New Jersey Turnpike Authority

P.O. Box 5042, Woodbridge, NJ 07095



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Document Change Announcement

2016 Standard Supplementary Specifications Concrete Test Cylinders DCA2023SS-03

Subject: Revisions to

Section 401 Concrete Structures, Subsection 401.16 Test Specimens Section 905 Concrete, Mortar and Grout, Subsection 905.22 Quality Acceptance Testing, Sampling, and Inspection for Portland Cement Concrete

Description of Change:

This DCA allows preparation of either 4" x 8" or 6" x 12" cylinders for compressive strength testing, in accordance with ASTM C31 and ACI 318 99 Part 3, Chapter 5, Item 5.6. Reference revisions are made to AASHTO TP95 testing methods for Surface Resistivity Tests to indicate the latest AASHTO test standards (AASHTO TP358) and inserting text to allow flexural strength testing specimen sizes to be 4" x 4" x 14" or 6" x 6" x 20".

Notice to New Jersey Turnpike Authority Staff and Design Consultants

Effective immediately, all contracts currently in the design phase shall incorporate the revisions herein. For advertised contracts awaiting the opening of bids this revision shall be incorporated via addendum. Contact your New Jersey Turnpike Authority Project Manager for instruction.

The revisions may be accessed on the Authority's webpage: https://www.njta.com/doingbusiness/professional-services

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NOTE: The following text REPLACES its respective Subsection in the latest version of the 2016 Standard Supplementary Specifications.

SECTION 401 – CONCRETE STRUCTURES

401.16 Test Specimens

Delete the entire Subsection and replace it with the following:

This Subsection specifies the requirements for the preparation, testing and evaluation of Portland cement concrete specimens. Final quality acceptance testing shall be in accordance with Section 905. In order that the Engineer can maintain a record of the strength gain of all concrete placed, the Engineer will make standard test specimens: $4'' \times 8''$ or $6'' \times 12''$ concrete test cylinders for ASTM C39 compressive strength testing, $4'' \times 8''$ cylinders for AASHTO T277 and AASHTO TP358 and $6'' \times 6'' \times 3''$ molds for AASHTO T259/T260 permeability testing, and $4'' \times 4'' \times 14''$ or $6'' \times 20''$ molds for ASTM C78 flexural strength testing. The Contractor shall provide the concrete and molds for the test specimens, shall be responsible for the handling and protection of the specimens on the job site and shall arrange for delivery of the specimens to the designated testing laboratory between 24 and 48 hours after casting.

(A) **TEST SPECIMEN PREPARATION.**

A sufficient number of curing facilities for the storage and curing of concrete test specimens on the project site for the time required by ASTM C 31 shall be provided as approved by the Engineer at the expense of the Contractor and for the sole use of the Authority. The curing facilities shall be provided with a minimummaximum thermometer and shall be securable with lock and key. If curing facilities are not provided as required, the Engineer will instruct the Contractor to provide such facilities. During the initial 24 hours, the Contractor is solely responsible for ensuring that the test specimens are undisturbed and maintained within the specified temperature range. The test facilities shall be provided when requested by the Engineer. The Contractor shall not be allowed to place any concrete until all needed test facilities are provided.

The cost of the concrete cylinder molds, care of the specimens on the site, and transporting the specimens to the testing laboratory shall be borne by the Contractor and shall be included in the price bid for the concrete item or items scheduled in the Proposal. The Authority will pay the costs of performing the tests at the testing laboratory.

(B) STANDARD AND FREQUENCY OF TESTING PRIOR TO FINAL ACCEPTANCE TESTING.

Some or all of the following procedures will be used by the Engineer to evaluate in-place concrete prior to final quality acceptance testing in accordance with Section 905.

(1) Compressive Strength Testing (ASTM C39)

In accordance with ASTM C31 and ACI 318-99 - Part 3, Chapter 5, Item 5.6, entitled "Evaluation and Acceptance of Concrete", except that samples will be done on a random basis with a minimum of two cylinders prepared for each sublot, as defined in Subsection 905.22. If 3-day and 7-day testing is requested by the Engineer for Portland cement concrete, four test cylinders will be prepared for each sublot. The Engineer will calculate the average of two test specimens at the design compressive strength time requirement for the material. The average of the two test specimen result values for each sublot at the design compressive strength time requirement shall be considered the sublot compressive strength value. The specimens will be made and cured in accordance with the requirements of ASTM C31 except submersion in water storage containers shall be used in lieu of moist room curing if required by the Engineer for hot weather concreting of Portland cement concrete.

