

# Concrete Discharge Time Requirements

## ASCC Position Statement #32

**P**roject specifications, including those that cite ACI 301, “Specifications for Structural Concrete,” and ASTM C94, “Specification for Ready-Mixed Concrete,” state time limits for the discharge of concrete. ASTM C94 states that discharge of the concrete shall be completed within 1-1/2 h after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. This time limitation is permitted to be waived by the purchaser if the concrete is of such slump or slump flow after the 1-1/2 h time limit has been reached that it can be placed, without the addition of water, to the batch. This waiver is seldom used because the reasons for allowing the waiver are not well understood.

ASTM STP 169D, *Significance of Tests and Properties of Concrete and Concrete-Making Materials*, includes Chapter 45, “Ready Mixed Concrete,” by Lobo and Gaynor. They state that the 1-1/2 h time limit is too conservative and that field and laboratory data demonstrate concrete strengths tend to improve with time, but only when water is not added. At higher temperatures, above 70°F, they indicate that the time limit can only be justified by a concern that the prohibition against water addition, after the adjustment or arrival at the job site, cannot or will not be enforced. They cite the following three references to support their position:

- “Effects of Prolonged Mixing on Properties of Concrete,” R.D. Gaynor, NRMCA Pub. 111, 1963, pp. 1-18.
- “Study of ASTM Limits on Delivery Time,” R.C. Meininger, NRMCA Pub. 131, Feb. 1969, pp. 1-17.
- “Effect of Temperature and Delivery Time on Concrete Proportions,” R.D. Gaynor, R.C. Meininger, and T.S. Khan, *Temperature Effects on Concrete*, ASTM STP 858, June 1985; also NRMCA Pub. 171.

Field experience of ASCC concrete contractors supports Lobo and Gaynor’s position and indicates concrete that exceeds the 1-1/2 h limit can often be placed without the addition of water and without any detrimental effects on the hardened concrete. Current high-range water reducing admixtures (HRWRA) make slump loss less of an issue, and field packs of HRWRA are available to compensate for slump loss, if necessary. Concrete contractors, however, will reject concrete if the slump is too low to allow it to be properly placed and consolidated.

The discharge time limit should be discussed at preconstruction meetings so all parties agree under what conditions the waivers can be applied. ASCC concrete contractors want to make sure all parties understand the basis for the ASTM waiver and when it can be used.

If you have any questions, contact your ASCC concrete contractor or the ASCC Technical Hotline at (800) 331-0668.



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