

*This guide specification has been prepared by Propex Operating Company, LLC. (Propex) to assist design professionals in the preparation of a specification section covering nonwoven geosynthetic as an interlayer (paving fabric) above fatigued asphalt pavement and beneath an asphalt pavement overlay to provide a permanent moisture barrier and to retard reflective cracking. It may be used as the basis for developing either a project specification or an office master specification. Since it has been prepared according to the principles established in the Manual of Practice published by The Construction Specifications Institute (CSI) including the use of section numbers and titles from the 2004 Edition of MasterFormat, this guide specification may be used in conjunction with most commercially available master specifications sections with minor editing.*

*The following should be noted in using this guide specification:*

- *Optional text requiring a selection by the user is enclosed within brackets, e.g.: “Section [01 33 00] [\_\_\_\_].”*
- *Items requiring user input are enclosed within brackets, e.g.: “Section [\_\_\_\_ - \_\_\_\_].”*
- *Optional paragraphs are separated by an “OR” statement, e.g.:*

*\*\*\*\* OR \*\*\*\**

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## **1 GENERAL**

### **1.1 SECTION INCLUDES**

*Edit the following paragraph to suit project requirements.*

- A. This specification is applicable to the use of a paving fabric saturated with asphalt cement between pavement layers.
- B. The function of the paving fabric is to act as a waterproofing and stress relieving membrane within the pavement structure.
- C. The specification is not intended to describe fabric membrane systems specifically designed for pavement joints and localized (spot) repairs.

### **1.2 RELATED SECTIONS**

*Edit the following paragraphs to coordinate with other sections of the Project Manual.*

- A. Section [31 20 00 – Earth Moving] [\_\_\_\_].
- B. Section [32 12 16 - Asphalt Paving] [\_\_\_\_].

C. Section [32 01 16 - Flexible Paving Rehabilitation] [\_\_\_\_\_].

### 1.3 UNIT PRICES

*Include the following article only for unit price contracts or lump sum contract with unit price adjustments. Delete for lump sum contracts.*

- A. Method of Measurement: By the square meter (or square yard as indicated in contract documents) including seams, overlaps, and wastage.
- B. Basis of Payment: By the square meter (or square yard - as indicated in contract documents) installed.

### 1.4 REFERENCES

*The following article assumes that the date of each reference standard will be the latest edition as of the date of the project specification. This provision must be defined in Division 1; coordinate with Division 1 statements.*

- A. American Association of State Highway and Transportation Officials (AASHTO) "Standard Specification for Geotextile Specification for Highway Applications" Designation M 288-05.
- B. Texas Department of Transportation, Manual of Testing Procedures: TEX-616-J: Asphalt Retention and Potential Change of Area.
- C. American Society for Testing and Materials (ASTM):
  - 1. D 276 - Method for Identification of Fibers in Textiles (Melting Point).
  - 2. D 4354 - Practice for Sampling of Geosynthetics for Testing.
  - 3. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
  - 4. D 4439 - Terminology for Geotextiles.
  - 5. D 4533 - Test Method for Index Trapezoid Tearing Strength of Geotextiles.
  - 6. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.
  - 7. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.
  - 8. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.
  - 9. D 5199 - Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
  - 10. D 5261 - Test Method for Measuring Mass per Unit Area of Geotextiles.
- D. Geosynthetic Accreditation Institute - Laboratory Accreditation Program (GAI-LAP).

### 1.5 DEFINITIONS

- A. *Maximum Average Roll Value (MaxARV)*: Property value calculated as typical plus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will be below the value reported.
- B. *Minimum Average Roll Value (MARV)*: Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.
- C. *Typical Roll Value*: Property value calculated from average or mean obtained from test data.

### 1.6 SUBMITTALS

*Edit the following to coordinate with Division 1.*

- A. Submit under provisions of Section [01 33 00] [\_\_\_\_\_]:
  - 1. Certification:

- a) The Contractor shall provide the Engineer a certificate stating the name of the geotextile manufacturer, product name, style, chemical compositions of filaments or yarns and other pertinent information to fully describe the geotextile.
- b) The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.
- c) The manufacturer's certificate shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the manufacturer's quality control program. A person having legal authority to bind the Manufacturer shall attest to the certificate.

2. Manufacturing Quality Control (MQC) test results shall be provided upon request.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Geotextile labeling, shipment and storage shall follow ASTM D 4873.
- B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.
- C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.
- D. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.
- E. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap of geotextile material must be discarded before installation.
- F. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71 deg C (160 deg F) and any other environmental condition that might damage the geotextile.

