**GEOSYNTHETICS:**

|  |  |  |
| --- | --- | --- |
| (03-21-23)(Rev. 4-18-23) | 1056 | SP10 R56 |

Revise the *Standard Specifications* as follows:

**Page 10-77, Article 1056-1 DESCRIPTION, lines 13-16**, delete and replace the second sentence in the second paragraph with the following:

Steel anchor pins shall have a diameter of at least 3/16 inch, a length of at least 18 inches, a point at one end and a head at the other end that will retain a steel washer with an outside diameter of at least 1.5 inches.

**Page 10-77, Article 1056-2 HANDLING AND STORING, lines 20-21**, delete and replace the third sentence in the first paragraph with the following:

Geosynthetics with defects, flaws, deterioration or damage will be rejected by the Engineer.

**Page 10-77, Article 1056-3 CERTIFICATIONS AND IDENTIFICATION, lines 25-27**, delete and replace the first sentence in the first paragraph with the following:

Provide Type 1, Type 2 or Type 4 material certifications in accordance with Article 106-3 for geosynthetics except certifications are not required for Type 1 through Type 5 geotextiles.

**Page 10-77, Article 1056-3 CERTIFICATIONS AND IDENTIFICATION, lines 32-35**, delete the second paragraph.

**Page 10-77, Article 1056-3 CERTIFICATIONS AND IDENTIFICATION, lines 36-41**, delete and replace the third paragraph with the following:

Allow the Engineer to visually identify geosynthetic products before installation. Open packaged geosynthetics just before use in the presence of the Engineer to verify the correct product. Geosynthetics that are missing original packaging or product labels or that have been unwrapped or previously opened will be rejected unless otherwise approved by the Engineer.

**Page 10-77, Article 1056-4 GEOTEXTILES, lines 43-45**, delete the first paragraph.

**Page 10-78, Article 1056-4 GEOTEXTILES, before line 1 and lines 1-5**, delete Table 1056-1 and lines 1-5 and replace with the following:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TABLE 1056-1 GEOTEXTILE REQUIREMENTS** | | | | | | |
| **PropertyA** | **Requirement (MARVA)** | | | | | **Test Method** |
| **Type 1** | **Type 2** | **Type 3B** | **Type 4** | **Type 5C** |
| *Typical Application* | *Shoulder Drains* | *Under Rip Rap* | *Silt Fence Fabric* | *Soil Stabilization* | *Subgrade*  *Stabilization* |
| Elongation  (MD & CD) | ≥ 50% | ≥ 50% | ≤ 25% | < 50% | < 50% | ASTM D4632 |
| Grab Strength  (MD & CD)**A** | Table 1**D**, Class 3 | Table 1**D**, Class 1 | 100 lb | Table 1**D**, Class 3 | – | ASTM D4632 |
| Tear Strength  (MD & CD)**A** | – | ASTM D4533 |
| Puncture Strength | – | ASTM D6241 |
| Ultimate Tensile Strength  (MD & CD)**A** | – | – | – | – | Table 12**D**, Class 4A | ASTM D4595 |
| Permittivity | Table 2**D**,  15% to 50% *in Situ* Soil  Passing 0.075 mm | Table 6**D**,  15% to 50% *in Situ* Soil  Passing 0.075 mm | Table 7**D** | Table 5**D** | Table 12**D**, Class 4A | ASTM D4491 |
| Apparent  Opening Size | ASTM D4751 |
| UV Stability  (Retained Strength) | ASTM D4355 |