If the strength test results of a seven-day compressive strength test indicate that the concrete may not develop the minimum 28-day compressive strength specified, the Engineer reserves the right to order the Contractor to immediately core the portion of the concrete structure represented by that cylinder for testing purposes. The coring shall be made of the size and at the locations ordered. If the results of the core tests indicate that, in the sole opinion of the Engineer, the expected rate of increase in strength is not sufficient to produce a satisfactory compressive strength at 28 days, the portion of the concrete structure represented by the core tests by the core shall be removed and disposed of, and replaced with new construction.

If the results of the core tests indicate, in the sole opinion of the Engineer, that a satisfactory 28-day compressive strength may yet be realized, possible rejection or pay adjustment of the concrete in question will be deferred until the 28-day cylinders are tested in accordance with Subsection 905.22.

All coring and filling core holes with concrete, as outlined in the two preceding paragraphs, shall be entirely at the Contractor's expense; core testing will be done at the Authority's expense in accordance with Subsection 105.03.

(2) Permeability Testing (AASHTO T277, AASHTO TP358 and AASHTO T259/T260)

The "Coulomb Test" (AASHTO T277), "Surface Resistivity Test" (AASHTO TP358) and "Ponding Test" (AASHTO T259/T260) are used to evaluate the permeability of concrete. Two-inch thick samples will be cut from the center of each cylinder for AASHTO T277 testing, with a maximum of two slices per cylinder utilized. Samples shall be wet cured in water storage containers per ASTM C31 for 2 days, and air cured at the site for 3 days, prior to pick-up for testing. Additionally, the two (2) 6" x 6"x 3" molds will be tested for permeability in accordance with AASHTO T259/T260.

(3) Flexural Strength Testing (ASTM C78)

The "Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)" (ASTM C78) is used to determine the flexural strength of concrete by the use of a simple beam with third-point loading. Samples shall be formed within $4'' \times 4'' \times 14''$ or $6'' \times 6'' \times 20''$ molds in conformance to ASTM C31.

Removal and replacement of deficient concrete, as previously outlined, shall be entirely at the Contractor's expense.

Refer to Subsections 905.21, 905.22 and 905.23, including modifications made in the Supplementary Specifications, for requirements of quality acceptance limit, testing and sampling.

NOTE: Tracked changes herein indicate REVISIONS to the latest version of the 2016 Standard Supplementary Specifications.

SECTION 905 – CONCRETE, MORTAR AND GROUT

905.22 Quality Acceptance Testing, Sampling, and Inspection for Portland Cement Concrete

(A) Quality Assurance Testing Standards and Frequency of Testing.

Some or all of the following procedures will be used by the Engineer to evaluate the quality of in-place concrete:

(1) Compressive Strength.

In accordance with ASTM C 31 and ACI 318-99 - Part 3, Chapter 5, Item 5.6, entitled "Evaluation and Acceptance of Concrete", except that samples will be obtained on a random basis with a minimum of six cylinders prepared for each sublot. For LMC and Silica Fume Concrete Overlays, a minimum of six test cylinder for compressive strength testing will be made for each truck load (sublot). The test cylinder size will be <u>4" by 8" or 6" by 12" with plastic molds and the samples will be made in accordance with ASTM C 31</u>, except submersion in water storage containers shall be used in lieu of moist room curing if when required by the Engineer for hot weather concreting of Portland cement concrete, and LMC and silica fume concrete will be air cured once demolded. The Engineer will calculate the average of 2 test specimens at the design compressive strength time requirement (28 days). The average of the two test specimen result values for each sublot shall be considered the sublot compressive strength value.

(2) Flexural Strength.

From each sublot sample, three test beams shall be made in accordance with ASTM C 31. The beams will be $4'' \times 4'' \times 14''$ or $6'' \times 6'' \times 20''$. The beams shall be tested in accordance with ASTM C 78. The Engineer will calculate the average of 2 test specimens at the design flexural strength time requirement (28 days). The average of the two test specimen result values for each sublot will be considered the sublot flexural strength value.