# Rapid Strength Concrete for Pavement Repair NJSP-19-02

**1.0 Description.** This specification covers the requirements of rapid strength concrete that is suitable for full depth pavement repairs. The work shall be in accordance with Sec 613.10, unless otherwise specified with this special provision.

**2.0 Materials.** All material, proportioning, air-entraining, mixing and transporting of concrete shall be in accordance with Sec 501 as applicable to pavement concrete, except as noted herein.

**2.1 Cement.** The cement shall meet the requirements of ASTM C1600 for Type VRH or Type URH. Type III cement and soluble chloride accelerators are not allowed.

**2.2 Admixtures.** The use of chemical admixtures is allowed and shall be in accordance with AASHTO M 194.

**2.3 Mix Requirements.** The concrete mix design shall meet a minimum compressive strength of 3000 psi within 4-hours; while maintaining initial workability to effectively place the concrete and meet the requirements of this specification.

The concrete mix design shall not exceed 700 lb/yd3 of cement.

The concrete mix design shall not exceed 0.04% shrinkage at 28 days in accordance with ASTM C 157 with the following modifications:

1. The demold time shall be determined by ASTM C 403 Final Set plus 25% of that time.
2. Initial measurement shall be taken immediately after demolding.
3. The shrinkage specimens shall be air cured until 28 days.

**2.4 Certification.** In addition to the mix design information required in Sec 501.3; the contractor shall submit ASTM C 666 – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing test results from an independent laboratory with a concrete mixture containing similar cement type and amount in comparison to the approved mix design. For acceptance, the concrete mixture tested, shall meet a minimum durability factor of 80 percent.

**3.0 Construction.** All construction requirements shall be in accordance with Sec 502 except as follows:

**3.1 General Inspection.** All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required for inspection and sampling.

**3.2 Trial Mix Requirement.** The contractor shall construct a test pad (used during maturity testing) or a small pavement repair location using the approved mix design prior to production. The test pad or repair area will be evaluated and will be subject for approval from the engineer before any further production.

**3.3 Mix Design Representative.** During construction and concrete placement, the cement manufacturer’s representative shall be present on the project to provide technical expertise.

**3.4 Compressive Strength Requirements**. The concrete opening strength to all traffic shall be a minimum compressive strength of 3000 psi. Light construction traffic is allowed when the concrete achieves a minimum compressive strength of 2000 psi. The opening strength shall be verified by the maturity method in accordance with Sec 507, except the strength-maturity relationship shall be developed using 2-hour, 4-hour, 6-hour, 1-day, 7-day, and 28-day time intervals.

**3.5 Curing.** After concrete placement and after surface irregularities have been removed, the concrete surface shall be given a uniform roughened finished by a broom, wet burlap drag, or other methods approved by the engineer for a temporary surface texture. Immediately after texturing, the concrete shall have a wet burlap cure until the concrete has achieved a minimum compressive strength of 2000 psi. When the wet burlap is removed, the concrete shall have a white pigmented membrane applied in accordance with Sec 502.

**3.6 Texturing.** The finished pavement surface shall be diamond ground in accordance with Sec 622.3. Smoothness requirements shall follow Sec 613.3.5.

**3.7 Testing.** The concrete mixture shall be within the specified limits for compressive strength, pavement thickness, and air content. The QC and QA test frequencies shall follow Sec 613.10.

**4.0 Method of Measurement and Basis of Payment.** The method of measurement and basis of payment shall be in accordance with Sec 613.10. The accepted quantity of pavement repair shall be paid for at the contract unit price for Item No. 613-99.05, Rapid Strength Concrete for Pavement Repair, per square yard.