August 26, 2010

REVISION OF SECTIONS 420, 605 AND 712

GEOSYNTHETICS AND GEOTEXTILES

**NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction.* It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by CDOT’s Standards and Specifications Unit. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use in projects having geotextiles or geosynthetics.

August 26, 2010

1

REVISION OF SECTIONS 420, 605 AND 712

GEOSYNTHETICS AND GEOTEXTILES

Sections 420, 605 and 712 of the Standard Specifications are hereby revised for this project as follows:

Delete subsection 420.02 and replace with the following:

**420.02** Geotextiles and geomembranes shall meet the applicable requirements of subsections 712.07 and 712.08 for the use intended. Geotextiles for erosion control for drainage or for separators may be Class 1, Class 2, or Class 3, conforming to subsection 712.08, if the class is not specified on the plans.

Asphalt cement binder for the paving geotextile shall be the same grade as the asphalt cement used for Item 403.

Paving geotextile shall be a minimum Class 3, conforming to subsection 712.08.

Subsection 420.08 shall include the following:

Geotextile for landscape weed barrier shall be a minimum Class 3, conforming to subsection 712.08.

In subsection 605.03, delete the second sentence of the first paragraph and replace with the following:

Sufficient Geotextile (Drainage) (Class 3) shall be placed along the bottom and sides of the trench as shown on the plans to provide the required overlap over the top of the filter material.

In subsection 605.05, delete the second sentence and replace with the following:

The trench shall be lined with Geotextile (Drainage) (Class 3) and filled with the designated filter material to the depth shown on the plans.

Delete subsection 712.07 and replace with the following:

**712.07 Geosynthetics.** Geosynthetic rolls shall be furnished with suitable wrapping to protect against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled to provide pro­duct identification sufficient for invento­ry and qual­ity control purposes. Rolls shall be stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover. The Contractor shall submit a certified test report from the manufacturer in accordance with subsection 106.13 including all data necessary to verify com­pliance with this specification.

Securing pins shall be made from galvanized steel wire or other approved wire material, 0.091 inch or larger in diameter. They shall be U-shaped, with legs 6 inches long and a 1 inch crown.

Physical requirements of geosynthetics shall meet or exceed what is shown in Table 712-1. Unless otherwise stated, all property values represent minimum average roll values (MARV) in the weakest principle direction. Stated values are for non-critical, non-severe conditions. Lots shall be sampled in accor­dance with ASTM D 4354.

(a) *Geomembrane.*  Geomembrane shall be manufactured ­for stopping seep­age loss­. The lining shall consist of virgin polyvi­nyl chloride (PVC) resins, plasticizers, stabi­liz­ers, and other necessary materials that, when com­pounded, shall meet or exceed the physical require­ments for the thickness spec­ified in Table 712-1.

August 26, 2010

2

REVISION OF SECTIONS 420, 605 AND 712

GEOSYNTHETICS AND GEOTEXTILES

Individual widths of PVC materials shall be fabricated into large sections by dielectric sealing into a single piece, or into a minimum number of panels, up to 100 feet wide, as required to fit the facility. Lap joints with a minimum joint width of ½ inch shall be used. After fabrication, the lining shall be accordion folded in both directions and pack­aged for minimum handling in the field. Shipping boxes shall be sub­stantial enough to prevent damage to contents.

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| **Table 712-1**  **Physical Requirements for Geomembrane** | | | | |
|  | **Thickness** | | |  |
| Property | **0.25 mm**  **(10 mil)** | **0.51 mm**  **(20 mil)** | **0.76 mm**  **(30 mil)** | **Test Method** |
| Thickness, % Tolerance  Tensile Strength, kN/m (lbs./in.) width  Modulus @ 100% Elon­gation, kN/m (lbs./in.)  Ultimate Elongation, %  Tear Resistance: ­N (lbs)  Low Temperature Im­pact, °C (°F)  Volatile loss, % max.  Pinholes, No. /8 m2 (No. Per 10 sq. Yds.) max.  Bonded Seam Strength,  % of tensile strength | ±7  3.50 (20)  1.58 (9)  350  18 (3.2)  -23 (-13)  1.5  1  80 | ±5  8.75 (50)  3.50 (20)  350  29 (6.5)  -26 (-15)  0.9  1  80 | ±5  12.25 (70)  5.25 (30)  350  38 (8.5)    -29 (-20)  0.7  1  80 | ASTM D 1593  ASTM D 882, Met­hod B  ASTM D 882, Met­hod B  ASTM D 882, Met­hod A  ASTM D 1004  ASTM D 1790  ASTM D 1203, Met­hod A |

Delete subsection 712.08 and replace with the following:

**712.08 Geotextiles.** Geotextile rolls shall be furnished with suitable wrapping to protect against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled to provide pro­duct identification sufficient for invento­ry and qual­ity control purposes. Rolls shall be stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover. The Contractor

shall submit a certified test report from the manufacturer in accordance with subsection 106.13 including all data necessary to verify com­pliance with this specification.

