

SECTION 33 46 16.16 (MF 04)
(Formerly 2621 MF 95)

GEOCOMPOSITE FOUNDATION DRAINAGE

Date: 22MAY07

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: **
- A. Section includes: Subdrainage system material at vertical ** waterproofed walls ** lagging ** as complete designed working drainage system channeling liquid water to **
 - 1. ** drainage piping system specified elsewhere.
 - 2. ** Modular Chimney Drainage System specified in this Section; connection to piping system specified elsewhere.
 - 3. ** Vertical Collection System specified in this Section; connection to 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.

1.01 RELATED SECTIONS

- 1. 01 25 13 Product Substitution Procedures.
- 2. 03 30 00 Cast-in-Place Concrete.
- **3. 06 10 00 Rough Carpentry.
- 4. 07 12 10 Waterproofing.
- 5. 07 13 00 Membrane Waterproofing.
- 6. 07 14 16 Cold Fluid-Applied Waterproofing.
- 7. 07 17 00 Bentonite Waterproofing.
- 8. 31 20 00 Earth Moving.
- 9. 31 23 10 Building Excavation and Fill.

1.03 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

1.04 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.

1.05 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/ft² (6105 l/min/m²) when tested in accord with ASTM D4491-99a.
 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 D4716-01.

1.06 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".
 - **2. Modular chimney drainage system material: 4" length.
 - **3. SWD collection drainage system material: 4" length.

1.07 QUALITY ASSURANCE

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

1.08 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 aromatic hydrocarbons.

1.09 SEQUENCING AND SCHEDULING

- A. Schedule installation after waterproofing installation and curing and protection board placement just prior to backfilling operations.

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

- 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 http://www.j-drain.com			

B. GEONET DRAINAGE SYSTEM material, characteristics:

1. Type: **JDR Enterprises, Inc.; J-DRain; ****
 - ** **300 Series**; extra heavy duty core, single sided nonwoven fabric (providing drainage and filtration from one side only).
 - ** **302 Series**; extra heavy duty core, double sided nonwoven 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/m²).

3. **GEOTEXTILE:**
 - a. Material: Nonwoven needle punch polypropylene.
 - b. Weight: 4.0 oz. per square yard (136 g/m²), 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. 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 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: 400 SERIES IS SIMILAR TO 300 SERIES BUT DIMPLED CORE.

SPEC NOTE: 420 SERIES HAS A PROTECTIVE SHEET TO PREVENT INTRUSION OF WATERPROOF 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/m²).
- ** **400/420 Series:** 15,000 PSF (718 kN/m²).
- ** **400XL/420XL Series:** 16,500 PSF (790 kN/m²).
- ** **700/720 Series:** 21,000 PSF (1005 kN/m²).

3. **GEOTEXTILE:** **

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

- a. Material: Nonwoven needle punch polypropylene.
- b. Weight: 4.0 oz. per square yard (136 g/m²), 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/m²), 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/m²), 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.

SPEC NOTE: SWD-6 MODULAR CHIMNEY DRAINAGE SYSTEM SPECIFIED IN THIS SECTION PROVIDES VERY ECONOMICAL WALL DRAINAGE SYSTEM. CHIMNEYS ARE PLACED ON 4' to 8' CENTERS.

SPEC NOTE: SWD-6 CAN ALSO BE USED TO REPLACE PIPE COLLECTION SYSTEM.

SPEC NOTE: END OUT AND SIDE OUT FITTINGS ARE AVAILABLE TO TRANSITION TO COLLECTION PIPE SPECIFIED IN ANOTHER SECTION.

SPEC NOTE: USE AT DEEPER FOUNDATIONS REQUIRE CONSULTATION WITH **JDR ENTERPRISES, INC.**, FOR APPROPRIATE DESIGN.

D. **MODULAR CHIMNEY DRAINAGE SYSTEM material**, characteristics:

- 1. Type: JDR Enterprises, Inc.; J-DRain **SWD-6 MODULAR DRAINAGE SYSTEM**.
- 2. Size: 6" high by 1" thickness by 165' rolls.

