Department of Health Care Access and Information
Office of Statewide Hospital Planning and Development
2020 West El Camino Avenue, Suite 800 • Sacramento, CA 95833 • (916) 440-8300
355 South Grand Avenue, Suite 1900 • Los Angeles, CA 90071 • (213) 897-0166

POLICY INTENT NOTICE

PIN: 82

SUBJECT

Ready Mix Concrete/Grout Placement Times

Effective: 10/09/2025

PURPOSE

Establish a time duration from mixing of materials and final discharge of ready-mix concrete. Also establish a maximum drum revolution limit as to when the concrete discharge must begin. Concrete, in the context of this document, also includes ready-mix grout used for structural members and piles.

BACKGROUND

ASTM C94 has gone through several iterations over the last 10 years. The latest version, ASTM C94/C94M - 24d, is the International Standard Specification for Ready-Mixed Concrete, no longer provides specific guidance on the duration from the start of mixing materials to the placement of the concrete at its final setting location, nor does it specify the maximum number of drum revolutions used for Truck-Mixed concrete. Additionally, ASTM C94 does not take into consideration the unique requirements of health care facilities constructed in California where quality control and quality assurance play a pivotal role in assuring health care facilities meet the requirements of the California Health and Safety Code.

The current version of ASTM C94 leaves the determination of duration and maximum number of drum revolutions to the "Purchaser" and states that if no time limit or drum revolution limit is specified by the purchaser, the *"*Producer/Manufacturer" should establish these quantities and inform the purchaser prior to delivery. Typically, purchasers (indirectly the owner/facility representatives) rely on their contractors for guidance on these quantities. Most contractors determine these quantities based on the logistics of their projects rather than their impact on the strength and durability of the cured concrete.

Previous versions of ASTM C94 had specified a 1½ hour time limit from mixing to the end of discharge of concrete, since its original publication in 1935. It is recognized that with modern admixtures, concrete setting times can be adjusted to suit the geographic and environmental conditions at the project site. However, this time interval (between mix and placement) is not required to be reflected in the concrete break history (per ACI 301-20, Section 4.2.3) or trial mixtures (per ACI 301-20, Section 4.2.3.4(c)) that accompanies the concrete mix-design submitted to the HCAI District Structural Engineer for concurrence before concrete pours. Generally, concrete compression test results / break histories do not include sufficient supporting documentation such as batch tickets or special inspection reports that demonstrate the time interval from mixture to placement and/or drum revolutions, therefore these variables are unknown.

The current requirements in ASTM C94 may affect concrete strengths in projects. Concrete cylinder breaks show a strength decrease the longer the concrete remains in the mixer truck beyond the 1-1/2 hour time limit at a construction site before being discharged. There may also be an adverse relationship between concrete strength and an excessive number of drum revolutions. Therefore, it is

important to manage these factors to achieve the required concrete strength and durability in a project. Effective planning and logistics can ensure concrete is delivered to the project site when needed, thereby minimizing wait times for concrete mixer trucks.

POLICY

To ensure consistency, discharge/placement of the concrete shall be completed within 1½ hours after the introduction of the mixing water to the cement and aggregates. And, a maximum of 300 drum revolutions (comprising no more than 100 mixing revolutions with the remainder being agitating revolutions) until the completion of concrete discharge. These limitations may **NOT** be waived by the manufacturer/producer or by the purchaser. The mixing process shall commence once all materials have been loaded into the mixer, whether it be stationery or a truck-mixer (ASTM C94, Section 12.5).

While a time limit is set at 1½ hours, it is also recognized that there may inevitably be some delays in discharge of concrete at the site. Exceeding the 1½ hour limit is permitted (This is only allowed for unplanned delays without an alternate method of compliance) if the following procedure is followed:

1. The concrete temperature remains under 90 degrees F, the slump needs to stay in the approved range, and water is not to be added after discharge begins.
2. At 90 minutes, the pump operator documents time, slump, and temperature of material. If slump is at acceptable tolerance and temperature is less than 90 deg F, placement proceeds.
3. Check temperature at 10-minute intervals, unless the temperature is 85-88 deg F, in which case the interval will shorten to 5 minutes.
4. Measure slump at 110 minutes, or at end of placement, whichever is first.
5. Placement ends at 120 minutes, and all data is recorded in the inspector's report.

Except for unplanned delays (see above), the 1½ hour time limit and a maximum of 300 drum revolutions cannot be waived by the manufacturer/producer or by the purchaser unless an alternative compliance method is submitted and approved by HCAI. Any request to extend the time limit or increase the maximum drum revolutions require alternative materials, design and methods of construction and equipment (aka alternate method of compliance) request as stipulated in Section 104.11 of the California Building Code and Section 7-104 of the California Administrative Code. The written request shall include substantiating evidence in support of the alternate and may require but not limited to, concrete break history, trial mixtures or field testing that incorporate the proposed extensions of time and revolutions.

When requesting an alternative compliance method for increased time limits or drum revolutions, additional requirements must be met. These include ambient air temperature, concrete temperature measurements, temperature control methods, trim water volume, admixture amounts, slump tests, and the casting of extra test cylinders and additional concrete compression tests results beyond those required by Section 1905A.1.17 of the California Building Code.

Original signed	10/09/2025
Chris Tokas, Deputy Director	Date

APPENDIX

ASTM C94/C94M-24d

6.1.9 Purchaser shall state any drum revolution limit as to when the concrete discharge must begin. If no drum revolution limit is stated by purchaser, the producer shall determine and communicate the limit to the purchaser prior to delivery.

6.1.10 Purchaser shall state a time limit from the start of mixing defined in 12.3 or 12.5 to when the concrete discharge must be completed. If no time limit is stated by purchaser, the producer shall establish and communicate the limit to the purchaser prior to delivery. The time limit to complete discharge shall be stated on the delivery ticket in accordance with 14.1.14.

NOTE 10—This specification previously included a 1 1⁄2 h time limit to end of discharge since its original publication in 1935. There are many options available to the producer to provide the required quality of concrete with end of discharge limits beyond 1 1⁄2h or less than 1 1⁄2h. The purchaser should consult with the producer for available options to establish a time limit to end of discharge prior to or at the time concrete is ordered. Selection of a time limit to end of discharge should consider ambient conditions, types of cementitious materials and admixtures used, placement procedures, and projected transportation time between the batch plant and the point of delivery.

California Building Code

1905A.1.17 ACI 318, Section 26.12.2.1(a). Replace ACI 318 Section 26.12.2.1(a) by the following:

26.12.2.1(a) Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards (345 m^3) of concrete, or not less than once for each 2,000 square feet (186 m^2) of surface area for slabs or walls. Additional samples for 7-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.