

**TABLE OF CONTENTS**

**DIVISION 1400  
CONCRETE ADMIXTURES AND CURING MATERIALS**

<b>SECTION</b>	<b>PAGE</b>
1401 - AIR-ENTRAINING ADMIXTURES FOR CONCRETE .....	1400-1
1402 - CHEMICAL ADMIXTURES FOR CONCRETE .....	1400-2
1403 - PRECURE/FINISHING AID.....	1400-4
1404 - LIQUID MEMBRANE FORMING COMPOUNDS .....	1400-5
1405 - BURLAP .....	1400-6
1406 - SHEET MATERIALS FOR CURING CONCRETE.....	1400-7

## 1401 - AIR-ENTRAINING ADMIXTURES FOR CONCRETE

### SECTION 1401

#### AIR-ENTRAINING ADMIXTURES FOR CONCRETE

##### 1401.1 DESCRIPTION

This specification covers admixtures for use as air-entraining agents to be added to concrete mixtures. An air-entraining agent is defined as an admixture that is used as an ingredient of concrete, added to the batch immediately before or during mixing, for the purpose of entraining air.

##### 1401.2 REQUIREMENTS

Provide material that complies with AASHTO M 154 for compressive and flexural strength, and resistance to freezing and thawing.

##### 1401.3 TEST METHODS

As specified in AASHTO M 154. Tests for bleeding, time of set, and length change are not required.

##### 1401.4 PREQUALIFICATION

a. Each air-entraining admixture must be prequalified. Submit a written request to be evaluated for prequalification to the Bureau Chief of Construction and Materials. Provide the following for each brand and type of material to be evaluated:

(1) Name and address of the manufacturer.

(2) Brand name of the material.

(3) Two copies of a certified test report prepared by a laboratory regularly inspected by the Cement and Concrete Reference Laboratory (CCRL) of the National Institute of Standards and Technology, showing test results complying with the applicable requirements of AASHTO M 154. Also, include evidence that the laboratory is regularly inspected by CCRL. Test results are to be no more than 36 months out of date.

(4) An infra-red spectrum of the admixture which was used in the laboratory tests.

(5) Results of tests from the AASHTO National Transportation Product Evaluation Program (NTPEP). Include the most recent NTPEP test report along with evidence that the product being offered is identical to the one reported in the NTPEP report.

b. A one-liter sample from production of each type of admixture being offered will be accepted in lieu of the NTPEP test report until June 1, 2016. Submit the sample in addition to the documentation requested above for prequalification to the Engineer of Tests. The manufacturer will be advised of the results.

c. The Bureau of Construction and Materials will maintain a list of prequalified air-entraining admixtures. Products that have been prequalified by the above procedures will remain prequalified, as long as the formulation and manufacturing processes remain unchanged, and field experience indicates that the admixture functions appropriately. Any prequalified product that does not have a NTPEP test report on file as of January 1, 2017 will be removed from the list of prequalified air-entraining admixtures for concrete. Changes in the formulation, manufacturing process, or failure of the admixture to function appropriately will require a new prequalification.

##### 1401.5 BASIS OF ACCEPTANCE

a. Prequalification as set forth under **subsection 1401.4**.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

## 1402 - CHEMICAL ADMIXTURES FOR CONCRETE

### SECTION 1402

#### CHEMICAL ADMIXTURES FOR CONCRETE

##### 1402.1 DESCRIPTION

This specification covers chemical admixtures to be added to concrete mixtures during mixing operations for the purposes listed below:

**a. Type A – Water Reducing Admixture.** An admixture that reduces the quantity of mixing water required to produce concrete of a given consistency.

**b. Type B – Set Retarding Admixture.** An admixture that retards the setting of concrete.

**c. Type C - Accelerating Admixture.** An admixture that accelerates the setting of concrete.

**d. Type D – Water Reducing-Set Retarding Admixture.** An admixture that reduces the quantity of mixing water required to produce concrete of a given consistency, and retards the setting of concrete.

**e. Type E - Water Reducing and Accelerating Admixture.** An admixture that reduces the quantity of mixing water required to produce concrete of a given consistency, and accelerates the setting of concrete.

**f. Type F – Water-Reducing, High Range Admixture.** An admixture that reduces the quantity of mixing water required to produce concrete of a given consistency by 12% or greater.

**g. Type G – Water Reducing, High Range, and Retarding Admixture.** An admixture that reduces the quantity of mixing water required to produce concrete of a given consistency by 12% or greater, and retards the setting of concrete.

**h. Type S – Specific Performance Admixture.** An admixture that provides a desired performance characteristic(s) other than reducing water content, or changing the time of setting of concrete, or both, without any adverse effects on the fresh, hardened, or durability properties of concrete.

