight of hydrated cement. It is this gel that gives hydrated cement its strength and durability.

Where the 48 hour waiting period between coats comes from is a bit of a mystery, and **Wachuwannano** would be glad to hear

any enlightened logic justifying the specific time frame. One theory is that one of the best ways to prevent plaster from cracking is to make sure that it cures slowly, evenly and uniformly—especially within the first few days after installation. As stucco cures, it shrinks and gains strength and even though it may continue to cure for a period of many years, thereby gradually gaining strength and shrinking slightly over time, it shrinks the most in the first few days after application.

While there exists much debate on the “best” method for helping the plaster to uniformly cure, one of the oldest methods is to moist cure the stucco by fog spraying each coat of plaster for a minimum of 48 hours prior to the application of the subsequent coat. In the instance of the scratch (first) coat of stucco, this is done to allow the first coat to shrink to a point that any future shrinkage will not adversely affect the subsequently applied coats of plaster. In other words, in the first 48 hours after application, the scratch coat shrinks about as much as it is going to shrink, and any future shrinkage won’t be noticeably deleterious to either the appearance or performance of the stucco.

We can prove the existence of the 48 hour waiting period between coats in the UBC back to the 1960s, and the method is probably one of those that is tried and true and will never be removed from the code. **Wachuwannano** is not intimately familiar with local and state codes, but you may want to further investigate the municipal code requirements you are working under, for there are alternate application methods written into the UBC that do allow for a shorter application interval between first and second coats of exterior plaster. Reference section 2508 of the code.

## About the Author

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