1. SCOPE

This test method covers acceptance tests for Shear Key Grout (NY Standard Specification Item 701-06). The method includes tests for setting time, expansion/contraction, compressive strength, resistance to freeze-thaw, pourability, chloride content, and sulfate content.

2. REFERENCED DOCUMENTS

2.1 AASHTO Standards
   M 201 Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in Testing of Hydraulic Cements and Concretes
   T 105 Chemical Analysis of Hydraulic Cement
   T 106 Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in Cube Specimens)
   T 131 Time of Setting of Hydraulic Cement by Vicat Needle
   T 162 Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency
   T 260 Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials by Procedure B (Acid-Soluble Chloride Ion by Atomic Absorption)

2.2 ASTM Standards
   C 1090 Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout
   C 1107 Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

2.3 NYSDOT Standards
   Test Method 502-3P Freezing and Thawing, Portland Cement Concrete Cores Standard Specifications - Construction and Materials
3. APPARATUS

3.1 Apparatus is specified in Referenced Documents with the following exceptions:
   3.1.1 The 50mm (2") cube mold assembly may be fabricated of high density polyethylene or Teflon.
   3.1.2 Mortar mixing apparatus is as specified in AASHTO T 162 except the bowl positioner is adjusted to allow for the largest size aggregate in the mixture being tested.

3.2 Shear Key Pourability Test Mold - A mold to simulate shear key geometry in order to observe the grout’s ability to fill the shear key volume with minimum voids and irregularities. See Figures 1 and 2.

4. PROCEDURE

4.1 Mixing of Shear Key Grout Material - Premix dry components to ensure uniformity. Mix the concrete repair material in accordance with the manufacturer’s mixing instructions using water/grout ratio specified in the Laboratory Request Memo. If no mixing instructions are specified, add the specified amount of water to the mixing bowl of the apparatus described in AASHTO T 162, add grouting material and mix at slow speed for 3 minutes. Briefly stop mixer (not over 15s) during first minute of mixing to scrape into the batch any grout that may have collected on the side of the bowl.

4.2 Setting Time - Determine the setting time according to AASHTO T 131 except place the material in the mold immediately after mixing and store the specimen at ambient conditions instead of in the moist cabinet. Begin taking Vicat readings immediately. Obtain additional readings at 2 minute intervals for materials whose initial set is expected to be 15 minutes or less. Obtain readings at 5 minute intervals if the initial set is expected to be greater than 15 minutes.

4.3 Expansion/Contraction - Determine expansion or contraction according to ASTM C 1090 using moist cabinet storage conditions. Obtain measurements at 1, 3, and 7 days.

4.4 Compressive Strength - The compressive strength at a specified curing time is the average compressive strength of three 50mm (2") compression cubes. Cast the cubes in cube molds following the procedures of AASHTO T 106 for compressive strength except omit the use of a cover plate. Remove from the molds after 24 hours and cure in lime water inside the moisture cabinet until they are to be broken. Follow manufacturer’s curing instructions if material is not portland cement based. Break the cubes in compression as described in AASHTO T 106.

4.5 Freeze-Thaw - Cast one set of three 50mm (2") cubes in cube molds following procedures of AASHTO T 106 for compressive strength except omit the use of a
cover plate. Remove from the molds after 24 hours and cure in lime water inside the moist cabinet for six additional days. Follow manufacturer's curing instructions if material is not portland cement based. Test the set of cubes according to NYSDOT Test Method 502-3P except as a container use a 300mm (12") x 150 mm (6") plastic cylinder mold cut to a height of 100mm (4"). The three cubes are then placed in one container and soaked in solution for 24 hours before beginning the first cycle.

4.6 Pourability - Fill shear key test mold to the top by ladling or pouring mortar into key way (Figure 2). After filling, if necessary rod the top inch of the key way. Note any air voids within the mold. Strip the mold after 24 hours and note any cracking or surface irregularities.

4.7 Chlorides - Determine Chloride content according to AASHTO T 260 Procedure B.

4.8 Sulfates - Determine Sulfate content according to AASHTO T 105 section 15.1.

5. REPORT

5.1 Batch weights with water amount (w/g ratio)
5.2 Initial Setting Time (minutes)
5.3 Expansion or Contraction (%)
5.4 Compressive Strength (MPa and/or psi)
5.5 Freeze-Thaw loss (%)
5.6 Pourability
5.7 Chloride (%)
5.8 Sulfate (%)

Figure 1
SHEAR KEY FLOWABILITY TEST MOLD
Side Plates

NOTE: 1. All dimensions in mm
2. Material in stainless steel
3. Small hole to allow drainage
4. Not drawn to scale

Threaded hole: ££
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See NOTE 3
Figure 2

SHEAR KEY POURABILITY TEST MOLD
End Plates and Side Plates Assembled