

**B-4255****Project Special Provisions  
Erosion Control****Rowan County****Seeding and Mulching:****(West)**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined by the Engineer. All rates are in pounds per acre.

## Shoulder and Median Areas:

August 1 - June 1

20# Kentucky Bluegrass  
75# Hard Fescue  
25# Rye Grain  
500# Fertilizer  
4000# Limestone

May 1 - September 1

20# Kentucky Bluegrass  
75# Hard Fescue  
10# German or Browntop Millet  
500# Fertilizer  
4000# Limestone

## Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1

100# Tall Fescue  
15# Kentucky Bluegrass  
30# Hard Fescue  
25# Rye Grain  
500# Fertilizer  
4000# Limestone

May 1 - September 1

100# Tall Fescue  
15# Kentucky Bluegrass  
30# Hard Fescue  
10# German or Browntop Millet  
500# Fertilizer  
4000# Limestone

## Approved Tall Fescue Cultivars:

Adventure	Adventure II	Amigo	Anthem
Apache	Apache II	Arid	Austin
Brookstone	Bonanza	Bonanza II	Chapel Hill
Chesapeake	Chieftain	Coronado	Crossfire II
Debutante	Duster	Falcon	Falcon II
Finelawn Petite	Finelawn	Finelawn I	Genesis
Grande	Guardian	Houndog	Jaguar
Jaguar III	Kentucky 31	Kitty Hawk	Monarch
Montauk	Mustang	Olympic	Pacer
Phoenix	Pixie	Pyramid	Rebel
Rebel Jr.	Rebel II	Renegade	Safari
Shenandoah	Tempo	Titan	Tomahawk
Trailblazer	Tribute	Vegas	Wolfpack
Wrangler			

Approved Kentucky Bluegrass Cultivars:

Adelphi	Baron	Bristol	Challenger
Columbia	Fylking	Glade	Kenblue
Merit	Plush	Ram I	Rugby
Sydsport	Touchdown	Vantage	

Approved Hard Fescue Cultivars:

Aurora	Bardur	Crystal	Reliant	Scaldis
Spartan	Valda	Waldina	Warwick	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

**Native Grass Seeding And Mulching**

**Bluegrass**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands, and adjacent to Stream Relocation and/or Trout Stream construction within a 50 foot zone on both sides of the stream(or depression), measured from top of stream bank, (or center of depression). The stream bank of the Stream Relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the Permanent Soil Reinforcement Mat section of Preformed Scour Holes, and in other areas as directed by the Engineer.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined by the Engineer. All rates are in pounds per acre.

August 1 - June 1

May 1 - September 1

- 25# Kentucky Bluegrass
- 8# Big Bluestem
- 6# Indiangrass
- 4# Switchgrass
- 35# Rye Grain
- 500# Fertilizer
- 4000# Limestone

- 25# Kentucky Bluegrass
- 8# Big Bluestem
- 6# Indiangrass
- 4# Switchgrass
- 25# German or Browntop Millet
- 500# Fertilizer
- 4000# Limestone

Approved Kentucky Bluegrass Cultivars:

Adelphi	Baron	Bristol	Challenger
Columbia	Fylking	Glade	Kenblue
Merit	Plush	Ram I	Rugby
Sydsport	Touchdown	Vantage	

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Payment for Native Grass Seeding and Mulching shall be made under:

Seeding and Mulching.....Acre

**Temporary Seeding:**

Fertilizer shall be the same analysis as specified for "Seeding and Mulching" and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

**Fertilizer Topdressing:**

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

**Supplemental Seeding:**

The kinds of seed and proportions shall be the same as specified for "Seeding and Mulching", and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined by the Engineer prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

**Mowing:**

The minimum mowing height on this project shall be six inches.

**Response For Erosion Control:**

Description:

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

- (A) Seeding and Mulching
- (B) Temporary Seeding and Mulching
- (C) Temporary Mulching
- (D) Fertilizer Topdressing
- (E) Repair Seeding
- (F) Supplemental Seeding
- (G) Silt Fence Installation or Repair
- (H) Installation of Matting for Erosion Control

Construction Methods:

Provide an approved subcontractor who performs an erosion control action as described in Form 1675. Each erosion control action may include one or more of the above work items.

