

**SECTION 33 46 23.19 (MF 04)**  
(Formerly 2629 MF 95)

**GEOSYNTHETIC DRAINAGE LAYERS**

Date: 22MAY07

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes: \*\*
1. Combination subdrainage system material at horizontal waterproofed plaza slabs \*\* or \*\* planters \*\* as complete designed working drainage system channeling liquid water to drainage piping system specified elsewhere.
  2. Subdrainage system material at horizontal waterproofed plaza slabs \*\* or \*\* planters \*\* as complete designed working drainage system channeling liquid water to drainage piping system specified elsewhere.

SPEC NOTE: MAKE SELECTIONS OF RELATED SECTIONS: DELETE OTHERS: ADD RELATED SECTIONS FOR COVER MATERIAL.

SPEC NOTE: USE 06 10 00 IF WOOD STRIPS ARE USED.

SPEC NOTE: DELETE 01 25 13 IF NO SUBSTITUTIONS ARE ALLOWED OR YOU HAVE COORDINATED FRONT END DOCUMENTS THAT NEED NO ACTUAL REFERENCE TO DIVISION 01

- B. Related sections:
1. 03 30 00 Cast-in-Place Concrete.
  - \*\*2. 06 10 00 Rough Carpentry.
  3. 07 12 10 Waterproofing.
  4. 07 13 00 Membrane Waterproofing.
  5. 07 14 16 Cold Fluid-Applied Waterproofing.
  6. 07 17 00 Bentonite Waterproofing.

**1.02 REFERENCES AND INDUSTRY STANDARDS**

- A. Standards of the following as referenced:
1. American Society for Testing and Materials (ASTM).
  2. Underwriters Laboratories (UL) Class A

**1.03 DEFINITIONS**

- A. Terms 1 through 4 taken from ASTM D4439:
1. Geotextile: Any permeable textile used with foundation, soil, rock, earth, or any other geotechnical material, as an integral part of man-made product, structure, or system.
  2. Normal direction: Direction perpendicular to the plane of a geotextile.
  3. Permittivity: Volumetric flow rate of water per unit cross sectional area per unit head under laminar flow conditions, in the normal direction through a geotextile.
  4. Permeability: Rate of flow of a liquid under a differential pressure through a material.
  5. Transmissivity: Flow or amount of liquid water per foot of material width passing through composite system at certain maximum soil pressure against geotextile at defined hydraulic gradient.

#### 1.04 SYSTEM DESCRIPTION

SPEC NOTE: UV RESISTANCE REQUIREMENTS NECESSARY TO ALLOW BACKFILL OR COVER MATERIAL IS IN PLACE 60 DAYS MAXIMUM FROM INSTALLATION, ALTHOUGH NOT IMMEDIATELY REQUIRED IF WEATHER AND CONSTRUCTION SEQUENCING DO NOT PERMIT.

- A. Performance requirements:
  - 1. Geotextile:
    - a. UV resistance: 70% or more when tested in accord with ASTM D4355-02.
    - b. Permittivity: 150 gal/min/ft<sup>2</sup> (6105 l/min/m<sup>2</sup>) when tested in accord with ASTM D4491-03.
  - 2. Core material, compressive strength: Specified in PART 2 - PRODUCTS Article below for selected materials.
  - 3. Transmissivity or Flow Q with hydraulic gradient of 1 with confining stress indicated in MANUFACTURED UNITS Article in accord with ASTM D4716-04.

#### 1.04 SUBMITTALS

- A. Product data: Manufacturer's product data; indicate products supplied. Provide complete installation instructions proposed for use.
- B. Samples:
  - 1. Subdrainage system material: 4" by 4".

#### 1.05 QUALITY ASSURANCE

- A. Preinstallation conferences: Coordinate with conference scheduled for waterproofing materials. Follow requirements indicated in waterproofing materials section.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing and shipping: Provide materials in original unopened containers with manufacturer's labels intact and legible.
- B. Acceptance at site:
  - 1. Unload materials: check for damage.
  - 2. Damaged materials determined by visual inspection will not be accepted.
  - 3. Remove rejected materials from site immediately.
- C. Storage and protection:
  - 1. Store materials in dry area in manufacturer's protective packaging in original containers with labels and installation instructions intact.
  - 2. Store materials under cover, off ground; protect from sunlight.
  - 3. Do not expose to hydrocarbons.

**1.07 SEQUENCING AND SCHEDULING**

SPEC NOTE: DELETE PROTECTION BOARD FOR 1000 SERIES.