3. Core:
 - a. Material: Extruded HDPE; High Density Polyethylene Polymer, 0.945 density.
 - b. Type: Formed dimpled core.
 - c. Compressive strength: 8500 – 11000 PSF (407 - 527 kN/m²).
4. Geotextile:
 - a. Material: Nonwoven needle punch polypropylene.
 - b. Weight: 4.0 oz. per square yard (136 g/m²), minimum.
 - c. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
 - d. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.
5. Adhesive bonding core material to geotextile: Pressure sensitive applied to core, manufacturer's standard.
6. Flow Q of Polyethylene core, when tested in accord with ASTM D4716-01 with hydraulic gradient of .1 with confining stress of 3600 PSF: 30.0 gallons/min/ft. (372 lpm/m).
7. Furnish system manufacturer's standard polypropylene 6X6 corner fittings and 6X4 end-out, 6X4 side-out, and 6X4 corner-out fittings with 4" dia. female connector for connection to 4" dia corrugated plastic piping system specified elsewhere.

SPEC NOTE: SWD CAN BE USED TO REPLACE PIPE COLLECTION SYSTEM WHEN USED IN CONJUNCTION WITH JDRAIN 200/220; 300/320; 400/420; 400XL/420XL AND 700/720 WALL DRAINAGE SYSTEM.

SPEC NOTE: END OUT AND SIDE OUT FITTINGS ARE AVAILABLE TO TRANSITION TO COLLECTION PIPE SPECIFIED IN ANOTHER SECTION.

- E. **SWD DRAINAGE SYSTEM material**, characteristics:
1. Type: JDR Enterprises, Inc.; J-DRain; **SWD DRAINAGE SYSTEM**.
 2. Size: 6" & 12" high by 1" thickness by 165' rolls.
 3. Core:
 - a. Material: Extruded HDPE; High Density Polyethylene Polymer, 0.945 density.
 - b. Type: Formed dimpled core.
 - c. Compressive strength: 8500 - 11000 PSF (407 - 527 kN/m²).
 4. Geotextile:
 - a. Material: Nonwoven needle punch polypropylene.
 - b. Weight: 4.0 oz. per square yard (136 g/m²), minimum.
 - c. Treat fabric for UV stability to meet requirements in SYSTEM DESCRIPTION Article above.
 - d. Permittivity: Meet requirements in SYSTEM DESCRIPTION Article above.
 5. Adhesive bonding core material to geotextile: Pressure sensitive applied to core, manufacturer's standard.
 6. Flow Q of Polyethylene core, when tested in accord with ASTM D4716-01 with hydraulic gradient of .1 with confining stress of 3600 PSF: 30.0 gallons/min/ft. (372 lpm/m).
 7. Furnish system manufacturer's standard polypropylene 6X6 corner fittings and 6X4 end-out, 6X4 side-out, and 6X4 corner-out fittings OR standard ABS (Acrylonitrile Butadiene Styrene) 12X12 corner fittings and 12X4 end-out, 12X4 side-out, and 12X4 corner-out fittings with 4" dia. female connector for connection to 4" dia corrugated plastic piping system specified elsewhere.

SPEC NOTE: USE FURRING STRIPS IF METHOD 2 INSTALLATION INDICATED ON DRAWINGS FOR VERTICAL INSTALLATION

**F. Furring strips: Pressure treated lumber specified in Rough Carpentry Section.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of conditions:

- **1. Verify waterproofing protection board is in place, if specified in respective waterproofing section.
2. Examine conditions and substrates where products specified in this section are installed; submit written notification of unacceptable conditions or substrates.
3. Submit copy of installer's report to Architect within 72 hours of report receipt.
4. 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

SPEC NOTE: FOUNDATION WALL VERTICAL INSTALLATION HANGS MATERIAL VERTICALLY FULL DEPTH IN ONE PASS LAPPING FILTER MATERIAL AT VERTICAL JOINTS. METHOD REQUIRES FULL HEIGHT BACKFILL AFTER ALL MATERIAL IS INSTALLED. VERTICAL INSTALLATION CAN BE DONE IN LIFTS, IF DESIRED.

SPEC NOTE: HORIZONTAL INSTALLATION RUNS MATERIAL HORIZONTALLY ALLOWING SEPARATE LIFTS IN BACKFILL. CAN LEAVE SELECTION TO CONTRACTOR IF NO SPECIAL REQUIREMENTS.

SPEC NOTE: FOUNDATION WALL METHOD 1 UTILIZES ADHESIVE APPLICATION AT DRAINAGE MATERIAL TOP; METHOD 2 UTILIZES WOOD FURRING STRIP TO HOLD MATERIAL AT FINISH GRADE LEVEL IN PLACE UNTIL BACKFILLED.