Measurement and Payment:

“Response for Erosion Control” will be measured by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 will not apply to the item of work.

Payment will be made under:

Response for Erosion Control.....Each

**Specialized Hand Mowing:**

The work covered by this section consists of specialized hand mowing around or under fixed objects, including but not limited to guardrails, signs, barriers and slopes in a method acceptable to the Engineer.

The work of specialized hand mowing shall be completed with mechanically powered trimmers, string trimmers, hand operated rotary mowers, or self-propelled mowers of sufficient size and quality to perform the work timely and efficiently.

The quantity of mowing to be performed will be affected by the actual conditions which occur during the construction of the project. The quantity of mowing may be increased,

decreased or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

The quantity of specialized hand mowing to be paid for will be the actual number of man hours worked while hand mowing along the surface of the ground, at the direction of the Engineer. Where an area has been mowed more than once, at the direction of the Engineer, separate measurement will be made each time the area is mowed.

Payment will be made under:

Specialized Hand Mowing.....HR

**Minimize Removal Of Vegetation**

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed by the Engineer.

**Stockpile Areas:**

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed by the Engineer.

**Reforestation:**

Reforestation will be planted in areas where the detour fill is removed and regraded to natural contours, and in areas designated by the Engineer. Reforestation is not shown on the plan sheets. See the reforestation detail sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire Reforestation operation shall comply with Section 1670 of the *Standard Specifications*.

Seasonal limitations: Seedlings shall be planted from November 15 through March 15.

Seedlings shall be planted as soon as practical following permanent Seeding and Mulching. Seedlings shall be planted in a 16 ft. wide swath adjacent to mowing pattern line.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay ("kaolin") or a superabsorbent that is made to be used as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval. With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the

roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

**Waste Areas And Borrow Sources:**

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices which may be required on a commercial borrow or waste site will be done at the Contractor's expense.

**Temporary Diversion:**

The work by this section for installation, maintenance, and cleanout of temporary diversions shall be in accordance with Section 1630. The quantity of excavation for installation and cleanout will be measured and paid for per cubic yard as provided in Article 1630 for "Silt Excavation".

**Safety Fence:**

Description:

The work of "Safety Fence" shall consist of furnishing, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland or water, and as directed by the Engineer in accordance with the special provisions included herein. The fence shall be installed prior to any land disturbing activities.

Materials:

Fence Material:

Polyethylene or polypropylene fence shall be a preconstructed safety fence approved by the Engineer.

Posts:

Either wood posts or steel posts may be used. Wood posts shall be nominal 2" x 4" or 4" x 4", lengths as required, structural light framing, grade No. 2, Southern Pine. Steel posts shall be at least 5 feet in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb./ft. of length. The steel post shall be equipped with an anchor plate having a minimum area of 14 square inches.

Clearing and Grading:

No additional clearing and grubbing is anticipated for the installation of this fence; however, if any clearing and grubbing is required, it will be the minimum required for the installation of the safety fence. Such clearing shall include satisfactory removal and disposal of all trees, brush, stumps and other objectionable material.

The fence shall be erected to conform to the general contour of the ground. When determined necessary by the Engineer, minor grading along the fence line shall be done to meet this requirement provided no obstructions to proper drainage are created.

Installation:

Posts shall be set and maintained in a vertical position and may be hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. If power driven, wood posts may be sharpened to a dull point. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30 degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence fabric shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment:

The quantity of safety fence to be paid for shall be the actual number of linear feet of "Safety Fence", installed in place and accepted. No direct payment will be made for post and post bracing. Cost shall be included in the cost of the fence per linear foot.

The quantity of safety fence will be paid for at the contract unit price per linear foot of safety fence. Such payment will be full compensation for the work as described in the above paragraphs, including but not limited to clearing and grading, furnishing and installing fence fabric with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Safety Fence.....LF

**Gravel Construction Entrance:**

## Description:

The work covered by this section consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a Gravel Construction Entrance.

## Materials:

The filter fabric shall meet the requirements of Section 1056 for Type 2 Fabric.

Stone shall be Class A Stone and shall meet the requirements of Section 1042 for Stone for Erosion Control, Class A.

