

# ASFE Practice ALERT

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## Initial Curing of Concrete Test Specimens in the Field: Who Is Responsible for What?

Assuming you're a construction-materials engineering and testing (CoMET) consultant, you're probably familiar with American Concrete Institute (ACI) Standard 301-05, *Specification for Structural Concrete*. Developed by ACI Committee 301, the standard in Section 1.6.3.2.d states that one of the contractor's "Duties and Responsibilities" is to **"Provide and maintain adequate facilities on the project site for safe storage and initial curing of concrete test specimens as required by ASTM C31/C31M for the sole use of the testing agency."** While the term "adequate facilities" is somewhat ambiguous, it has been generally interpreted to mean that, during the initial curing period in the field, the contractor is responsible for providing a curing environment that satisfies the requirements of ASTM C31. The "facilities" involved could be something as simple as an insulated curing box or container, or something as complex as the thermostatically controlled field-curing box that could be required in extreme hot- or cold-weather conditions. The general interpretation reflects the common belief that a project site is the contractor's domain, where the contractor has "24/7" responsibility for project-site safety and security. As such, no part of the project site – like a facility for initial curing in the field – should become the responsibility of another party. But the general interpretation no longer applies, because ACI 301-05 no longer applies.

In December 2010, ACI rolled out its new *Specification for Structural Concrete*, ACI 301-10, a 77-page document that in many respects differs significantly from its predecessor, especially when it comes to initial curing of concrete test specimens in the field. The standard's "NOTE TO SPECIFIER" section states, in

part, that the document does not address "...responsibilities for any project participant other than the Contractor." While true on the surface, the statement is misleading because it fails to acknowledge that construction is a team activity and, as such, what any team member does or does not do has a direct and

immediate impact on what others do and do not do. The interrelationships involved are demonstrated in ACI 301-10 section 1.6.2.2.d, which states that the contractor is responsible for **"[providing] space and source of electrical power on the project site for facilities to be used for initial curing of concrete test**

**specimens as required by ASTM C31/C31M, for the sole use of the Owner's quality assurance testing agency."**

In fact, the contractor's revised responsibility to provide "space and source of electrical power" – as opposed to "adequate facilities" – may transform CoMET firms' initial curing responsibilities in the field. Somewhat ominously, it could also lead to uncertainty and confusion, common precursors of delays, disputes, and claims, because of the ambiguity some associate with the word "space." Does it imply that the contractor must set aside an area at the construction site where the CoMET consultant or some other party will place or construct initial curing facilities? Or does "space" mean "an environmentally controlled space" for initial curing in the field?

Then-ACI 301 Committee Chair W. Calvin McCall, P.E., FACI discussed new elements of ACI 301-10A in a series of three articles that appeared in the April, May, and June 2011 editions of *Concrete International*. In the May 2011 article, Mr. McCall wrote that the new wording "clarifies that the owner's testing agency has the responsibility of maintaining adequate field curing conditions." (So much for not addressing "...responsibilities for any project participant other than the Contractor.") If Mr. McCall is correct, ACI 301-10 would mandate for many a 180-degree change from what is now conventional practice. But Mr. McCall's statements are *not* authoritative. What ACI 301-10 states – even though, arguably, it's ambiguous – takes precedence over what Mr. McCall states, because the former is a standard and the latter is just one person's opinion.

What about the site-specific specifications prepared for most construction projects? Could they help? Feasibly, but not likely. Although site-specific specifications are supposed to identify the responsibilities of each construction-team member, they seldom identify the party responsible for initial curing of concrete test specimens in the field. As such, ACI 301 becomes the "go-to" default by stated or unstated reference. When this occurs, you'd be wise to ask which version of ACI 301 is intended, assuming neither -05 or -10 is specified. If you cannot obtain an authoritative response, you probably would be well-advised to assume the current version (ACI 301-10) is the default requirement. *Make that assumption known*; e.g., "In accordance with ACI 301-10,...." and likewise make known any alternative assumption; e.g., "In accordance with ACI 301-05,...." You likely would also be well-advised to detail the scope of CoMET services with respect to this issue. If you plan to provide the initial-curing facility at the construction site, make that service clear, indicating the additional time involved as well as the fees for equipment transport and use, feasibly among other, related services. Clear details also are needed if you choose to assume otherwise; e.g., that the contractor or some other party will provide initial-curing facilities. One way of doing this may be to include in your scope of service words to the effect that "CONSULTANT will **not** provide facilities for the initial curing of concrete test specimens in the field. CONSULTANT will use the initial-curing facilities furnished by the contractor." In that case, however, you feasibly may want to note that your firm is capable of providing the necessary facilities, and what the cost of doing so would be.

