SECTION 1054

CONCRETE ADMIXTURES

1054.1 Scope. This specification covers air-entraining admixtures, water-reducing admixtures, retarding admixtures, accelerating admixtures and latex emulsion admixtures for concrete.

1054.2 Air-Entraining Admixtures.

1054.2.1 Air-entraining admixtures shall conform to the requirements of AASHTO M 154 except as modified herein.

1054.2.2 Manufacturer's Certification and Guarantee. The manufacturer shall submit a certification and guarantee to the Division Engineer, Materials, showing the brand name and designation; the composition or description of the admixture; the manufacturing ranges for specific gravity at 77 F (25 C), percent total solids, and pH; the infrared spectrum; the manner in which the material will be identified on containers; and certifying that the material will conform to the requirements of these specifications. The certifications shall include or have attached specific test results as required in Sec 1054.2.2.1 or 1054.2.2.2. The manufacturer shall also guarantee that as long as material is furnished under that brand and designation the material will be of the same composition as originally approved and will in no way be altered or changed.

1054.2.2.1 For an air-entraining admixture other than that specified in Sec 1054.2.2.2 the certification shall include results of tests conforming to the requirements of AASHTO M 154. Tests for bleeding, bond strength and volume change will not be required.

1054.2.2.2 For an air-entraining admixture which is an aqueous solution of vinsol resin, manufactured by neutralizing the resin with caustic soda (sodium hydroxide), the certification shall include results of tests showing the ratio of sodium hydroxide to vinsol resin, and the percentage of solids based on the residue dried at 105 C. The certification or test report shall also state that no other additive or chemical agent is present in the solution.

1054.2.3 Approval and Acceptance. Upon approval of the air-entraining admixture and the manufacturer's certification and guarantee, that brand and designation will be placed on a list of prequalified air-entraining admixtures and will be accepted for use without further certification. If, in actual field use, there is evidence of unsatisfactory results, variability or change in composition or misbranding, the material will be rejected and approval for further use withdrawn until the admixture is again prequalified. Samples of any air-entraining admixture offered for use may be taken at any time considered necessary by the engineer.

1054.2.4 Packaging and Marking. The containers in which air-entraining admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. Bulk shipments shall be accompanied by a delivery ticket showing this information. If the manufacturer supplies air-entraining admixtures in more than one concentration, one concentration shall be designated as standard and others as double strength or triple strength with the containers marked

accordingly in letters at least one inch high, or for bulk shipments in a prominent manner on the delivery ticket.

1054.3 Water-Reducing Admixtures.

1054.3.1 Water-reducing admixtures shall comply with the requirements of AASHTO M 194, Type A, except as modified herein. High range water-reducing admixtures, when permitted for use, shall comply with the requirements of AASHTO M 194, Type F or G.

1054.3.2 Manufacturer's Certification and Guarantee. The manufacturer shall submit a certification and guarantee to the Division Engineer, Materials, showing the brand name and designation; the composition or description of the admixture; the manufacturing ranges for specific gravity at 77 F (25 C), percent total solids and pH; the infrared spectrum; the manner in which the material will be identified on containers; and certifying that the material will conform to the requirements of these specifications. The certification shall include or have attached specific test results complying with AASHTO M 194, Type A, F or G as applicable and the recommendation for use including amounts to be added. The manufacturer shall also guarantee that as long as material is furnished under the brand and designation the material will be of the same composition as originally approved and will in no way be altered or changed.

1054.3.3 Approval and Acceptance. Upon approval of the water-reducing admixture and the manufacturer's certification and guarantee, that brand and designation will be placed on a list of prequalified water-reducing admixtures and will be accepted for use without further certification. If, in actual field use, there is evidence of unsatisfactory results, variability or change in composition, or misbranding the material will be rejected and approval for further use withdrawn until the material is again prequalified. Samples of any water-reducing admixture offered for use may be taken at any time considered necessary by the engineer.

1054.3.4 Packaging and Marking. The containers in which water-reducing admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. Bulk shipments shall be accompanied by a delivery ticket showing this information.

1054.4 Retarding Admixtures.

1054.4.1 Retarding admixtures shall conform to the requirements of AASHTO M 194, Type B or D except as modified herein.

1054.4.2 Manufacturer's Certification and Guarantee. The manufacturer shall submit a certification and guarantee to the Division Engineer, Materials, showing the brand name and designation; the composition or description of the admixture; the manufacturing ranges for specific gravity at 77 F (25 C), percent total solids and pH; the infrared spectrum; the manner in which the material will be identified on containers; and certifying that the material will conform to the requirements of these specifications. The certification shall include or have attached specific test results complying with AASHTO M 194, Type B or D, and the recommendation for use including amounts to be added. The manufacturer shall also guarantee that as long as material is furnished under that brand and designation the material will be of the same composition as originally approved and will in no way be altered or changed.