## Construction:

The Contractor shall install a Gravel Construction Entrance in accordance with the details in the plans and at locations as directed by the Engineer.

## Measurement and Payment

Payment for installation of Filter Fabric shall be paid for at the contract unit price per square yard "Filter Fabric for Drainage".

Payment for installation of Class A Stone shall be paid for at the contract unit price per ton "Stone for Erosion Control, Class A".

Such price and payment shall be considered full compensation for all work covered by this provision including all materials, construction, maintenance, and removal of Gravel Construction Entrance as directed by the Engineer.

**Special Stilling Basin:**

## Description:

The work covered by this section consists of furnishing, placing, and removing a special stilling basin as directed by the Engineer. The special stilling basin shall be used to filter pumped water during construction of drilled piers.

## Materials:

The filter fabric shall meet the requirements of Section 1056 for Type 2 Fabric.

Sediment control stone shall meet the requirements of Section 1005. Install stone according to the detail shown on the plans.



The special stilling basin shall be a water permeable fabric bag that traps sand, silt, and fines as sediment laden water is pumped into it. This device shall be constructed such that it is portable and can be used adjacent to each drilled pier.

The special stilling basin shall be a bag constructed to a minimum size of 10' x 15' made from a nonwoven fabric. It shall have a sewn-in 8 in. (maximum) spout for receiving pump discharge. The bag seams shall be sewn with a double needle machine using a high strength thread. The seams shall have a minimum wide width strength as follows:

Test Method	Minimum Specifications
ASTM D-4884	60 lb/in

The fabric used to construct the bag shall be stabilized to provide resistance to ultra-violet degradation and meet the following specifications for flow rates, strength, and permeability:

Property	Test Method	Units	Minimum Specifications
Weight	ASTM D-3776	oz/yd	8.0
Grab tensile	ASTM D-4632	lb	200.0
Puncture	ASTM D-4833	lb	130.0
Flow rate	ASTM D-4491	gal/min/s f	80.0
Permittivity	ASTM D-4491	1/sec	1.2
UV Resistance	ASTM D-4355	%	70.0

#### Construction:

The Contractor shall install the special stilling basin in accordance with the details in the plans and at locations as directed by the Engineer.

The special stilling basin shall be placed so the incoming water flows into and through the bag without causing erosion. The neck or spout of the bag shall be tied off tightly to stop the water from flowing out of the bag without going through the walls.

The special stilling basin shall be replaced and disposed of when it is 3/4 full of sediment or when it is impractical for the bag to filter the sediment out at a reasonable flow rate. Prior approval from the Engineer shall be received before removal and replacement.

The Contractor shall be responsible for providing a sufficient quantity of bags to contain silt from pumped effluent during construction of drilled piers.

#### Measurement and Payment:

The quantity of special stilling basin to be paid for will be the actual number of bags used during drilled pier construction as specified and accepted by the Engineer.

Measurement of filter fabric will be made by the number of square yards as measured over the surface of the ground over which filter fabric has been acceptably placed.

The quantity of sediment control stone will be measured according to Article 1610-4.

Payment for special stilling basin will be as follows:

Filter Fabric for Drainage .....	Square Yard
Sediment Control Stone .....	Ton
Special Stilling Basin .....	Each

Such price and payment will be full compensation for all work covered by this provision, including but not limited to, furnishing all materials, placing and maintaining the special stilling basin, and removal and disposal of silt accumulations and bag.

**Special Sediment Control Fence:**

Description:

The work covered by this section consists of the construction, maintenance, and removal of special sediment control fence. Place special sediment control fence as shown on the plans or as directed by the Engineer.

Materials:

(A) Posts:

Either wood or steel posts may be used. Wood posts shall be a minimum of 6 feet long , at least 3 inches in diameter, and straight enough to provide a fence without noticeable misalignment. Steel posts shall be at least 5 feet in length, approximately 1 3/8 inches wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire in the desired position without displacement.

(B) 1/4 inch Hardware Cloth:

Hardware cloth shall have 1/4 inch openings constructed from #24 gauge wire. Install hardware cloth according to the detail shown on the plans.

