

National Cooperative Highway Research Program (NCHRP) Report 350 guidelines. Work Zone Category 1 Devices include plastic drums, cones, and tubular markers. Work Zone Category 2 Devices include portable sign stands (with signs), Type I, Type II, and Type III barricades, vertical panels, intrusion alarms, and other work zone devices under 45 kg [100 lb]. All new Work Zone Category 1 and Category 2 Devices purchased by the Contractor shall meet NCHRP Report 350 guidelines.

Vendors/Contractors will be allowed to self-certify Work Zone Category 1 Devices with a letter of self-certification. A letter of self-certification shall contain at a minimum

- a. A title e.g., “Certificate of Crashworthiness”,
- b. Name and Address of the Vendor making certification,
- c. Unique identification of the certificate (such as a serial number) and of each page and the total number of pages,
- d. Description and unambiguous identification of the item tested,
- e. Identification of the basis for the self-certification process used and to what test level of NCHRP 350,
- f. Signature and title of person(s) accepting responsibility for the content of the certificate and date of issue, and
- g. A statement that the certificate shall not be reproduced except in full.

Crash test information is available on the FHWA Office of Highway Safety’s Homepage: <http://safety.fhwa.gov/programs/roadsideHardware.htm>.

Contractors may use existing Work Zone Category 1 Devices (purchased before October 1, 1998) until the end of their service life. Existing Work Zone Category 2 Devices (purchased before October 1, 2000) may be used until the end of their service life or October 30, 2003, whichever occurs first. When a device reaches the end of its service life, it shall be replaced with a NCHRP 350 and MUTCD compliant device.

SECTION 701 - STRUCTURAL CONCRETE RELATED MATERIAL

701.01 Portland Cement and Portland Pozzolan Cement Portland cement shall conform to the requirements of AASHTO M85, Type II.

A Type II or Type III cement meeting AASHTO M85 may be used when making

precast units.

A Type IP (MS) portland-pozzolan cement (blended hydraulic cement with moderate sulfate resistance) meeting the requirements of AASHTO M240, may be used instead of Type II or where Type I portland cement, meeting the requirements of AASHTO M85, is allowed. The definitions of the two hydraulic cements mentioned above are as follows: (See ASTM C219)

Portland cement - a hydraulic cement produced by pulverizing portland cement clinker, and usually containing calcium sulfate.

Portland-pozzolan cement - a hydraulic cement consisting of an intimate and uniform blend of portland cement or portland blast furnace slag cement and fine pozzolan produced by intergrinding portland cement clinker and pozzolan, by blending portland cement or portland blast furnace slag cement and finely divided pozzolan, or a combination of intergrinding and blending, in which the amount of the pozzolan constituent is within specified limits.

Only one brand of cement shall be used on any one contract unless otherwise permitted, in writing, by the Resident.

701.02 Water Water used in mixing or curing concrete shall be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetation, or substances injurious to the finished product. If required by the Resident, it shall be tested by comparison with water of known satisfactory quality. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength. Any indication of unsoundness, marked change in time of setting or a reduction of more than 10% in strength from results obtained with mixtures containing water of known satisfactory quality shall be sufficient cause for rejection of the water that is being tested. Water, known to be of potable quality may be used without testing. Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

701.03 Air-Entraining Admixtures Air-entraining admixtures shall be in accordance with the requirements of AASHTO M154.

The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.04 Water Reducing Admixtures Water reducing admixtures shall conform to the requirements of AASHTO M194, Type A.

The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.0401 High Range, Water Reducing, Admixture High range, water-reducing admixture, commonly referred to as both super-water-reducers and/or superplasticizers, shall conform to the requirements of AASHTO M194, Type F.

The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.05 Set-retarding Admixtures Set-retarding admixtures shall conform to the requirements of AASHTO M194, Types B or D.

The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.06 Curing Materials Sheet materials for curing concrete shall conform to the requirements of AASHTO M171. Burlap cloth shall conform to the requirements of AASHTO M182 Class 3, 310 g/m [10 oz/yd]. Liquid membrane-forming compounds shall conform to the requirements of AASHTO M148 and shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

The two types of approved liquid membrane-forming compounds are: (1) Type 1-D, clear or translucent with fugitive dye which must be readily distinguishable for at least 4 hours and must be inconspicuous in 7 days and (2) Type 2, white pigmented.