**i. Type I – Plasticizing Admixture.** An admixture that produces flowing concrete without further addition of water.

**j. Type II – Plasticizing and Set Retarding Admixture.** An admixture that produces flowing concrete without further addition of water, and retards the setting of concrete.

NOTE: Flowing concrete is defined as having a slump equal to or greater than 7 ½ inches.

##### 1402.2 REQUIREMENTS

**a.** Provide Type A, B, C, D, E, F, G, and S admixtures that comply with ASTM C 494.

**b.** Provide Type I and II plasticizing admixtures that comply with ASTM C 1017.

##### 1402.3 TEST METHODS

**a.** Test Type A, B, C, D, E, F, G, and S admixtures as specified in ASTM C 494, with the following exception:

(1) Provisional qualification, as stated in Table 1, Note C, will not be considered until at least 6 months of data has been established.

**b.** Test Type I and II plasticizing admixtures as specified in ASTM C 1017.

## 1402 - CHEMICAL ADMIXTURES FOR CONCRETE

### 1402.4 PREQUALIFICATION

a. Each brand and type of admixture covered by this specification must be prequalified. Submit a written request to be evaluated for prequalification to the Bureau Chief of Construction and Materials. Provide the following for each brand and type of material to be evaluated:

- (1) Name and address of the manufacturer.
- (2) Brand name of the material.
- (3) Type of material as defined in **subsection 1402.1**.
- (4) The chloride content of the admixture and whether or not chloride was added during its manufacture.
- (5) Recommended manner and time of adding the admixture to the concrete batch.

(6) Two copies of a certified test report prepared by a laboratory regularly inspected by the Cement and Concrete Reference Laboratory (CCRL) of the National Institute of Standards and Technology, showing test results complying with the applicable requirements of ASTM C 494 or ASTM C 1017. Also, include evidence that the laboratory is regularly inspected by CCRL. Test results are to be no more than 36 months out of date.

(7) An infra-red spectrum of the admixture which was used in the laboratory tests.

(8) Results of tests from the AASHTO National Transportation Product Evaluation Program (NTPEP). Include the most recent NTPEP test report along with evidence that the product being offered is identical to the one reported in the NTPEP report.

b. A one-liter sample from production of each type of admixture being offered will be accepted in lieu of the NTPEP test report until June 1, 2016. Submit the sample in addition to the documentation requested above for prequalification to the Engineer of Tests. The manufacturer will be advised of the results.

c. The Bureau of Construction and Materials will maintain a list of prequalified chemical admixtures for concrete. Products that have been prequalified by the above procedures will remain prequalified, as long as the formulation and manufacturing processes remain unchanged, and field experience indicates that the admixture functions appropriately. Any prequalified product that does not have a NTPEP test report on file as of January 1, 2017 will be removed from the list of prequalified chemical admixtures for concrete. Changes in the formulation, manufacturing process, or failure of the admixture to function appropriately will require a new prequalification.

### 1402.5 BASIS OF ACCEPTANCE

a. Prequalification as set forth under **subsection 1402.4**.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

## 1403 - PRECURE/FINISHING AID

### SECTION 1403

#### PRECURE/FINISHING AID

##### 1403.1 DESCRIPTION

This specification covers evaporation retarding material for use in finishing concrete flatwork, and serves as a finishing aid. This material is not a substitute for regular curing compound, which must be applied after the concrete is finished.

##### 1403.2 REQUIREMENTS

a. Provide a pigmented water based material, as described in ACI 345R, capable of producing a monomolecular film over freshly placed concrete, which serves to retard evaporation from the surface.

b. The material may have no deleterious effects on concrete.

c. Prepare and use the material in accordance with the manufacturer's instructions. Provide a copy of those instructions to the Field Engineer prior to commencing operations.

##### 1403.3 TEST METHODS

None specified.

##### 1403.4 PREQUALIFICATION

Pre-cure/ finishing aid materials must be prequalified. For approval of proposed products, submit complete technical data and material safety data sheets to the Bureau of Construction and Materials. The manufacturer will be notified of the acceptance or denial of the product. The Bureau of Construction and Materials will maintain a list of prequalified pre-cure/finishing aid material for concrete. Products prequalified by the above procedures will remain prequalified, as long as the formulation and manufacturing processes remain unchanged, and field experience indicates that the admixture functions appropriately.

##### 1403.5 BASIS OF ACCEPTANCE

a. Prequalification as required by **subsection 1403.4** of this specification.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

# 1404 - LIQUID MEMBRANE FORMING COMPOUNDS

## SECTION 1404

### LIQUID MEMBRANE FORMING COMPOUNDS

#### 1404.1 DESCRIPTION

This specification covers liquid membrane forming compounds (also referred to as concrete curing compounds) suitable for spraying on horizontal and vertical concrete surfaces to retard the loss of water during the early hardening period and subsequent curing period.