(C) Sediment Control Stone:

Sediment control stone shall meet the requirements of Section 1005. Install stone according to the detail shown on the plans.

Maintenance and Removal:

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed by the Engineer in accordance with Section 1630.

Measurement and Payment:

The quantity of 1/4 inch hardware cloth to be paid for will be the actual number of linear feet measured along the ground, which has been completed and accepted.

The quantity of sediment control stone will be measured according to Article 1610-4.

Payment for special sediment control fence will be as follows:

1/4 inch Hardware Cloth.....	Linear Foot
Sediment Control Stone.....	Ton

**Coir Fiber Mat:**

Description:

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed by the Engineer. Work includes providing all materials, excavating and backfilling, and placing and securing Coir Fiber Matting.

Materials:

(A) Matting:

Provide matting to meet the following requirements:

- 100 % coconut fiber (coir) twine woven into a high strength matrix.
- Thickness - 0.30 in. minimum.
- Tensile Strength - 1348 x 626 lb/ft minimum
- Elongation - 34% x 38% maximum
- Flexibility - 65030 x 29590
- Flow Velocity- Observed 11 ft/sec
- Weight - 20 oz/SY
- Size - 6.6 x 164 ft (120 SY)
- “C” Factor - 0.002
- Open Area (measured) - 50%

(B) Stakes:

Provide wooden stakes 12 in. in length with a notch cut 1 in. from top.

**Construction Methods:**

Place the matting immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the matting with the soil. Take care to preserve the required line, grade, and cross section of the area covered.

Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Bury the top slope end of each piece of matting in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the matting or as directed by the Engineer. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting at least 6 in. where 2 or more widths of matting are installed side by side.

Place stakes across the matting at ends, junctions, and check trenches approximately 1 ft. apart with notch facing upslope.

Place stakes along the outer edges and down the center of each strip of matting 3 feet apart. Place stakes along all lapped edges 1 ft. apart. Refer to details in the plan sheets.

The Engineer may require adjustments in the trenching or staking requirements to fit individual site conditions.

**Measurement and Payment:**

The quantity of coir fiber matting measured will be paid for according to the actual number of square yards measured along the surface of the ground over which coir fiber matting is installed and accepted.

The quantity of Coir Fiber Matting, measured as provided above, will be paid for at the contract unit price per square yards for "Coir Fiber Matting."

Payment will be made under:

Coir Fiber Mat..... Square Yard

**Skimmer Basin with Baffles:**

**Description:**

Provide a skimmer basin to remove sediment from construction site runoff at locations shown on the plans. Work includes constructing sediment basin, installation of coir fiber baffle, installation of Faircloth Skimmer, disposing of excess materials, providing and placing filter fabric emergency spillway liner, removing filter fabric liner and skimmer,

backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

**Material:**

Coir Fiber Mat for Baffles shall meet specifications of Special Provisions.

Steel Posts for Coir Fiber Baffles shall meet requirements of Section 1605 for Temporary Silt Fence.

Use local material or material specified on plans.

Provide filter fabric to meet requirements of Section 1056 for Type 2 fabric.

Use appropriately sized Faircloth skimmer.

**Construction requirements:**

Excavate basin according to Erosion Control plans with basin surface free of obstructions, debris, and pockets of low-density material. Construct Coir Fiber Baffles and emergency spillways according to Skimmer Basin with Baffles Detail.

Install Steel Posts for Coir Fiber Baffle according Standard Drawing No. 1605.01 for Temporary Silt Fence and according to Skimmer Basin with Baffles Detail.

Secure Coir Fiber Mat to Steel Posts with metal fasteners and staple the mat into the side slopes of the Skimmer Basin. The height of the Coir Fiber Baffle shall be 3 feet.

Install Faircloth skimmer according to manufacturer recommendations.

Utilize suitable material and provide disposal area for unsuitable material.

Line emergency spillway with fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of fabric in a trench at least five inches deep and tamp.

Make vertical overlaps a minimum of eighteen inches with upstream fabric overlapping the downstream fabric.

Secure fabric with eleven gauge wire staples shaped into a "u" shape with a length of not less than six inches and a throat not less than one inch in width. Place staples along outer edges and throughout the fabric a maximum of three feet horizontally and vertically.