**Essential:** Understand the requirements for initial curing of concrete test specimens in the field. Read the project specifications on *every project; assume nothing.*

If the design and construction team will be holding a preconstruction meeting, ask to be invited (if you otherwise might not be) specifically to address the initial curing issue (feasibly among others). If your scope of service calls for another party to provide "adequate facilities," who will do so? The contractor? Or might it be the concrete supplier? If you have agreed to provide the facilities, make sure the contractor is aware of that fact and is ready to provide "space and source of electrical power" *as well as the additional services that may be required*; e.g., around-the-clock security, access to the facilities after hours and on weekends, and help moving the facilities from place to place on site. Be certain that what's said about this matter is recorded in the meeting's minutes. Be sure to request a draft version of the minutes to ensure the information is reported correctly and in appropriate detail.

If you are unable to attend the "precon" or if one is not held, you still need to communicate with the design and construction team, *especially* if you have not addressed on-site initial-curing facilities in the scope of CoMET services or – better – have specifically excluded the service, noting another party needs to perform it. It probably would be worthwhile to inform the appropriate parties *in writing* that, because of the ambiguity of ACI 301-10, you want them to be aware that you will or will not be providing the facilities. If you fail to inform them, possibly from the belief that some

other party is responsible for doing so, problems would arise if no initial-curing facilities were ready on-site for the first concrete placements, and the finger of blame would likely be pointed at you. (Most projects also have a request-for-information (RFI) system that would allow you to ask and get answers to questions like these. An RFI system of itself may not be enough to put the appropriate people on notice, however. It's far better to do what you can to avoid problems than it is to document the fact that you're not responsible for causing them, although both actions usually are recommended.)

Note, too, that ACI 301-10 may be part of a building code. Depending on local conditions, requirements for initial curing in the field may be strictly enforced or, at the other end of the spectrum, may be more or less ignored. "Everyone does it this way" does not excuse failure to follow a standard to which local officials require adherence. *You need to know what local conditions are.* Speak with appropriate code officials. Request a formal, *written* determination that you can share with others and rely on for future reference.

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Committee also urges you to read ACI 301-10 from cover to cover, as well as the three *Concrete International* articles. You need to be aware of *all* the new requirements; e.g., the requirement of ASTM E329 for "inspection" of reinforcing steel (section 1.6.1.1); the requirement of 3 tests at 28 days for compressive strength of 4-inch x 8-inch concrete cylinders (section 1.6.3.2.e); and the sampling frequency of concrete every 150 cubic yards as opposed to every 100 cubic yards (section 1.6.3.2.d).

Of course, when all is said and done, the real issue is not who provides the facilities, nor is it the importance of correct initial curing in the field; it's about serving the owner's interests well by addressing known risks before they can become problems, and properly protecting and adequately curing concrete test specimens using appropriate on-site initial-curing facilities the owner will pay for no matter who provides them.

Communication, cooperation, and coordination are essential for an effective construction-project outcome. When you take the initiative in those respects, you help enhance your value – and your perceived value – to the owner, the design team, and the contractor.

## Keyword Index\*

ACI Standard 301

American Concrete Institute

ASTM C31

ASTM E329

CoMET

compressive strength

concrete testing

construction-materials engineering and testing

field curing

initial curing of concrete test specimens

preconstruction meeting

QA

quality assurance

request for information

RFI

scope of service

Specification for Structural Concrete

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