

Concrete and Mortar Quality Assurance

Achieving Required Moisture Levels With an Instant Moisture Meter

By John Bogart | Tuesday, July 6, 2021

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THE CHALLENGE: MOTHER NATURE'S WHIMS

For commercial and industrial construction business owners and professionals, ensuring concrete and mortar quality can be difficult when mother nature intervenes with variable jobsite factors such as seasonal rainfall, temperature changes, humidity, wind and groundwater that significantly changes moisture levels.

Because water is an essential element of concrete and mortar, any change in moisture levels can impact setting and drying time. Incorporating the wrong moisture levels can also be disastrous to quality, finish, longevity and safety.

Concrete-water ratios can make a big difference in concrete permeability. However, air humidity and summer heat also can affect the rate at which moisture migrates through drying concrete.

High humidity can increase the risk of fractures and other structural issues. Concrete can also gradually change from ductile to brittle when humidity decreases. This naturally occurs when summer heat affects concrete's evaporation time.

Concrete cures best between 70°F to 80°F. So, if temperatures rise above that and climb towards 90°F, concrete surface problems can occur, as well as reduced strength.

Hot weather, wind and dry conditions can increase a concrete slab's rate of evaporation, which can threaten the integrity of the top layer of concrete. Water quickly evaporates from the surface layer, which can cause the mix to be drier and susceptible to surface cracking and shrinkage.

Reduced strength can also become an issue with hot, dry weather, which can shorten the hydration portion



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of the curing process (when water is absorbed and crystals form in the concrete). Then the concrete mixture has less time to hydrate these forming crystals and create strong compressive strength. So, concrete curing in hot weather can suffer from limited strength and durability.

In wetter seasons, however, excess moisture can do a great deal of damage to concrete and its protective coatings, as well as affect concrete-water ratios. Because concrete is porous, issues arise when water is trapped in the concrete.

For any kind of structural concrete, including foundational slabs, construction contractors do not want to “guesstimate” moisture levels, which can potentially jeopardize the whole project.

THE SOLUTION: HANDHELD INSTANT MOISTURE MEASUREMENT

Industry innovators have developed simplified testing equipment that allows anyone in the field to get laboratory-quality measurements in any environment.

As an example, using a hand-held concrete and mortar moisture meter, a worker can select the calibration (e.g., concrete or mortar), press it against the sample and moisture is immediately displayed with accuracy of +/-0.5% (0% to 12% for concrete and 0% to 15% for mortar). Automatic temperature compensation enhances measurement accuracy and two “raw” modes allow the user to calibrate for deep or shallow samples. Up to 1,000 measurements can be stored in memory and downloaded to a computer for analysis.



Instant moisture measurement assures speedy results on the jobsite.

Such a device uses high-frequency capacitance, comparing the di-electric constant of the solid with water. A direct relationship exists between this and moisture content.

One construction contractor used the moisture meter to confirm that the concrete flooring on a 20-story building was ready for custom surface treatment. In fact, the contractor was able to test the entire project in one morning.

With an instant moisture meter, flooring installers can test concrete humidity as water passes through the concrete’s surface even after it hardens. This kind of testing is critical in indoor installations, where high levels of moisture and trapped water in concrete can create mold or lead to bubbling or degradation of its strength and integrity.

This approach can be particularly helpful to contractors responsible for concrete subflooring.

Construction contractors building on a slab know the importance of a concrete subfloor that is fully dried and accurately prepared for use. Knowing how the concrete will act when the concrete is coated, flooring is installed or the slab is prepared for final use is key to success.

For contractors that need more specialized applications of measuring moisture, such as for “wet” concrete, this is also available with other units. For instance, with such units, the sample moisture of slurry and aggregate can be instantly measured, allowing contractors to optimize batch mixing anytime, anywhere.

No matter the season or varied environmental conditions, the bottom line for contractors working with concrete or mortar is that using hand-held devices that provide instant moisture measurement helps to ensure that quality work is done as soon as it is feasible, without excess or insufficient moisture setting, or drying times. Job by job, this facilitates profitability.

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