**Measurement and Payment:**

Measurement of excavation will be made by the cubic yard of excavation as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Measurement of the Coir Fiber Mat will be made by the number of square yards as measured across each baffle section of the Skimmer Basin.

Measurement of filter fabric will be made by the number of square yards as measured over the surface of the ground over which filter fabric has been acceptably placed.

Measurement of skimmer will be made by the number of skimmers used.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made for the quantities as measured above under the items listed below:

Silt Excavation.....	Cubic Yard
Coir Fiber Mat.....	Square Yard
Filter Fabric for Drainage .....	Square Yard
Faircloth Skimmer.....	Each

## PROJECT SPECIAL PROVISIONS EPOXY MATERIAL

Epoxy Pavement Marking Materials

April 3, 2006

Revise the 2006 *Standard Specifications* as follows:

Page 10-220, 1087 **PAVEMENT MARKINGS:**  
Add the following:

### **Epoxy Composition.**

*Epoxy pavement marking must be composed of the following materials:*

#### *COMPONENT BY WEIGHT*

<i>BINDER - Epoxy Resin .....</i>	<i>77% Max.</i>
<i>Titanium Dioxide .....</i>	<i>18% Min.</i>
<i>(ASTM D-476-73 Type II &amp; III)</i>	
<i>Chrome Yellow .....</i>	<i>23% Min.</i>
<i>(for yellow markings)</i>	
<i>(ASTM D-211 Type III)</i>	

*The epoxy resin proportion of component A white, and component A yellow must be identical, if the same component B is used for both white and yellow.*

*Combine the two components of the resin in the manner and proportions as recommended by the manufacturer based on tested pavement marking performance.*

### **TESTS TO BE PERFORMED.**

#### **2- Epoxy Pavement Marking Material :**

##### **2.1 Formulation:**

*Use epoxy pavement marking material consisting of 100% solid two-part system formulated and designed to provide a simple volumetric mixing ratio of the two components.*

##### **2.2 Epoxide Value:      ASTM D1652**

*WPE of the epoxy resin must be 250±50 for both white and yellow component A on a pigment free basis.*

##### **2.3 Amine Value: ASTM D2074**

*The total amine value of the curing agent (component B) must be 450±50*

##### **2.4 Color:**

**White:** Daylight reflectance 2° Standard observer and CIE illuminant  
Using XYZ scale D65/10°: 75 Percent minimum.  
ASTM E-97

**Yellow:** Daylight reflectance 2° Standard observer and CIE illuminant  
Using XYZ scale D65/10°: 38 Percent minimum.  
ASTM E-97

Yellowness Index- ASTM D1925  
Maximum before QUV: 15.  
Maximum after QUV: 20.

**2.5 Hardness:** ASTM D2240

Minimum Shore D hardness: 80

**2.6 Abrasion Resistance:** ASTM C-501

Minimum wear index of catalyzed sample: 80

**2.7 Adhesion To Concrete:** ASTM D4541

At 100% concrete failure: greater than 325 psi

**2.8 Tensile Strength:** ASTM D638

Minimum average tensile strength: 6000 psi

**2.9 Compressive Strength:** ASTM D695

Minimum compressive strength: 12000 psi

**2.10 Drying Time:** ASTM D711

Maximum drying time at 75±2°F (25±.5°C): 10 minutes

**2.11 Gel Time:** ASTM D2471

Maximum gel time: 3 minutes

**MATERIAL CERTIFICATION:**

Furnish the following pavement marking material certifications in accordance with Article 106-3:

Epoxy - Type 3 Material Certification and Type 4 Material Certification

Page 12-1, 1205 PAVEMENT MARKING, MARKERS AND DELINEATION:

Add the following:



## CONSTRUCTION METHODS.

### ***Epoxy Application Equipment:***

*Use epoxy application equipment which is equipped with or capable of the following:*

