

SECTION 02005 - EVALUATION OF EARLY-AGE CONCRETE

(Follow all instructions and make all edits with “Track Changes” turned on. This Section is not published in the Oregon Standard. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the Project, unless the item(s) that are included in the subsection, paragraph, sentence, or bullet are not required on the Project and then they should be deleted. In general do not re-number or re-letter subsections when item(s) are deleted. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Section 02005 is not a Standard Specification and is included in this Project by Special Provision.

Description

02005.00 General - This Section includes the requirements of using sensors and other alternative means to take temperature and strength measurements of placed portland cement concrete or high-early strength concrete throughout this Specification referred to as structural concrete, Commercial Grade Concrete, or concrete.

02005.01 Definitions:

Early-Age - A length of time shorter than the timeframe specified in the specific specification for f'c acceptance.

02005.02 Submittals - Submit reports from AASHTO T 325 when using maturity meters. Include the Equipment used to establish the maturity index and the Equipment to be used during field measurements.

Equipment

02005.20 In-Place Concrete Sensors - Provide maturity meters meeting the requirements of ASTM C1074 (AASHTO T325) and from the QPL.

Construction

02005.40 General - Early-Age readings of concrete strength, f'c, can be used for subsequent loading and return-to-traffic strength measurement. The Early-Age readings are not part of acceptance according to Section 00165. Early-Age readings can be completed by one of the following methods:

(a) Early-Age Concrete Cylinders - Cast and cure at least 2 test cylinders according to AASHTO R 100 in 6-inch by 12-inch or 4-inch by 8-inch single use plastic molds. Test at an Early-Age according to AASHTO T 22. Test at the same frequency and from the same sample as acceptance tests.

(b) Strength-Maturity Relationship - Establish a strength-maturity relationship for concrete mix designs according to AASHTO T 276 and AASHTO T 325 during the mix design phase. Test at ages of 24 hours and 3, 7, 14, and 28 Days. For high-early strength concrete, test at ages of 1, 3, 5, 8, and 24 hours. Alternative testing ages may be submitted with a minimum of 5 test ages, with intervals at approximately equal strength increments. Each reading requires averaging the two maturity cylinders and breaking two compressive strength specimens.

02005.41 In-Place Concrete Strength Measurements - Use sensors meeting the requirements of 02005.20 to measure in-place strength of concrete.

(a) Field Measurements - Prior to concrete placement, securely attach sensors to the reinforcement at equivalent spacing throughout the placement area. Install a minimum of two sensors per placement, maintaining a minimum density of two sensors for every 100 cubic yards of concrete. If the strength measurements are used to authorize subsequent loading or return-to-traffic, place the sensors in the latest portion of the pour. For standard concrete, calculate Early-Age strength after 72 hours. For high-early strength concrete, Early-Age strength may be calculated at any time after the final set. The time of final set is determined by field observation when the concrete has stiffened sufficiently to resist the penetration of a weighted test device.

(b) Regression Analysis - When estimating strength for a future date, perform a regression analysis according to AASHTO T 276.

(c) Early-Age Strength - For subsequent loading or return-to-traffic strength, calculate the strength of concrete based on the maturity index readings according to AASHTO T 325.

02005.45 Temperature Monitoring - Use sensors meeting the requirements of 02005.20 to monitor the temperature of concrete, as required. Monitor temperature on all mass concrete placements.