

ITEM 11555.0106 M - WATERPROOF CONCRETE

DESCRIPTION. This work consists of furnishing and placing waterproof portland cement concrete as indicated on the plans and in accordance with the specifications.

MATERIALS. The materials required for waterproof concrete shall be as described in NYSDOT Standard Specification Section 555-2, "Materials," and as further described below.

In addition to the above materials, a waterproofing chemical admixture will be required for waterproof concrete. The chemicals in this admixture shall react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete and thus causes the concrete to become permanently sealed against the penetration of water or liquids from any direction. This waterproofing chemical admixture shall cause the waterproof concrete to have the following properties:

1. When subjected to water pressure of 1034.25 kilopascals (150 pounds per square inch, or 350 foot or 106.68 meter waterhead) for 120 hours (5 days) (U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete"), water penetration of the waterproof concrete shall be no more than 1.5 mm.
2. When subjected to water pressure that is gradually increased over five days and then maintained at 7 bars (224 foot or 68.2752 meter waterhead) for ten days (U.S. Army Corps of Engineers CRD C48-73 "Permeability of Concrete"), the waterproof concrete shall not leak any water.
3. When tested 28 days after placement (ASTM C 39 "Compressive Strength of Cylindrical Concrete Specimens"), compressive strength of waterproof concrete samples shall be at least 5% greater than equivalent concrete samples not containing the chemical admixture.
4. When subjected to 300 freeze/thaw cycles (ASTM C 666 "Freeze/Thaw Durability), waterproof concrete samples shall have 94% relative durability.
5. When potable water is exposed to waterproof concrete (NSF 61 "Drinking Water System Components - Health Effects"), no harmful effects are indicated.

The contractor shall receive approval for the waterproofing chemical admixture to be used from the Engineer prior to starting the work.

CONSTRUCTION DETAILS. Waterproof concrete shall be manufactured as required by NYSDOT Standard Specification Section 555-3, "Construction Details," and as further required below:

The waterproofing chemical admixture shall be added to the concrete at the time of batching at the rate of 9 kilograms per cubic meter or as recommended by the manufacturer to prevent leaching of concrete into the soil and as approved by the engineer in charge.

In order to ensure a homogeneous mixture of waterproofing chemical admixture and concrete, one of the following sequences of procedures for addition of the admixture shall be used unless

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the manufacturer recommends a different procedure. Dry admixture powder shall not be added directly to wet concrete since this could cause clumping which would prevent thorough dispersion of the admixture. The contractor shall receive approval from the Engineer for the procedure to be used prior to starting work.

1. Ready Mix Plant - Dry Batch Operation. Add admixture in powder form to the drum of the ready-mix truck. Drive the truck under the batch plant and add 60% - 70% of the required water along with 136 kilograms - 227 kilograms of aggregate. Mix the materials for 2 - 3 minutes to be sure the admixture is distributed evenly throughout the mix water. Add the balance of materials to the ready-mix truck in accordance with standard batch practices.

2. Ready Mix Plant - Central Mix Operation. Mix admixture with water to form a very thin slurry (e.g. 6 kilograms - 8 kilograms of powder mixed with 10 liters of water). Pour the required amount of material into the drum of the ready-mix truck. The aggregate, cement, and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the concrete into the truck and mix for at least 5 minutes to ensure even distribution of the admixture throughout the concrete.

3. Precast Batch Plant. Add admixture to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass shall be blended using standard practices.

Limitations. The temperature of the concrete mix shall be above 4 degrees Celsius when the admixture is incorporated. The Contractor shall allow the waterproof concrete to cure for fourteen days, and shall then powerwash it to remove all water soluble ions before covering the concrete with soil or water.

METHOD OF MEASUREMENT. The method of measurement shall be as described in NYSDOT Standard Specification Section 555-4, "Method of Measurement".

BASIS OF PAYMENT. The basis of payment shall be as described in NYSDOT Standard Specification Section 555-5, "Basis of Payment".