SECTION 711 - CONCRETE CURING MATERIALS AND ADMIXTURES

711.01 Curing Materials. Curing materials shall conform to the following:

Liquid Membrane-Forming Compounds for Curing Concrete (Excluding Bridge Decks)	AASHTO M 148
Liquid Membrane-Forming Compounds for Curing Concrete (Bridge Decks Only)	AASHTO M 148 Type 2
Waterproof Paper for Curing Concrete	AASHTO M 171
White Polyethylene Sheeting (Film) for Curing Concrete	AASHTO M 171
Burlap Cloth made for Jute or Kenaf	AASHTO M 182

711.02 (Unassigned)

711.03 Admixtures. Admixtures used in portland cement concrete shall be according to the contract. The Contractor shall use admixtures when specified or ordered by the Engineer. The Contractor may use the admixture at its option as provided below.

The Contractor shall not use chemical admixtures and air-entraining admixtures containing chlorides as Cl over one (1) percent by weight of admixture according to California Test 415 in prestressed or reinforced concrete.

The Contractor shall not use calcium chloride in concrete containing steel reinforcement or other embedded metals.

If the Contractor finds the admixture non-uniform in properties during their use in the work, the Contractor shall not use the admixtures.

If the Contractor uses more than one (1) admixture, the admixtures shall be compatible with each other.

If establishing the total amount of free water per cubic yard, the liquid admixtures requiring dosages greater than half (1/2) gallon per cubic yard shall be free water.

(A) Materials. Admixtures shall conform to the following:

(1) Chemical Admixtures - AASHTO M 194

(2) Air-entraining Admixtures - AASHTO M 154

(3) Calcium Chloride - AASHTO M 144

(4) Mineral Admixtures - ASTM C 618, except that the loss on ignition shall not exceed three (3) percent.

(B) Admixture Acceptance. The Contractor shall not use admixtures unless authorized in writing or specified in the contract. Subject to such authorization, the Contractor may use the admixtures in dosages specified. Acceptance of admixtures will be dependent on compliance with the contract based on the certified test results submitted and tests the Engineer may choose to do. If required, the Contractor shall furnish the samples of admixtures thirty (30) days before the Contractor plans to use the admixture.

If the Contractor proposes to use a previously accepted admixture, the Contractor shall furnish a certification from the manufacturer certifying that the Contractor is using a previously accepted admixture. The Engineer may take samples for testing at any time even if the Contractor has submitted a Certificate of Compliance.

If the Contractor delivers a mineral admixture directly to the working site, the manufacturer or supplier shall sign the certificate of compliance. If the Contractor uses the mineral admixture in ready-mix concrete or precast concrete products, the manufacturer of that concrete or product shall sign the certificate of compliance.

(C) Admixture Usage. If the contract specifies the use of a chemical admixture or calcium chloride or ordered by the Engineer, the admixture shall be at the dosage specified or ordered. If the contract does not specify the dosage, the Contractor shall use the admixture at the dosage normally recommended by the manufacturer of the admixture. If the contract specifies air-entraining or ordered by the Engineer, the Contractor shall use air-entraining admixture in amounts to produce a concrete having the specified air content according to AASHTO T 152.

The Engineer will permit the Contractor to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures according to AASHTO M 194 to conserve cement or to ease concrete construction application. The Engineer will not allow reduction in minimum cement content.

If the contract has not specified air-entraining or ordered by the Engineer, the Engineer will permit the Contractor to use an air-entraining admixture. The air content shall not exceed four (4) percent and shall be within a tolerance of $\pm$ one (1) percent.

The Engineer will permit the Contractor to replace up to fifteen (15) percent by weight of the required portland cement other than Type IP, with a mineral admixture in concrete except where the contract specifies high early strength or where the contract prohibits the use of mineral admixtures. The weight of mineral admixture used shall be equal to or greater than the weight of portland cement replaced. In deciding the amount of free water that the Contractor may use in the concrete, the Contractor shall consider mineral admixture to be cement.

Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be of the same brand and of the same percentage.