

DIVISION 10 – MATERIALS

10 10 00 GENERAL PROVISIONS

- A. All work in this Division shall be completed in accordance with the provisions of Division 10 of the North Carolina Department of Transportation Standard Specifications for Roads and Structures 2006 Edition (hereinafter referred to as *Standard Specifications*) except as amended or supplemented herein.

10 20 00 SPECIAL PROVISIONS-NCDOT

02. HIGH STRENGTH CONCRETE FOR DRIVEWAYS:

(11-21-00) (7-18-06)

SP10 R01

1. Use high early strength concrete for all driveways shown in the plans and as directed by the Engineer. Provide high early strength concrete that meets the requirements of Article 1000-6 of the *Standard Specifications*.
2. Measurement and payment will be in accordance with Section 848 of the *Standard Specifications*.

03. GALVANIZED HIGH STRENGTH BOLTS, NUTS AND WASHERS:

(2-17-09)

SP10 R02

Revise the *Standard Specifications* as follows:

Page 10-126, Subarticle 1072-7(F)(3) Change the AASHTO reference to B 695 Class 55

Page 10-247, Table 1092-2, Steel Sign Materials, Change High Strength Bolts, Nuts & Washers ASTM Specifications for Galvanizing to B695 Class 55.

Page 10-259, Subarticle 1094-1(A) Breakaway or Simple Steel Beam Sign Supports, replace the third paragraph with the following:

Fabricate high strength bolts, nuts, and washers required for breakaway supports from steel in accordance with ASTM A325 and galvanize in accordance with AASHTO B 695 Class 55.

Page 10-261, Article 1096-2 Steel Overhead Sign Structures, replace the last sentence with the following:

The galvanizing shall meet the requirement of AASHTO B 695 Class 55 for fasteners and of ASTM A123 for other structural steel.

04. AGGREGATE PRODUCTION:

(11-20-01)

SP10 R05

1. Provide aggregate from a producer who uses the current Aggregate Quality Control/Quality Assurance Program that is in effect at the time of shipment.
2. No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

05. CONCRETE BRICK AND BLOCK PRODUCTION:

(11-20-01)

SP10 R10

1. Provide concrete brick and block from a producer who uses the current Solid Concrete Masonry Brick/Unit Quality Control/Quality Assurance Program that is in effect on the date that material is received on the project.
2. No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

06. AGGREGATES FOR ASPHALT PAVEMENTS AND SURFACE TREATMENTS (ULTRA-THIN):

(7-18-06)

SP10 R15

Revise the 2006 Standard Specifications as follows:

Page 10-40, Subarticle 1012-1(A), add the following at the end of the last paragraph, last sentence:

or ultra-thin bonded wearing course.

Page 10-41, Table 1012-1, add the following as the last row of the Table:

UBWC	100/85	40	45	10
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Page 10-42, Subarticle 1012-1(B)(6), add as the last sentence:

The percentage loss for aggregate used in UBWC shall be no more than 35%.

07. PORTLAND CEMENT CONCRETE (ALKALI-SILICA REACTION):

2-20-07

SP10 R16

Revise the 2006 Standard Specifications as follows:

Article 1024-1(A), replace the 2nd paragraph with the following:

Certain combinations of cement and aggregate exhibit an adverse alkali-silica reaction. The alkalinity of any cement, expressed as sodium-oxide equivalent, shall not exceed 1.0 percent. For mix designs that contain non-reactive aggregates and cement with an alkali content less than 0.6%, straight cement or a combination of cement and fly ash, cement and ground granulated blast furnace slag or cement and microsilica may be used. The pozzolan quantity shall not exceed the amount shown in Table 1024-1. For mixes that contain cement with an alkali content between 0.6% and 1.0%, and for mixes that contain a reactive aggregate documented by the Department, regardless of the alkali content of the cement, use a pozzolan in the amount shown in Table 1024-1.

Obtain the list of reactive aggregates documented by the Department

at: <http://www.ncdot.org/doh/operations/materials/pdf/quarryasrprob.pdf>

Table 1024-1 Pozzolans for Use in Portland Cement Concrete	
Pozzolan	Rate
Class F Fly Ash	20% by weight of required cement content, with 1.2 lbs Class F fly ash per lb of cement replaced
Ground Granulated Blast Furnace Slag	35%-50% by weight of required cement content with 1 lb slag per lb of cement replaced
Microsilica	4%-8% by weight of required cement content, with 1 lb microsilica per lb of cement replaced

08. GLASS BEADS:

(7-18-06)

SP10 R35

Revise the *Standard Specifications* as follows:

Page 10-223, 1087-4(C) Gradation & Roundness, Replace the second sentence of the first paragraph with the following:

All Drop-On and Intermixed Glass Beads shall be tested in accordance with ASTM D1155.