#### 1404.2 REQUIREMENTS

a. Provide liquid membrane forming compound that complies with ASTM C 309 for Type 1-D, clear or translucent with fugitive dye, or Type 2, white pigmented compound.

b. Type 2 white pigmented compound will be further classified into Type 2 (Wax Based) and Type 2 (Other). This is to allow specifying of wax based compound for certain applications where a bond breaker is desired. Either formulation base may be supplied except when wax based is specified.

c. Do not allow water-emulsion based material to freeze. Material that has been subjected to freezing temperatures will be rejected.

#### 1404.3 TEST METHODS

Test materials in accordance with ASTM C 309. Fingerprinting and screening of verification samples by infrared spectroscopy is done according to ASTM E 1252.

Water emulsion based material is not subject to the long term settling test by the freeze thaw cycling method.

Wax-based material for Cement Treated Base (CTB) with the following exceptions:

Moisture Loss, kg/sq m (max.) .....	0.60
Daylight Reflectance (min.) .....	50%

#### 1404.4 PREQUALIFICATION

Submit two 1-quart samples of material and a copy of the manufacturer's test results on samples of the same lot of material to the Engineer of Tests. Include a copy of the Material Safety Data Sheet (MSDS). For Type 2 white pigmented compounds, include a statement regarding whether the formulation is wax based or other, unless it is specifically addressed in the MSDS.

Samples will be tested for compliance with this specification. The manufacturer will be notified of the test results on the samples submitted.

Results of tests from the AASHTO National Transportation Product Evaluation Program (NTPEP) will be accepted in lieu of the sample requested above. Include the most recent NTPEP test report along with the other documentation requested. Include evidence that the product being offered is identical to the one reported in the NTPEP report.

Manufacturers whose products comply with this specification will be placed on a prequalified list. Manufacturers will remain on the list as long as the results of verification samples and performance in the field are satisfactory. Any changes in formulation will require re-submittal for prequalification testing.

#### 1404.5 BASIS OF ACCEPTANCE

a. Prequalification as required by **subsection 1404.4** above.

b. Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

## **1405 - BURLAP**

### **SECTION 1405**

#### **BURLAP**

##### **1405.1 DESCRIPTION**

This specification covers new and used burlap for use in curing concrete.

##### **1405.2 REQUIREMENTS**

**a. General.** Provide material which complies with AASHTO M 182, Class 3 (10 oz/yd) with the following additions:

- (1) Manila hemp may also be used to make burlap.
- (2) Burlap fabricated from bags may not be used.
- (3) Burlap may not contain any water soluble ingredient which will retard the setting time of portland cement concrete.

**b. Used Burlap.** Used burlap must comply with the requirements stated above, and can only have been used previously for curing concrete. "Like new" cleanliness is not expected, but contamination with any substance foreign to the concrete curing process (e.g. grease or oil) will be cause for rejection.

##### **1405.3 TEST METHODS**

As specified in AASHTO M 182.

##### **1405.4 PREQUALIFICATION**

None Required

##### **1405.5 BASIS OF ACCEPTANCE**

**a.** New burlap will be accepted on the basis receipt and approval of a Type D certification as specified in **DIVISION 2600** and a visual inspection for compliance with AASHTO M 182.

**b.** Used burlap will be accepted on the basis of a Contractor certification regarding the source and previous use of the material, and a visual inspection for compliance with AASHTO M 182.

## 1406 – SHEET MATERIALS FOR CURING CONCRETE

### SECTION 1406

#### SHEET MATERIALS FOR CURING CONCRETE

##### 1406.1 DESCRIPTION

This specification covers materials in sheet form used for covering the surfaces of hydraulic cement concrete to inhibit moisture loss during the curing period. In the case of white reflective materials, it also reduces temperature rise in concrete exposed to radiation from the sun. Materials included are clear and white opaque polyethylene film, and white-burlap polyethylene sheet.

##### 1406.2 REQUIREMENTS

**a. General.** Provide material that complies with AASHTO M 171.

**b. Used Sheet Material.** Used sheet material must comply with the requirements stated above, and can only have been used previously for curing concrete. "Like new" cleanliness is not expected, but contamination with any substance foreign to the concrete curing process (e.g. grease or oil) will be cause for rejection.

##### 1406.3 TEST METHODS

As specified in AASHTO M 171.

##### 1406.4 PREQUALIFICATION

None Required.

##### 1406.5 BASIS OF ACCEPTANCE

**a.** New sheet materials will be accepted on the basis receipt and approval of a Type D certification as specified in **DIVISION 2600**, and a visual inspection for compliance with AASHTO M 171.

**b.** Used sheet materials will be accepted on the basis of a Contractor certification regarding the source and previous use of the material, and a visual inspection for compliance with AASHTO M 171.