- *Precisely metering the two components in the ratio of proportion recommended by the manufacturer,*
- *Producing the required amount of heat at the mixing head and gun tip,*
- *Maintaining temperatures within the tolerances recommended,*
- *Gauges for each proportioning pump so that any pressure difference can be easily monitored,*
- *A minimum 24" long static mixer unit for proper mixing of the two components of the epoxy marking material,*
- *Each component of the epoxy pavement marking must be in a homogeneous state prior to mixing,*
- *Have the capability to totally mix component A with component B immediately prior to the marking application,*
- *Have the capability to spray both yellow and white pavement marking material and have the equipment mounted on a truck of sufficient size and stability with an adequate power source to produce uniform lines of the specified dimension,*
- *A metering device to register the accumulated installed footage for each gun.*

### ***Epoxy:***

*Apply epoxy pavement marking only when the ambient air temperature and the pavement surface temperature is a minimum of 35 °F and rising.*

### ***Epoxy Application***

*Produce epoxy pavement marking lines which have a minimum dry thickness of 15 mils when placed on concrete pavements, and 20 mils when placed on asphalt pavements.*

*Use **Type I** epoxy material (fast dry) for epoxy pavement markings except when otherwise specified in the special provisions.*

***Type II** epoxy material may be used with lane closures as approved by the Engineer to allow for curing time.*

*Do not place epoxy markings on fresh asphalt pavements until 15 days have elapsed after the last asphalt is placed.*

*Using the Epoxy application equipment, apply the pavement marking materials simultaneously. Hot-spray the Epoxy Resin, mixed in accordance with the manufacturer's recommendations, onto the pavement surface within an application temperature range recommended by the manufacturer. Inject retroreflective glass beads into the molten (liquid) Epoxy Marking.*

*Individual Components: Before mixing, heat the individual components to within the temperature range of 100°F to 170°F. Do not exceed the upper limit of the manufacturer's recommended heating temperature at any time under any circumstances.*

*Mixed Material: After mixing, make sure that the application temperatures for the combined materials at the gun tip are within the temperature range recommended by the manufacturer for the particular product used.*

*Apply glass beads in the proper ratio to immediately produce a highly reflective marking. Apply "Drop-on Beads" uniformly to the surface of the epoxy pavement marking so that the beads are partially embedded and at a rate to obtain the minimum reflectance values. At the time of installation, produce in-place marking with the minimum reflectance values shown below, as obtained with LTL 2000 retroreflectometer. Maintain the retroreflectance values shown below for a minimum of 30 days from the time of placement of marking material.*

**White: 375 mcd/lux/m<sup>2</sup>**

**Yellow: 250mcd/lux/m<sup>2</sup>**

*Produce marking, which upon cooling, is uniformly reflectorized and has the ability to resist deformation caused by traffic throughout its entire length.*

***Observation Period for Thermoplastic, Heated In Place Thermoplastic, Cold Applied Plastic, and Epoxy Pavement Markings :***

*Thermoplastic and epoxy pavement markings are subject to a 180 day observation period.*

*Maintain responsibility for the pavement markings for a 180 day observation period beginning upon the satisfactory completion of all work required in the plans. Guarantee the markings under the payment and performance bond, refer to Article 109-10.*

*Have traffic operating on the facility during the entire 180 day observation period unless otherwise directed.*

*Provide pavement marking material which during the 180 day observation period, shows no signs of failure due to blistering, excessive cracking, chipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel,*

*or gasoline drippings, spilling, poor adhesion to the pavement materials, loss of reflectivity, vehicular damage, and normal wear.*

*Replace, at no additional expense to the Department, any pavement markings that do not perform satisfactorily under traffic during the 180 day observation.*

*Provide thermoplastic and epoxy marking materials that maintain minimum retroreflectance values of **325 mcd/lux/m<sup>2</sup>** for white material and **200 mcd/lux/m<sup>2</sup>** for yellow material throughout the observation period. These measurements will be taken within 30 days prior to the end of the Observation Period. The reflectance values will be taken using a LTL 2000 retroreflectometer.*

*At the end of the Observation Period, the thermoplastic pavement marking material must be within 10 mils of the initial above the pavement thickness as required in the plan. Take the thickness measurements as specified by Materials and Tests Unit Procedure PM-1.0. See the Construction Manual for details.*

*Page 12-15, 1205-10 **MEASUREMENT AND PAYMENT***

*Section 1205-10, **Pay Item**: add the following:*

*Epoxy Pavement Marking Lines (4").....Linear Foot*