Delete the last paragraph.

09. ENGINEERING FABRICS TABLE 1056-1:

(7-18-06)

SP10 R40

Revise the *Standard Specifications* as follows:

Page 10-100, Table 1056-1, replace the values for Trapezoidal Tear Strength with the following:

Physical Property	ASTM Test Method	Type 1	Type 2	Type 3		Type 4
				Class A	Class B	
Typical Applications		Shoulder Drain	Under Riprap	Temporary Silt Fence		Soil Stabilization
Trapezoidal Tear Strength	D4533	45 lb	75 lb	--	--	75 lb

10. PRECAST DRAINAGE STRUCTURES - MACRO-SYNTHETIC FIBERS

(7-15-08)(Rev 11-18-08)

SP 10 R42

A. Description

1. Substitute as an option, macro-synthetic fibers in lieu of 4" x 4" W1.4 x W1.4 welded wire fabric reinforcement for selected precast concrete products in accordance with the following requirements.

B. Materials

Item

Portland Cement Concrete

Section

1077-5

1. Substitute macro-synthetic fibers only for steel reinforcement with an area of steel of 0.12 in²/ft or less in the following items:
 - a. *Precast Drainage Structure* units in accordance with the requirements of *Standard Drawing 840.45*.
 - b. *Precast Manhole 4.0' Riser Sections* in accordance with the requirements of *Standard Drawing 840.52*.
 - c. All other requirements, including reinforcement for these precast concrete items will remain the same.
2. *Submittal*. Submit to the Department for approval by the precast producer and fiber manufacturer, independently performed test results certifying the macro-synthetic fibers and the precast concrete products meet the requirements listed herein:
3. Macro-Synthetic Fibers
 - a. Manufacture from virgin polyolefins (polypropylene and polyethylene) and comply with ASTM C 1116.4.1.3.
 - 1) *Fibers manufactured from materials other than polyolefins* Submit test results certifying resistance to long-term deterioration when in contact with the moisture and alkalis present in cement paste and/or the substances present in air-entraining and chemical admixtures.
 - b. Fiber length - no less than 1-1/2 inch.
 - c. Macro-synthetic fibers - aspect ratio (length divided by the equivalent diameter of the fiber) between 45 and 150.
 - d. Macro-synthetic fibers - Minimum tensile strength of 40 ksi when tested in accordance with ASTM D 3822.
 - e. Macro-synthetic fibers - minimum modulus of elasticity of 400 ksi when tested in accordance with ASTM D 3822.
4. Fiber Reinforced Concrete
 - a. Approved structural fibers may be used as a replacement of steel reinforcement in allowable structures of NCDOT Standards 840.45 and 840.52. The dosage rate, in pounds of fibers per

cubic yard, shall be as per recommended by the fiber manufacturer to provide a minimum average residual strength (in accordance with ASTM C 1399) of concrete of no less than that of the concrete with the steel reinforcement that is being replaced, but no less than 5 lbs. per cubic yard. Submit the recommendations of the manufacturer that correlate the toughness of steel-reinforced concrete with that of the recommended dosage rate for the fiber-reinforced concrete.

- b. Fiber reinforced concrete - 4.5% air content, \pm 1.5% tolerance.
- c. Fiber reinforced concrete - develop a minimum compressive strength 4000 psi in 28 days.
- d. Workability of the concrete mix - determine in accordance with ASTM C995. The flow time - not be less than 7 seconds or greater than 25 seconds.
- e. Assure the fibers are well dispersed and prevent fiber balling during production. After introduction of all other ingredients, add the plastic concrete and mix the plastic concrete for at least 4 minutes or for 50 revolutions at standard mixing speed.

C. Measurement and Payment

- 1. No separate payment will be made for substitution of macro-fiber synthetic reinforcement for the steel reinforcing. The price bid for the precast units will be full compensation for furnishing and incorporating the macro-fiber synthetic reinforcement.

11. PAINT SAMPLING AND TESTING:

8-15-06

(SP10 R 45)

Revise the 2006 Standard Specifications as follows:

Page 10-190, Article 1080-4, Delete the first paragraph and replace with the following:

All paint will be sampled, either at the point of manufacture or at the point of destination. Inspection and sampling will be performed at the point of manufacture wherever possible. The Contractor shall not begin painting until the analysis of the paint has been performed, and the paint has been accepted.

12. TEMPORARY PORTABLE CONCRETE BARRIER

(2-20-07)

SP10 R50

The 2006 Standard Specifications is revised as follows:

Page 10-245, Article 1090-1(A) General, add the following after the first sentence:

The requirement for approved galvanized connectors will be waived if the barrier remains the property of the Contractor.

10 30 00 SPECIAL PROVISIONS-ADDITIONAL