#### 1.8 QUALITY ASSURANCE SAMPLING, TESTING, AND ACCEPTANCE

- A. Geotextile:
  1. Geotextiles shall be subject to sampling and testing to verify conformance with this specification. Sampling for testing shall be in accordance with ASTM D 4354.
  2. Acceptance shall be in accordance with ASTM D 4759 based on testing of either conformance samples obtained using Procedure A of ASTM D 4354, or based on manufacturer's certifications and testing of quality control samples obtained using Procedure B of ASTM D 4354.
- B. Sewn Seams (if required):
  1. For seams that are to be sewn in the field, the Contractor shall provide at least a 2 meter (6 ft) length of sewn seam for sampling by the Engineer before the geotextile is installed.
  2. For seams that are sewn in the factory, the Engineer shall obtain samples of the factory seams at random from and roll of geotextile that is to be used on the project.
  3. If seams are to be sewn in both directions, samples of seams from both directions shall be provided.
  4. For seams that are field sewn, the seams sewn for sampling shall be sewn using the same equipment and procedures as will be used for the production seams.
  5. The Contractor along with the sample of the seam shall submit the seam assembly description. The description shall include the seam type, sewing thread, and stitch density.
  6. Do not expose geosynthetics to elements over 14 days between installation and placement of cover.

**2 PRODUCTS**

**2.1 MANUFACTURERS**

- A. Propex Operating Company, LLC, Chattanooga, Tennessee, 37419 USA, Phone (800) 621-1273.

*Edit the following to coordinate with Division 1.*

- B. Substitutions: Under provisions of Section [01 25 00] [\_\_\_\_\_].

**2.2 MATERIALS**

- A. PETROMAT® 4598:

1. The geotextile construction shall be a needlepunched nonwoven geotextile composed of 75% polypropylene and 25% recycled polyester, staple fiber, calendared on one side.
2. The geotextile should be resistant to ultraviolet degradation. Minimum Average Roll Values:
3. The geotextile should meet the following Minimum Average Roll Values (MARV) for woven geotextile:

Property	Test Method	Units	Property Requirement
Grab Tensile Strength	ASTM D 4632	N (lbs)	450 (101)
Grab Elongation	ASTM D 4632	percent	50
Mass Per Unit Area	ASTM D 5261	g/m <sup>2</sup> (oz/yd <sup>2</sup> )	140 (4.1)
Asphalt Retention	ASTM D 6140	l/m <sup>2</sup> (gal/yd <sup>2</sup> )	0.9 (0.20)
Melting Point	ASTM D 276	Degrees C (Degrees F)	160 (320)
UV Resistance	ASTM D 4355	percent	70 at 150 hrs

\*\*\*OR\*\*\*

- B. PETROMAT® 4599:

1. The geotextile construction shall be a needlepunched nonwoven geotextile composed of 75% polypropylene and 25% recycled polyester, staple fiber, calendared on one side.
2. The geotextile should be resistant to ultraviolet degradation. Minimum Average Roll Values:
3. The geotextile should meet the following Minimum Average Roll Values (MARV) for woven geotextile:

Property	Test Method	Units	Property Requirement
Grab Tensile Strength	ASTM D 4632	N (lbs)	400 (90)
Grab Elongation	ASTM D 4632	percent	50
Mass Per Unit Area	ASTM D 5261	g/m <sup>2</sup> (oz/yd <sup>2</sup> )	122 (3.6)
Asphalt Retention	ASTM D 6140	l/m <sup>2</sup> (gal/yd <sup>2</sup> )	0.9 (0.20)

Melting Point	ASTM D 276	Degrees C (Degrees F)	160 (320)
UV Resistance	ASTM D 4355	percent	70 at 150 hrs

4. **QUALITY CONTROL**

- a) **Manufacturing Quality Control (MQC):** Testing shall be performed at a laboratory accredited by GAI-LAP for tests required for the geotextile, at frequency exceeding ASTM D 4354.

C. **Tack Coat:**

1. The sealant material used to impregnate and seal the geotextile, as well as bond it to both the base pavement and overlay, shall be a paving grade asphalt recommended by the geotextile manufacturer and approved by the Engineer.
2. Uncut asphalt cements are the preferred sealants; however, cationic and anionic emulsions may be used. Cutbacks and emulsions, which contain solvents, shall not be used.
3. The grade of asphalt cement specified for hot-mix design in each geographic location is generally the most acceptable material.

D. **Equipment:**

1. The asphalt distributor shall be capable of spraying the asphalt sealant at the prescribed uniform application rate. No streaking, skipping, or dripping will be permitted. The distributor shall also be equipped with a hand spray having a single nozzle and positive shut-off valve.
2. Mechanical or manual lay down equipment shall be capable of laying the geotextile smoothly.
3. The following miscellaneous equipment shall be provided: stiff bristle brooms or squeegees to smooth the geotextile; scissors or blades to cut the geotextile; brushes for applying asphalt sealant to geotextile overlaps.
4. Pneumatic rolling equipment to smooth the geotextile into the sealant, and sanding equipment may be required for certain jobs. Rolling is especially required on jobs where thin lifts or chip seals are being placed. Rolling helps ensure the geotextile bond to the adjoining pavement layers in the absence of heat and weight associated with thicker lifts of asphaltic pavement.