**A.** MD, CD and MARV per Article 1056-3.

**B.** Minimum roll width of 36 inches required.

**C.** Minimum roll width of 13 feet required unless otherwise approved by the Engineer for the application.

**D.** Per AASHTO M 288.

**Page 10-78, Article 1056-5 GEOCOMPOSITE DRAINS, before line 9 and lines 9-10**, delete Table 1056-2 and lines 9-10 and replace with the following:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **TABLE 1056-2 GEOCOMPOSITE DRAIN REQUIREMENTS** | | | | |
| **Property** | **Requirement** | | | **Test Method** |
| **Sheet Drain** | **Strip Drain** | **Wick Drain** |
| Width | ≥ 12" | 12" ±1/4" | 4" ±1/4" | N/A |
| In-Plane Flow Rate**A**  (with gradient of 1.0 and 24-hour seating period) | 6 gpm/ft  @ applied normal compressive stress of 10 psi | 15 gpm/ft  @ applied normal compressive stress of 7.26 psi | 1.5 gpm**B**  @ applied normal compressive stress of 1.45 psi | ASTM D4716 |

**A.** MARV per Article 1056-3.

**B.** Per foot of width tested.

**Page 10-79, Article 1056-5 GEOCOMPOSITE DRAINS, before line 3**, delete Table 1056-3 and replace with the following:

|  |  |  |  |
| --- | --- | --- | --- |
| **TABLE 1056-3 DRAINAGE CORE REQUIREMENTS** | | | |
| **Property** | **Requirement** | | **Test Method** |
| **Sheet Drain** | **Strip Drain** |  |
| Thickness | 1/4" | 1" | ASTM D1777 or  D5199 |
| Compressive Strength**A** | 40 psi | 30 psi | ASTM D6364 |

**A.** MARV per Article 1056-3.

**Page 10-79, Article 1056-5 GEOCOMPOSITE DRAINS, before line 6 and lines 6-11**, delete Table 1056-4, lines 6-7 and the last paragraph and replace with the following:

|  |  |  |
| --- | --- | --- |
| **TABLE 1056-4 WICK DRAIN GEOTEXTILE REQUIREMENTS** | | |
| **Property** | **Requirement** | **Test Method** |
| Elongation | ≥ 50% | ASTM D4632 |
| Grab Strength | Table 1**A**,  Class 3 | ASTM D4632 |
| Tear Strength | ASTM D4533 |
| Puncture Strength | ASTM D6241 |
| Permittivity**B** | 0.7 sec-1 | ASTM D4491 |
| Apparent Opening Size  (AOS) | Table 2**A**,  > 50% *in Situ* Soil  Passing 0.075 mm | ASTM D4751 |
| UV Stability  (Retained Strength) | ASTM D4355 |

**A.** Per AASHTO M 288.

**B.** MARV per Article 1056-3.

For wick drains with a geotextile fused to both faces of a corrugated drainage core along the peaks of the corrugations, use wick drains with an ultimate tensile strength of at least 1,650 lbs. per 4 inch width in accordance with ASTM D4595 and geotextiles with a permittivity, AOS and UV stability that meet Table 1056-4.

**Page 10-80, Article 1056-6 GEOCELLS, before line 1 and lines 1-4**, delete Table 1056-5 and lines 1-4 and replace with the following:

|  |  |  |
| --- | --- | --- |
| **TABLE 1056-5 GEOCELL REQUIREMENTS** | | |
| **Property** | **Requirement** | **Test Method** |
| Cell Depth | 4" | N/A |
| Fully Expanded Cell Area | 100 sq.in. max | N/A |
| Sheet Thickness | 50 mil -5%, +10% | ASTM D5199 |
| Density | 58.4 pcf min | ASTM D1505 |
| Carbon Black Content | 1.5% min | ASTM D1603 or D4218 |
| ESCR**A** | 5000 hr min | ASTM D1693 |
| Coefficient of Direct Sliding  (with material that meets AASHTO  M 145 for soil classification A-2) | 0.85 min | ASTM D5321 |
| Short-Term Seam (Peel)  Strength (for 4" seam) | 320 lb min | USACE**C** Technical Report GL-86-19, Appendix A |
| Long-Term Seam (Hang)  Strength**B** (for 4" seam) | 160 lb min |

**A.** Environmental Stress Crack Resistance.

**B.** Minimum test period of 168 hours with a temperature change from 74°F to 130°F in 1-hour cycles.

**C.** US Army Corps of Engineers (USACE).