701.07 Waterstops Waterstops shall be polyvinylchloride and conform to the requirements of US Army Corps of Engineers Specification CRD C-572.

701.08 Smooth Surfaced Asphalt Roll Roofing (formerly called Heavy Roofing Felt) Wherever heavy roofing is called for on the plans an approved standard brand of smooth surface asphalt roofing (organic felt) conforming to ASTM D224 Type I.

701.09 Styrene-Butadiene Latex Modifier for Concrete and Mortar The formulated styrene-butadiene latex modifier, hereinafter referred to as latex admixture, shall be a nonhazardous, film forming, polymeric emulsion in water to which all stabilizers have been added at the point of manufacture, and shall be homogeneous and uniform in composition. This styrene-butadiene latex modifier shall be used in the mortar or concrete and shall be one of the following:

- (a) Dow Modifier A; Dow Chemical Company; Midland, Michigan
- (b) Deco-Rez 4776; General Polymers Corp.; Cincinnati, Ohio
- (c) Thermoflex 8002 (also called Reichold 8002); Reichold Chemicals, Inc.; Dover, Delaware
- (d) Arco Dyles 1186; Arco Polymers, Inc.; Monaca, Pennsylvania

The prime Contractor shall be responsible for the cooperation and coordination with the latex supplier or manufacturer or both for the satisfactory performance of the work.

The latex admixture formulation shall conform to the following requirements:

Polymer Styrene-butadiene emulsion. $66 \pm 1\frac{1}{2}\%$ styrene, $31\frac{1}{2} \pm 1\frac{1}{2} \%$ butadiene
Percent 46.5 to 49.0%

Stabilizers The polymeric emulsion shall be stabilized with an anionic, nonionic and polyorganosiloxane fluid surfactant in which the anionic surfactant is a sodium alkyl sulfate.

Average Size of Particles 1,900 to 2,500 Angstroms

PH 8.5 to 11.0

Freeze-Thaw Stability 5.0 percent maximum in 300 cycles. AASHTO T 161; except modified with 3 percent. NaCl solution instead of plain water

Shelf life Minimum of 2 years

Color White

Weight per gallon 3.81 to 3.84 kg [8.4 to 8.47 lb] @
25°C [77°F]

Water AASHTO T 26

Method of Determining Total Solids-Latex Admixture, Percent

Scope This involves the determination of the percent solids on all latex admixture samples. It involves weighing a sample of wet latex admixture, drying in an oven and then expressing the weight ratio of dry/wet in percent.

Procedure

(a) All samples to be tested must be at room temperature. If the sample is warm, it can be cooled in a pan of cold tap water.

(b) The level of the balance should be checked and adjusted if necessary. In addition, the zero of the balance should be checked and adjusted correspondingly.

(c) Weigh 3 aluminum cups and record the weight of each (tare weight). NOTE: Every sample tested must be done in triplicate.

(d) Mix by hand each sample when cool by inverting the container 5 to 10 times.

(e) Weigh approximately 1 gram [0.035 oz] of latex admixture to the nearest milligram into each preweighed aluminum cup.

(f) Place all 3 samples in the oven to dry for 120 minutes (oven temperature $140 \pm 1^\circ\text{C}$ [$285 \pm 2^\circ\text{F}$]).

(g) Remove the samples from the oven and place immediately in a desicator for a few minutes or until cool. This prevents moisture pick up from the air while cooling.

(h) Reweigh each sample out of the desicator to the nearest milligram and record.

(i) Calculations.

Total solids in percent - $\frac{C-A}{C} \times 100$

B-A

Where:

A - The weight of the empty aluminum cup.

B - The weight of the aluminum cup and the wet sample.

C - The weight of the aluminum cup and the dried sample.

(j) Results

(1) If all three samples are within 2 percent, average the 3 samples to obtain the percent solids.

(2) If all 3 samples are not within 2 percent, but 2 samples are within 1 percent, the average between the 2 samples within 1 percent is reported as the percent solids and the third determination is discarded.

(3) If all 3 samples are not within 2 percent and no 2 are within 1 percent, all the values must be discarded and the solids procedure must be repeated.

701.10 Fly Ash Fly Ash shall conform to the following chemical and physical requirements for mineral admixtures, Class F as listed in AASHTO M295 .

Physical Requirements:

Fineness Amount retained when wet screened on a 45 μm [No. 325] sieve. Maximum 34% allowed as per AASHTO T192.

Strength Activity Index at 7 Days with Portland Cement Meeting a minimum 75% of control.

