

ITEM 555.0103 25 – RAPID SETTING CONCRETE

1. DESCRIPTION:

- 1.01 This work shall consist of furnishing and placing rapid setting concrete at the locations indicated on the Contract Plans or where ordered by the Engineer.

2. MATERIALS:

- 2.01 **Cement:** All cement for the work shall be Rapid Set DOT Cement manufactured by:

CTS Cement Manufacturing Corp.
11065 Knott Avenue, Suite A
Cypress, CA 90630
Phone: ()
Website: www.ctscement.com

NO OTHER TYPE CEMENT MATERIAL WILL BE ALLOWED.

The manufacturer's technical representative shall be on site for up to five (5) working days to make recommendations for mix design, trial batching, field placement and curing of the rapid setting concrete.

- 2.02 **Mix Design:** Develop a mix design using Rapid Set DOT Cement, an approved fine aggregate (703-01) and an approved coarse aggregate (703-02). The mix shall meet the specified properties of Table 1. Approximate mix proportions are , per cubic yard of concrete. The final mix proportions shall be determined by trial batching. The maximum allowable total chloride content in the concrete shall not exceed 0.05 percent by weight of cement.

TABLE 1 – Rapid Setting Concrete Mix Design Requirements	
Compressive Strength* (ASTM C39)	1 hr** 28 day
Shrinkage (ASTM C596) *	
Air Entrainment	
Freeze-Thaw (NYSDOT Test Method 502-3P) *	
Minimum Set Time	15 minutes
Maximum Coarse Aggregate Size	***
Slump	Slump shall be the minimum value that will allow the concrete to completely fill the placement area
Capable of being retarded when necessary.	
Capable of being placed in a continuous operation without requiring cold joints.	
Be flowable such that the mix pours into and completely fills the formwork.	
Match the color and texture of the surrounding concrete.	
Provide a durable, crack free final product.	

* Average of three tests.

** Prior to opening to traffic, see Section 3.12

*** The maximum coarse aggregate size shall be for all placements except for full depth pavement slab placements which shall use CA 2 coarse aggregate conforming to the requirements of Section 501-2.02B.

The final mix design proportions and results of tests in Table 1 from trial batching shall be submitted to the Engineer for review. All materials used are subject to the approval of the Engineer. Final approval will be based on the results of the trial batch and test panels successfully completed. A mix design must be finalized at least 30 days prior to the beginning of the work.

ITEM 555.0103 25 – RAPID SETTING CONCRETE

2. MATERIALS: (cont'd)

- 2.03 **Trial Batching:** Prepare a trial batch using the same (1) materials and (2) mixing, transporting, and discharging methods as those to be used on the project. Demonstrate the mix's ability to achieve the specified mix design properties to the Engineer. Determine the required time to achieve the specified strengths. The results of the trial batching will be used as a basis for approval of the mix design.

Changes other than minor fluctuations in admixture dosage rates will require a new mix design and trial batch as determined by the Engineer. The Engineer may halt material placement and order new trial batches whenever the specified properties are not achieved.

- 2.04 **Test Panels:** If indicated in the Contract Plans, demonstrate to the satisfaction of the Engineer that the rapid setting concrete can be adequately mixed, placed, consolidated and cured in test panels similar in size and shape to actual field conditions before any work begins. Using the approved mix design, and the same mixing, transporting, placing, and consolidating methods as those to be used on the project, construct three (3) test panels to determine the mix's pourability and crack susceptibility. Each test panel shall be cast from a separate batch of rapid setting concrete.

3. CONSTRUCTION DETAILS:

- 3.01 Rapid setting concrete shall be batched in a mobile mixer meeting the requirements of Section 501-2.04C. No hand mixing will be allowed.
- 3.02 The Contractor shall have a representative of the cement manufacturer on site during the initial placement of rapid setting concrete to verify field conditions and placement procedures. The manufacturer's representative shall remain on site until the Engineer is satisfied that the Contractor is familiar with the use of the rapid setting concrete as demonstrated by consistently satisfactory usage and placement.
- 3.03 No material shall be placed when the ambient air or concrete surface temperature is above or below the manufacturer's recommended placement temperature, unless the manufacturer's hot and cold weather placement procedures are followed. The Contractor shall submit the manufacturer's hot and cold weather placement procedures to the Engineer for approval. Do not expose fresh concrete to direct rainfall.
- 3.04 Existing concrete surfaces against which cast-in-place rapid setting concrete is to be placed shall be thoroughly cleaned and vacuumed to remove any dirt or other foreign substances, laitance or partially loose chips of concrete.
- 3.05 After the cleaned surface has been accepted, thoroughly wet all surfaces which will be in contact with fresh concrete. Remove all standing water with oil-free compressed air, and protect the surface from drying, so the concrete remains in a saturated surface dry condition until concrete placement.
- 3.06 All forms for cast-in-place rapid setting concrete shall be in accordance with the requirements of Section 555-3.03.
- 3.07 Rapid setting concrete shall be placed and consolidated with internal vibrators in accordance with the requirements of Sections 555-3.04D and 555-3.04E.
- 3.08 Finishing of exposed unformed surfaces shall be in accordance with Section 555-3.07. Finishing of pavement surfaces shall be in accordance with Section 502-3.09.

ITEM 555.0103 25 – RAPID SETTING CONCRETE

3. CONSTRUCTION DETAILS: (cont'd)

- 3.09 Concrete joints shall be in accordance with the requirements of Section 555-3.06. Construct joints only where shown on the Contract Plans or at locations approved by the Engineer.
- 3.10 Texturing of concrete surfaces shall be as noted on the Contract Plans.
- 3.11 The curing procedure shall be in conformance with the cement Manufacturer's recommendations.
- 3.12 All rapid setting concrete placements shall be scheduled and coordinated in increments that can be started and completed during a single work shift defined by the lane closure time frames indicated in the Proposal. The rapid setting concrete shall achieve a minimum compressive strength of 3000 psi prior to opening to traffic. The contractor shall be responsible to make, cure and compression test three 6 inch diameter x 12 inch long test cylinders prepared in accordance with NYSDOT Materials Method 9.2 - Field Inspection of Portland Cement Concrete. The contractor shall submit to the Engineer for approval the certified materials testing firm to be used for this work and is required to submit a report of all test results. These cylinders shall be cured in the same manner as concrete they represent. If the first compression test yields a compressive strength above [REDACTED] the remaining cylinders do not need to be tested. If the remaining two cylinders need to be tested to verify strengths above [REDACTED] the Engineer will determine the subsequent testing periods based on the results of the first test. Once multiple successful concrete pours have been completed, these testing requirements may be waived by the Engineer if testing results are consistently meeting specification requirements.

4. METHOD OF MEASUREMENT:

- 4.01 The work will be measured as the number of cubic yards of rapid setting concrete satisfactorily placed, measured to the nearest 0.1 cubic yard within the limits shown on the Contract Plans. No deduction shall be made for the volume of joint material, embedded reinforcement or chamfers.

5. BASIS OF PAYMENT:

- 5.01 The unit price bid per cubic yard shall include the cost of all labor, materials, and equipment necessary to complete the work including cleaning existing concrete surfaces and membrane curing compound. Furnishing and placing reinforcement will be paid for separately under other contract items.