Securing pins shall be made from galvanized steel wire or other approved wire material, 0.091 inch or larger in diameter. They shall be U-shaped, with legs 6 inches long and a 1 inch crown.

August 26, 2010

3

REVISION OF SECTIONS 420, 605 AND 712

GEOSYNTHETICS AND GEOTEXTILES

Physical requirements for all geotextiles shall conform to the requirements of AASHTO M-288. Materials shall be selected from the New York Department of Transportation’s Approved Products List of Geosynthetic materials that meet the National Transportation Product Evaluation Program (NTPEP) and AASHTO M-288 testing requirements. The current list of products that meet these requirements is located at:

[www.dot.state.ny.us](http://www.dot.state.ny.us)

The Geotextile Approved Products List may be accessed by clicking on the following tabs once on the NYDOT site to:

1. Publications
2. more
3. site index tab
4. approved list of Materials & Equipment
5. geosynthetics for Highway Construction
6. geotextiles

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| **Table 712-2**  **Typical Values of Permeability Coefficients1** | | | | |
| **Turbulent Flow** | **Particle**  **Size Range**  **Millimeters (inches)** | | **Effective**  **Size** | **Permeability**  **Coefficientk**  **cm/s** |
| **D max** | **D min** | **D 20 mm** **(inches)** |
| Derrick STONE  One-man STONE  Clean, fine to  coarse GRAVEL  Fine, uniform GR­AVEL  Very coarse, clean,  uniform SAND | 3000 (120)  300 (12)  80 (3)  8 (⅜)  3 (⅛) | 900 (36)  100 (4)  10 (¼)  1.5 (1/16)  0.8 (1/32) | 1200 (48)  150 (6)  13 (½)  3 (⅛)  1.5 (1/16) | 100  30  10  5  3 |
| Continued on Page 5 | | | | |

August 26, 2010

4

REVISION OF SECTIONS 420, 605 AND 712

GEOSYNTHETICS AND GEOTEXTILES

|  |  |  |  |  |
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| **Table 712-2(continued)**  **Typical Values of Permeability Coefficients1** | | | | |
| **Laminar Flow** | **Particle**  **Size Range**  **Millimeters (inches)** | | **Effec­tive**  **Size** | **Per­meabi­lity**  **Coefficient-k**  **cm/s** |
| **D max** | **D min** | **D 10 mm** |
| Uniform, coarse SAND  Uniform, medium SAND  Clean, well-graded  SAND & GRAVEL  Uniform, fine SAND  Well-graded, silty  SAND & GRAVEL  Silty SAND  Uniform SILT  Sandy CLAY  Silty CLAY  CLAY (30% to  50% clay si­zes)  Colloidal CLAY  (-2 μm 50%) | 2 (⅛)  0.5    10  0.25  5  2  0.05  1.0  0.05  0.05  0.01 | 0.5 (1/64)  0.25  0.05  0.05  0.01  0.005  0.005  0.001  0.001  0.0­005  10 | 0.6  0.3    0.1  0.06  0.02  0.01  0.006  0.002  0.­0015  0.­0008  40 | 0.4  0.1  0.01  40 x 10-4  4 x 10-4  1.0 x 10-4  0.5 x 10-4  0.05 x 10-4  0.01 x 10-4  0.001 x 10-4  10-9 |
| 1 Basic Soils Engineering, R.K. Hough, 2nd Edition, Ronald Pess Co.; 1969, Page 76.  Note: Since the permeability coefficient of the soil will be unknown in most non-critical, non-severe applications for erosion control and drainage, the soil-permeability coefficients listed in Table 712-2 may be used as a guide for comparing the permeability coefficient of the fabric with that of the in-place soil. | | | | |

In subsection 712.12, second paragraph, delete the first sentence and replace with the following:

Drainage geotextile shall be a minimum Class 3, conforming to AASHTO M 288.