- Autoclave Expansion or Contraction Maximum 0.8% allowed per AASHTO T107 Footnote c_c shall apply.

Uniformity requirements The specific gravity and fineness of individual samples shall not vary from the average established by the 10 preceding tests, or by the preceding tests if the number is less than 10, by more than 5%.

Chemical Requirements:

Silicon dioxide (SiO₂) plus aluminum oxide (Al₂O₃) plus iron oxide (Fe₂O₃)
Shall meet a minimum 70% per AASHTO T105 (ASTM C114).

- SO₃ Sulfate ion reported as Sulfur trioxide. Maximum 5% allowed per AASHTO T105 (ASTM C114).

Moisture content Shall be a maximum 3% per AASHTO T105 (ASTM C311)

Loss of ignition (LOI) Shall be 6% maximum per AASHTO T105 (ASTM C311)

Source, Acceptance, Quality Control Conformance to these specifications will be assured by a program of testing, including quality control (QC) exercised by the fly ash producer, and quality acceptance (QA) exercised by the department.

a. Source The fly ash supplier's source shall receive acceptance based on forwarding detailed information on the following.

1. Source of raw materials.
2. Fly ash recovery process and type of collection equipment.
3. Fly ash properties and past variability's.
4. Storage facilities.
5. Frequency and results of suppliers quality control testing program.

b. Acceptance The approval of fly ash we will be based on comparative testing performed by the department on samples obtained from storage silos located at the redimix concrete plants.

Samples will be obtained for testing during the annual plant inspection. Further sampling will be on a per project basis at a frequency to be determined by the department.

c. Quality Control The quality control procedures employed by the supplier shall be such that only fly ash conforming to this Section is presented to the department for acceptance consideration.

701.11 Calcium Nitrite Solution Calcium nitrite solutions shall conform to the requirements of AASHTO M194, Type C (accelerating admixtures). An approved calcium nitrite based corrosion inhibitor shall be added to the concrete mix as an aqueous solution.

The material used shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.12 Silica Fume The silica fume material for use in Portland Cement Concrete shall be one of the products listed on the Maine Department of Transportation's Approved Product List.

701.13 Ground Granulated Blast Furnace Slag Ground granulated blast furnace slag shall conform to the following chemical and physical requirements for mineral admixtures, Grade 120 as listed in AASHTO M302.

Physical Requirements:

Fineness Amount retained when wet screened on a 45 µm [No. 325] sieve. Maximum 20% allowed as per AASHTO T192 (ASTM C430)

Air Content Air content of slag mortar mix. Maximum 12% allowed as per AASHTO T137 (ASTM C185)

Strength Activity Index Meeting the requirements listed in AASHTO M302 (ASTM C989) Table No. 1.

Chemical Requirements:

SO³ Sulfate ion reported as Sulfur Trioxide. Maximum 4% allowed as per AASHTO T105 (ASTM C114)

Source, Acceptance, Quality Control Conformance to these specifications will be assured by a program of testing, including quality control (QC) exercised by the slag producer, and quality acceptance (QA) exercised by the department.

a. Source The Slag supplier's source shall receive acceptance based on forwarding detailed information on the following.

1. Source of raw materials.
2. Slag recovery process and type of collection equipment.
3. Slag properties and past variability's.
4. Storage facilities.
5. Frequency and results of suppliers quality control testing program.

b. Acceptance The approval of slag we will be based on comparative testing performed by the department on samples obtained from storage silos located at the redi-mix concrete plants.

Samples will be obtained for testing during the annual plant inspection. Further sampling will be on a per project basis at a frequency to be determined by the department.

c. Quality Control The quality control procedures employed by the supplier shall be such that only slag conforming to this Section is presented to the department for acceptance consideration.

SECTION 702 - BITUMINOUS MATERIAL

702.01 Asphalt Cement Performance Graded Asphalt Binder shall conform to the requirements of AASHTO M 320.

702.03 Cutback Asphalt AASHTO M82.

702.04 Emulsified Asphalt AASHTO M140. Cationic emulsified asphalt shall conform to AASHTO M208.

702.05 Temperature Application Range, °C [°F]

<i>Type and Grade of Material</i>	<i>Spray</i>	<i>Mix</i>
RC 70 150]	27 to 66 [80 to 150]	27 to 66 [80 to
RC 250	28 to 79 [82 to 175]	27 to 66 [80 to