- A. Schedule subdrainage material installation on horizontal surfaces after waterproofing installation and curing \*\* and protection board placement \*\* and just prior to installation of cover material.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURED UNITS**

**A. Basis of Design:**

- 1. Products specified as standard of quality are manufactured by:

**JDR Enterprises, Inc.**  
 292 South Main Street Suite 200  
 Alpharetta, Georgia 30004.  
 Telephone: 800.843.7569 or 770.442.1461. Fax: 770.664.7951.  
 Website: [www.j-drain.com](http://www.j-drain.com)

- 2. Products of other manufacturers similar in type and quality are acceptable, subject to compliance with specified \*\* requirements.  
 \*\* requirements and submission of required data indicated in Product Substitution Procedures Section.

SPEC NOTE:

PRODUCT SELECTION GUIDE			
Application	Selection	Application	Selection
Foundation walls >20 ft.	300, 400, or 420*, 400XL, 420XL	Foundation walls <20 ft.	200 or 220*
Retaining walls >20 ft.	300, 302 or 400, 400XL	Retaining walls < 20 ft.	200
Retaining/Foundation Walls	Modular Drainage System		
Underslab (On grade)	400, 400 XL	Under slab (On grade)	302 (Heavy Duty)
Plaza decks (Regular)	400, 420*, 400XL, 420XL, 700, or 720*	Plaza decks (Vehicular)	300 or 1000*
Crib walls	302 or 400	Crib walls <20 ft.	200
Roof membrane assembly	400 or 420*	Roof gardens & planters	400, 420*, 700, or GRS
Split slab (Regular)	400, 420*, 400XL, 420XL 700, or 720*	Split slab (H.D. vehicular)	302, 1000*
Edge drains	SWD-6 or SWD-12	Trench drains	SWD-12, SWD-18, 302
Lagging walls	400, 400XL or 302		
(*) Compatible with waterproofing membranes WITHOUT protection layer - Visit web site at <a href="http://www.j-drain.com">http://www.j-drain.com</a>			

**B. GEONET DRAINAGE SYSTEM material, characteristics:**

1. Type: **JDR Enterprises, Inc.; J-DRain; \*\***
  - \*\* **300 Series**; extra heavy duty core, single sided fabric ( providing drainage and filtration from one side only).
  - \*\* **302 Series**; extra heavy duty core, double sided fabric (providing drainage and filtration from both sides).
  - \*\* **1000 Series**; extra heavy duty core, double sided heavy duty nonwoven fabric (providing drainage and filtration from both sides while providing protection for waterproofing systems requiring a protection layer).
  
2. **CORE:**
  - a. Material: Extruded HDPE; High Density Polyethylene Polymer, 0.945 density.
  - b. Thickness: 0.25" (0.635 cm), nominal, normal duty.
  - c. Compressive strength: 40,000 PSF (1915 kN/m<sup>2</sup>).
  
3. **GEOTEXTILE:**
  - a. Material: Non-woven needle punch polypropylene.
  - b. Weight: 4.0 oz. per square yard (136 g/m<sup>2</sup>), minimum.
  - c. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
  - d. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.

SPEC NOTE: SEVERAL GEOTEXTILE FABRICATION TECHNIQUES ARE AVAILABLE FOR PROVIDING FLOW THROUGH FABRIC: NON-WOVEN AND WOVEN FABRICS.

SPEC NOTE: NON-WOVEN FABRICS CAN BE NEEDLE PUNCHED, SPUN BONDED OR CHEMICALLY TREATED (SELDOM USED ANYMORE).

SPEC NOTE: TWO FABRICATION TECHNIQUES BOND GEOTEXTILE TO CORE, PRESSURE SENSITIVE ADHESIVE AND HEAT LANCING.

SPEC NOTE: USING PRESSURE SENSITIVE ADHESIVE ALLOWS EASIER INSTALLATION AT CUTS BY PULLING FABRIC OFF CORE AND REAPPLYING. HEAT LANCING ACTUALLY MELTS CORE MATERIAL TO FABRIC.

4. Bonding core material to geotextile: Manufacturer's standard heat lancing.

SPEC NOTE: SELECT SAME SERIES AS SPECIFIED ABOVE FOR FLOW Q.

5. Flow Q of Polyethylene Core when tested in accord with ASTM D4716-01 with hydraulic gradient of 1 with confining stress of 3600 PSF: \*\*
  - \*\* **300 Series**: 8.5 gallons/min/ft. (106.0 lpm/m) width in accord with ASTM D4716-01.
  - \*\* **302 Series**: 8.5 gallons/min/ft. (106.0 lpm/m) width in accord with ASTM D4716-01.
  - \*\* **1000 Series**: 8.5 gallons/min/ft. (106.0 lpm/m) width in accord with ASTM D4716-01.