1054.4.3 Approval and Acceptance. Upon approval of the retarding admixture and the manufacturer's certification and guarantee, that brand and designation will be placed on a list of prequalified retarding admixtures and will be accepted for use without further certification. If, in actual field use, there is evidence of unsatisfactory results, variability or change in

composition, or misbranding, the material will be rejected and approval for further use withdrawn until the material is again prequalified. Samples of any retarding admixture offered for use may be taken at any time considered necessary by the engineer.

1054.4.4 Packaging and Marking. The containers in which retarding admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. Bulk shipments shall be accompanied by a delivery ticket showing this information.

1054.5 Accelerating Admixtures.

1054.5.1 Accelerating admixtures shall conform to the requirements of AASHTO M 194, Type C or E, except as modified herein.

1054.5.2 Manufacturer's Certification and Guarantee. The manufacturer shall submit a certification and guarantee to the Division Engineer, Materials, showing the brand name and designation; the composition or description of the admixture; the manufacturing ranges for specific gravity at 77 F (25 C), percent total solids and pH; the infrared spectrum; the manner in which the material will be identified on containers; and certifying that the material will conform to the requirements of these specifications. The certification shall include or have attached specific test results complying with AASHTO M 194, Type C or E, and the recommendation for use including amounts to be added. The manufacturer shall also guarantee that as long as material is furnished under that brand and designation the material will be of the same composition as originally approved and will in no way be altered or changed.

1054.5.3 Approval and Acceptance. Upon approval of the accelerating admixture and manufacturer's certification and guarantee, that brand and designation will be placed on a list of prequalified accelerating admixtures and will be accepted for use without further certification. If, in actual field use, there is evidence of unsatisfactory results, variability or change in composition or misbranding, the material will be rejected and approval for further use withdrawn until the material is again prequalified. Samples of any accelerating admixture offered for use may be taken at any time considered necessary by the engineer.

1054.5.4 Packaging and Marking. The containers in which accelerating admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. Bulk shipments shall be accompanied by a delivery ticket showing this information.

1054.6 Latex Emulsion Admixtures.

1054.6.1 Latex emulsion admixtures shall be non-toxic, film forming, polymeric emulsion in water to which all stabilizers have been added at the point of manufacture. The admixture shall be a styrene-butadiene latex emulsion in which at least 90 percent of the non-volatiles are styrene-butadiene polymers.

1054.6.1.1 The admixture shall be homogeneous, uniform in composition and shall meet the following requirements when tested in accordance with the procedures shown in Report No. FHWA-RD-78-35, April 1978, Styrene-Butadiene Latex Modifiers for Bridge Deck Overlay Concrete.

Property	Specific Value
Color	White
Polymer Type	Styrene-Butadiene
Percent Solids	46 - 53
pH	5.0 - 12.0, the pH may not vary more than ±1 from the pH of material submitted for prequalification.
Particle Size	1400 to 2500 Angstroms, the mean particle size shall not vary more than ±300 Angstroms from the mean diameter of material submitted for the prequalification.
Viscosity	±20 centipoises of the viscosity of material submitted for prequalification.
Percent Coagulum	0.10 percent by weight (mass), max.
Freeze-Thaw Stability	0.10 percent by weight (mass) max. coagulum after 2 freeze-thaw cycles.
Surface Tension	50.0 dynes/cm, max.
Percent Butadiene	30 to 40 by weight (mass)

1054.6.2 Manufacturer and Brand Name Approval. The manufacturer shall submit a certification and guarantee to the Division Engineer, Materials, showing the brand name and designation; the composition or description of the admixture; the manufacturing ranges for specific gravity at 77 F (25 C), percent total solids and pH; the infrared spectrum; the manner in which the material will be identified on containers; and certifying that the material will conform to the requirements of these specifications. The certification shall include or have attached specific test results complying with this specification. The manufacturer shall also guarantee that as long as material is furnished under that brand and designation the material will be of the same composition as originally approved and will in no way be altered or changed.

1054.6.3 Approval and Acceptance. Upon approval of the latex emulsion admixture and manufacturer's certification and guarantee, that brand and designation will be placed on a list of prequalified latex emulsion admixtures and will be accepted for use without further certification. If, in actual field use, there is evidence of unsatisfactory results, variability or change in composition or misbranding, the material will be rejected and approval for further use withdrawn until the material is again prequalified. Samples of latex emulsion admixture offered for use may be taken at any time considered necessary by the engineer.

1054.6.3.1 For field use, the contractor shall submit a manufacturer's test report for each batch of latex admixture to the engineer. The test report shall show batch identification and shall be prepared, dated and signed by the manufacturer's representative responsible for performing the tests. The test report shall contain specific test results of the properties specified herein.

1054.6.4 Packaging and Marking. The containers in which latex emulsion admixtures are delivered shall be plainly marked with the manufacturer's name, the brand name and designation of the material, lot number and net quantity. Bulk shipments shall be accompanied by a delivery ticket showing this information.