**3 EXECUTION**

3.1 **PREPARATION**

- A. Washed concrete sand may be spread over an asphalt-saturated geotextile to facilitate movement of equipment during construction or to prevent tearing or delamination of the geotextile. Hot-mix broadcast in front of construction vehicle tires may also serve this purpose. If sand is applied, excess quantities shall be removed from the geotextile prior to placing the surface course.
- B. Sand is not usually required. However, ambient temperatures are occasionally sufficiently high to cause bleed-through of the asphalt sealant resulting in undesirable geotextile adhesion to construction vehicle tires.
- C. Neither the asphalt sealant nor the geotextile shall be placed when weather conditions, in the opinion of the Engineer, are not suitable. Air and pavement temperatures shall be sufficient to allow the asphalt sealant to hold the geotextile in place. For asphalt cements, air temperature shall be 10°C and rising. For asphalt emulsions, air temperature shall be 15°C (60°F) and rising.
- D. The surface on which the geotextile is to be placed shall be reasonably free of dirt, water, vegetation, or other debris. Cracks exceeding 3 mm (1/8 in) in width shall be filled with suitable crack filler. Potholes shall be properly repaired as directed by the Engineer. Fillers shall be allowed to cure prior to geotextile placement.

3.2 INSTALLATION OF TACK COAT

- A. The specified rate of asphalt sealant application must be sufficient to satisfy the asphalt retention properties of the geotextile and bond the geotextile and overlay to the old pavement.
- B. When emulsions are used, the application rate must be increased to offset water content of the emulsion.
- C. Application of the sealant shall be by distributor spray bar, with hand spraying kept to a minimum. Temperature of the asphalt sealant shall be sufficiently high to permit uniform spray pattern. For asphalt cements the minimum temperature shall be 150°C (300°F). To avoid damage to the geotextile, however, the distributor tank temperatures shall not exceed 160°C (320°F).
- D. A spray pattern for asphalt emulsion is improved by heating. Temperatures in the 55°C (130°F) to 70°C (160°F) range are desirable. A temperature of 70°C (160°F) shall not be exceeded since higher temperatures may break emulsion.
- E. The target width of asphalt sealant application shall be the geotextile width plus 150 mm (6 in). The asphalt sealant shall not be applied any farther in advance of geotextile placement than the distance the Contractor can maintain free of traffic.
- F. Asphalt spills shall be cleaned from the road surface to avoid flushing and geotextile movement.
- G. When asphalt emulsions are used, the emulsion shall be cured prior to placing the geotextile and final wearing surface. This means essentially no moisture remaining.

3.3 INSTALLATION OF THE GEOSYNTHETIC (PAVING FABRIC)

- A. The geotextile shall be placed onto the asphalt sealant (calendared or smooth side up) with minimum wrinkling prior to the time the asphalt has cooled and lost tackiness. As directed by the Engineer, wrinkles or folds in excess of 25 mm (1 in) shall be slit and laid flat.
- B. Blooming and/or pneumatic rolling will be required to maximize geotextile contact with the pavement surface.
- C. Overlap of geotextile joints shall be sufficient to ensure full closure of the joint, but should not exceed 150 mm. Transverse joints shall be lapped in the direction of paving to prevent edge pickup by the paver. A second application of asphalt sealant to the geotextile overlaps will be required if in the judgement of the Engineer additional asphalt sealant is needed to ensure proper bonding of the double geotextile layer.
- D. Removal and replacement of geotextile that is damaged will be the responsibility of the Contractor.

3.4 PROTECTION

- A. Trafficking the geotextile will be permitted for emergency and construction vehicles only.
- B. Placement of the hot-mix overlay should closely follow geotextile laydown. The temperature of the mix shall not exceed 160°C (320°F). In the event asphalt bleeds through the geotextile causing construction problems before the overlay is placed, the affected areas shall be blotted by spreading sand. To avoid movement of, or damage to the seal-coat saturated geotextile, turning of the paver and other vehicles shall be gradual and kept to a minimum.
- C. Prior to placing a seal coat (or thin overlay such as an open-graded friction course), lightly sand the geotextile at a spread rate of 0.65 to kg per m<sup>2</sup> (0.15 to 0.20 lb/ft<sup>2</sup>), and pneumatically roll the geotextile tightly into the sealant.

**END OF SECTION**