

1 **SECTION 711 - CONCRETE CURING MATERIALS AND ADMIXTURES**
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4 **711.01 Curing Materials.** Curing materials shall conform to requirements of
 5 Table 711.01-1 - Curing Material Requirements.
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TABLE 711.01-1 - CURING MATERIAL REQUIREMENTS	
MATERIAL	SPECIFICATION
Liquid Membrane-Forming Compounds for Curing Concrete (Excluding Bridge Decks)	AASHTO M 148
Liquid Membrane-Forming Compounds for Curing Concrete Bridge (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 from Jute or Kenaf	AASHTO M 182

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 8 **711.02 (Unassigned).**
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10 **711.03 Admixtures.** Admixtures in portland cement concrete shall be used when
 11 indicated in the contract documents or authorized in writing by the Engineer.
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13 Chemical and air-entraining admixtures shall not be used in prestressed or
 14 reinforced concrete if chloride content is more than 1 percent by weight of
 15 admixture, as determined by California Test 415.
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17 Admixture containing calcium chloride shall not be used in concrete with steel
 18 reinforcement or other embedded metal.
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20 Admixture that is non-uniform during application shall not be used.
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22 If two or more admixtures are used, all shall be compatible.
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24 In determining total quantity of free water per cubic yard of concrete, liquid
 25 admixture that requires dosage greater than 1/2 gallon per cubic yard shall be
 26 considered to be free water.
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(A) Admixture Material. Admixtures shall conform to requirements of Table 711.03-1 - Admixture Requirements.

TABLE 711.03-1 - ADMIXTURE REQUIREMENTS	
TYPE	SPECIFICATION
Chemical Admixtures for Concrete	AASHTO M 194
Air-Entraining Admixtures for Concrete	AASHTO M 154
Calcium Chloride	AASHTO M 144
Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete	AASHTO M 295, except that loss on ignition shall not exceed 3 percent

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(B) Admixture Acceptance. The Engineer's written acceptance is required prior to use of admixture in concrete. Acceptance is contingent upon furnishing of certified test results by the Contractor and additional tests the Engineer may choose to perform. If the Engineer requests samples of admixture for testing, samples shall be submitted at least 30 days prior to intended use.

If previously accepted admixture is proposed for use, the Contractor shall provide a certificate of compliance from manufacturer affirming that both admixtures are identical. The Engineer reserves the right to sample admixture even with the certification.

If mineral admixture is delivered directly to work site or is to be used in ready-mix concrete or precast concrete product, the Contractor shall submit a certificate of compliance signed by manufacturer or concrete supplier.

(C) Admixture Usage. If chemical admixture or calcium chloride is indicated for use in the contract documents or ordered in writing by the Engineer, quantity shall be as indicated or ordered. If quantity is not indicated or ordered, manufacturer's recommendation shall be followed.

Admixtures allowed are Type A or Type F water-reducing, Type B retarding, and Type D or Type G water-reducing and retarding, in accordance with AASHTO M 194, to economize on cement or facilitate construction.

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If air-entraining admixture is specified in the contract documents or ordered in writing by the Engineer, quantity of admixture shall be as required to produce concrete with specified air content, when tested in accordance with AASHTO T 152.

Air-entraining admixture will be allowed even when not specified or ordered. In such event, air content of concrete shall be 4 percent plus or minus 1 percent.

Replacement of up to 15 percent by weight of portland cement, other than Type IP, with mineral admixture will be allowed, except when high early strength concrete is specified or mineral admixture is prohibited. Weight of mineral admixture shall be equal to or greater than weight of portland cement replaced. In determining free water for concrete, mineral admixture shall be considered to be cement.

Same brand and percentage of mineral admixture shall be used for concrete in exposed surface of structures.

END OF SECTION 711