SPEC NOTE: HORIZONTAL APPLICATION **NOT PREFERRED** FOR 200/220 SERIES.

SPEC NOTE: HORIZONTAL APPLICATION WITH VEHICULAR TRAFFIC NOT PREFERRED FOR 200/220, 400/420.

A. **Foundation wall installation, general:**

1. Install subdrainage system material ** either ** vertically ** or ** horizontally ** in accord with manufacturer's reviewed installation instructions with core material facing protection board (if used) or waterproofing.
2. Lap geotextile fabric joints in accord with manufacturer's installation instructions.
- **3. Tie subdrainage material into previously installed vertical collection system material in accord with subdrainage system manufacturer's reviewed details for positive drainage directly to vertical collection system.

SPEC NOTE: USE ABOVE IN CONNECTION WITH VERTICAL COLLECTION SYSTEM INDICATED BELOW. USE BELOW IF ONLY PERFORATED DRAINAGE PIPING USED AND SPECIFIED IN ANOTHER SECTION.

- **4. Install subdrainage material at foundation drainage pipe material in accord with subdrainage system manufacturer's reviewed details for positive drainage directly to foundation drainage pipe.
- **5. Horizontal application: Verify backfill lifts are installed and compacted prior to installation of next subdrainage system material course.
6. Secure subdrainage system material to wall at grade in accord with manufacturers indicated and reviewed installation instructions.
7. Direct UV/sunlight can damage J-DRain products and can cause deterioration. To alleviate UV/sunlight damage, the engineered soil should be installed to cover J-DRain products within 10 – 14 days.

B. **Lagging installation, general:**

1. Install subdrainage system material vertically in accord with manufacturer's reviewed installation instructions.
2. Lap geotextile fabric joints in accord with manufacturer's installation instructions.
- **3. Tie subdrainage material into previously installed vertical collection system material in accord with subdrainage system manufacturer's reviewed details for positive drainage directly to vertical collection system.

SPEC NOTE: USE ABOVE IN CONNECTION WITH VERTICAL COLLECTION SYSTEM INDICATED BELOW. USE BELOW IF ONLY PERFORATED DRAINAGE PIPING USED AND SPECIFIED IN ANOTHER SECTION.

- **4. Install subdrainage material at foundation drainage pipe material in accord with subdrainage system manufacturer's reviewed details for positive drainage directly to foundation drainage pipe.
5. Secure subdrainage system material to wall at grade in accord with manufacturer's indicated and reviewed Method 2, wood strip.
6. Direct UV/sunlight can damage J-DRain products and can cause deterioration. To alleviate UV/sunlight damage, the engineered soil should be installed to cover J-DRain products within 10 – 14 days.

C. Modular Chimney Drainage System installation, general:

1. Unroll material horizontally along foundation base; adhere to partially cured waterproofing material; use adhesive acceptable to waterproofing material manufacturer for cured waterproofing or other sheet waterproofing not requiring curing.
2. Install preformed corner fittings at foundation interior and exterior corners.
3. Install outlet fittings where indicated; connect to corrugated drainage pipe if present at time of modular system installation; leave ready for connection to corrugated drainage pipe if not present.
4. Install vertical chimney sections in accord with manufacturer's installation instructions; tie into continuous horizontal footing drain. Vertical chimneys will be spaced every 4 to 8 feet, adhered to partially cured waterproofing material or using adhesive acceptable to waterproofing material manufacturer.
5. Direct UV/sunlight can damage J-DRain products and can cause deterioration. To alleviate UV/sunlight damage, the engineered soil should be installed to cover J-DRain products within 10 – 14 days.

D. SWD Drainage System installation, general:

1. Unroll material along foundation base; adhere to partially cured waterproofing material; use adhesive acceptable to waterproofing material manufacturer for cured waterproofing or other sheet waterproofing not requiring curing.
2. Install preformed corner fittings at foundation interior and exterior corners.
3. Install outlet fittings where indicated; connect to corrugated drainage pipe if present at time of modular system installation; leave ready for connection to corrugated drainage pipe if not present.
4. Cover remainder of wall with other J-DRain Wall Drainage Systems.
5. Provide filter overlap between J-DRain Wall Drainage Systems and J-DRain SWD.
6. Direct UV/sunlight can damage J-DRain products and can cause deterioration. To alleviate UV/sunlight damage, the engineered soil should be installed to cover J-DRain products within 10 – 14 days.

END OF SECTION 33 46 16.16

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