SPEC NOTE: JDRAIN 200/220, 400/420, and 700/720 SERIES ARE Dimpled Core PRODUCTS with LESS COMPRESSIVE STRENGTH THAN JDRAIN 300 and 1000 - SIMILAR TO COMPETITIVE Dimpled Products FOR COMPRESSIVE STRENGTH - NOT PREFERRED FOR HORIZONTAL APPLICATION WITH EXTREMELY HEAVY LOADS or VEHICULAR TRAFFIC

SPEC NOTE: 220, 420, and 720 HAVE PROTECTIVE SHEET TO PREVENT INTRUSION OF WATERPROOFING MEMBRANE INTO DIMPLED CORE.

C. **DIMPLE CORE DRAINAGE SYSTEM material**, characteristics:

1. Type: **JDR Enterprises, Inc.; J-DRain**; \*\*
  - \*\* **200 Series**; normal duty core, single sided nonwoven fabric.
  - \*\* **220 Series**; normal duty core, single sided nonwoven fabric with protective sheet on dimpled core.
  - \*\* **400 Series**; moderate duty core, single sided nonwoven fabric.
  - \*\* **420 Series**; moderate duty core, single sided nonwoven fabric with protective sheet on dimpled core.
  - \*\* **400 XL Series**; extra heavy duty core, heavy duty single sided nonwoven fabric.
  - \*\* **420 XL Series**; extra heavy duty core, heavy duty single sided nonwoven fabric with protective sheet on dimpled core.
  - \*\* **700 Series**; heavy duty core, single sided woven fabric.
  - \*\* **720 Series**; heavy duty core, single sided woven fabric with protective sheet on dimpled core.

2. **CORE:**

- a. Material: High impact polypropylene.
- b. Type: Formed dimpled core.
- c. Compressive strength: \*\*
  - \*\* **200/220 Series**: 11,000 PSF (527 kN/m<sup>2</sup>).
  - \*\* **400/420 Series**: 15,000 PSF (718 kN/m<sup>2</sup>).
  - \*\* **400XL/420XL Series**: 16,500 PSF (790 kN/m<sup>2</sup>).
  - \*\* **700/720 Series**: 21,000 PSF (1005 kN/m<sup>2</sup>).

3. **GEOTEXTILE**: \*\*

**\*\*200/220/400/420 Series:**

- a. Material: Nonwoven needle punch polypropylene.
- b. Weight: 4.0 oz. per square yard (136 g/m<sup>2</sup>), minimum.
- c. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
- d. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.

**\*\*400XL/420XL Series:**

- a. Material: Nonwoven needle punch polypropylene.
- b. Weight: 6.0 oz. per square yard (203 g/m<sup>2</sup>), minimum.
- c. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
- d. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.

**\*\*700/720 Series:**

- a. Material: Woven monofilament polypropylene.
- b. Weight: 5.6 oz. per square yard (190 g/m<sup>2</sup>), minimum.
- e. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
- f. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.

4. Adhesive bonding core material to geotextile: Pressure sensitive applied to core, manufacturer's standard.

**SPEC NOTE: SELECT SAME SERIES AS SPECIFIED ABOVE FOR FLOW Q.**

5. Flow Q of Polypropylene Core when tested in accord with ASTM D4716-01 with hydraulic gradient of 1 with confining stress of 3600 PSF: \*\*
  - \*\* **200 Series:** 18.0 gallons/min/ft. (223 lpm/m) width in accord with ASTM D4716-01.
  - \*\* **400 Series:** 21.0 gallons/min/ft. (261 lpm/m) width in accord with ASTM D4716-01.
  - \*\* **400XL Series:** 21.0 gallons/min/ft. (261 lpm/m) width in accord with ASTM D4716-01.
  - \*\* **700 Series:** 23.0 gallons/min/ft. (286.0 lpm/m) width in accord with ASTM D4716-01.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Verification of conditions:
  1. Examine conditions and substrates where products specified in this section are installed; submit written notification of unacceptable conditions or substrates.
  2. Submit copy of installer's report to Architect within 72 hours of report receipt.
  3. Proceeding with construction activities of this section:
    - a. Indicates acceptance of conditions or substrates.
    - b. Additional work in this section due to pre-existing conditions not noted will not be paid as extra.

**3.02 INSTALLATION**

- A. Horizontal plaza slab and planter installation, general:
  1. Roll out subdrainage system material to cover entire deck surface in accord with manufacturer's reviewed installation instructions with core material facing protection board.
  2. Butt adjacent panels; lap geotextile fabric and use adhesive to bond adjacent fabric panels in accord with manufacturer's installation instructions.
  3. Make cuts at deck drains in accord with subdrainage system material manufacturer's reviewed details to allow water flow to deck drains.

**END OF SECTION 33 46 23.19**