

SECTION 02621

FOUNDATION DRAINAGE SYSTEMS

Date: 07/01/99

PART 1 - GENERAL

1.01 SUMMARY

- 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.

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

USE 06100 IF WOOD STRIPS ARE USED.

DELETE 01630 IF NO SUBSTITUTIONS ARE ALLOWED OR YOU HAVE COORDINATED FRONT END DOCUMENTS THAT NEED NO ACTUAL REFERENCE TO DIVISION 01.

- B. Related sections:
1. Section 01630: Product Substitution Procedures.
 2. Section 02320: Earthwork.
 3. Section 02321: Building Earthwork.
 4. Section 03300: Cast-in-Place Concrete.
 5. Section 06100: Rough Carpentry.
 6. Section 07125: Waterproofing.
 7. Section 07130: Membrane Waterproofing.
 8. Section 07140: Fluid Applied Waterproofing.
 9. Section 07170: Bentonite Waterproofing.

1.02 REFERENCES

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

1.03 DEFINITIONS

- A. Terms; 1 through 4 taken from ASTM D4439-85:
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

UV RESISTANCE NECESSARY TO ALLOW BACKFILL OR COVER MATERIAL 60 DAYS MAXIMUM FROM

INSTALLATION, NOT IMMEDIATELY, IF WEATHER AND CONSTRUCTION SEQUENCING DO NOT PERMIT.
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- A. Performance requirements:
 - 1. Geotextile:
 - a. UV resistance: 70% or more when tested in accord with ASTM D4355-84.
 - b. Permittivity: 140 gal/min/ft² (5698 l/min/m²) when tested in accord with ASTM D4491-85.
 - 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 D4716-95.



1.05 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. Vertical collection drainage system material: 4" length.

1.06 QUALITY ASSURANCE

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

1.07 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.

**1.08 SEQUENCING AND SCHEDULING

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

PART 2 - PRODUCTS

2.01 MANUFACTURED UNITS

- A. Acceptable manufacturers:
 - 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.
 - 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.

PRODUCT SELECTION GUIDE			
Application	Selection	Application	Selection
Foundation walls >20 ft.	300, 400, or 420*	Foundation walls < 20 ft.	200 or 220
Retaining walls > 20 ft.	300 or 400	Retaining walls < 20 ft.	200
Retaining/Foundation walls	SWD-6, SWD-12		
Underslab (On grade)	400	Under slab (ongrade)	302 (Heavy Duty)
 decks (Regular)	400, 420*, or 700	Plaza decks (Vehicular)	300 or 1000*
Crib walls	302 or 400		
Roof membrane assembly	400 or 420*	Roof gardens & planters	400, 420*, 700, GRS
Split slab (Regular)	420* or 700	Split slab (H.D. vehicular)	1000*
Edge drains	SWD-6 or SWD-12	Trench drains	SWD-12, SWD-18
(*) 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; heavy duty core, single sided fabric.
 ** 302 Series; heavy duty core, double sided fabric.
 ** 1000 Series; heavy duty core, double sided fabric.
2. Core:
 - a. Material: Extruded HDPE; High Density Polyethylene Polymer, 0.945 density.
 - b. Thickness: 0.22" (0.56 cm), nominal, normal duty.
 - c. Compressive strength: 30,000 PSF (1438 kN/m²).
3. Geotextile:
 - a. Material: Non-woven needle punch polypropylene.
 - b. Weight: 4.0 oz. Per square yard (94.8 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.

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

NON-WOVEN FABRICS CAN BE NEEDLE PUNCHED, SPUN BONDED OR CHEMICALY TREATED (SELDOM USED ANYMORE).

TWO FABRICATION TECHNIQUES BOND GEOTECTILE TO CORE, PRESSURE SENSITIVE ADHESIVE AND HEAT LANCING.

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.

SELECT SAME SERIES AS SPECIFIED ABOVE FOR FLOW Q.

5. Transmissivity or Flow Q of composite construction, geotextile bonded to core when tested in accord with ASTM D4716-95 with hydraulic gradient of 1 with confining stress of 3600 PSF: **

300 Series: ** 7.0 gallons/min/ft. (86.93 lpm/m) width in accord with ASTM



D4716-95.

302 Series: ** 5.5 gallons/min/ft. (68.30 lpm/m) width in accord with ASTM

D4716-95.

1000 Series: ** 7.0 gallons/min/ft. (86.93 lpm/m) width in accord with ASTM

D4716-95.

400, 420, and 700 SERIES ARE Dimpled Core PRODUCTS with LESS COMPRESSIVE STRENGTH THAN 300 and 1000 SERIES – SIMILAR TO OTHER Dimpled Products FOR COMPRESSIVE STRENGTH – NOT PREFERRED FOR HORIZONTAL APPLICATION.

400 SERIES IS SIMILAR TO 400 SERIES BUT Dimpled Core.

420 SERIES HAS A 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®; **
 - ** 400 Series; normal duty core, single sided fabric.
 - ** 420 Series; normal duty core, single sided fabric with protective sheet on dimpled core.
 - ** 700 Series; normal duty core, single sided woven fabric with protective sheet on dimpled core.
2. Core:
 - a. Material: High Impact Polystyrene.
 - b. Type: Formed dimpled core.
 - c. Compressive strength: **
 - 400 Series:** ** 15,000 PSF (719 kN/m²).
 - 700 Series:** ** 18,000 PSF (862 kN/m²).
3. Geotextile:
 - a. Material: Non-woven needle punch polypropylene (400 Series) woven filter fabric (700 Series).
 - b. Weight: 4.0 oz. per square yard (94.8 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.
4. Adhesive bonding core material to geotextile: Pressure sensitive applied to core, manufacturer's standard.

SELECT SAME SERIES AS SPECIFIED ABOVE FOR FLOW Q.

5. Transmissivity or Flow Q of composite construction, geotextile bonded to core when tested in accord with ASTM D4716-95 with hydraulic gradient of 1 with confining stress of 3600 PSF: **
 - 400 & 402 Series:** ** 18.0 gallons/min/ft. (226 lpm/m) width in accord with ASTM D4716-95.
 - 700 Series:** ** 21.0 gallons/min/ft. (260 lpm/m) width in accord with ASTM D4716-95.

SWD-6 MODULAR CHIMNEY DRAINAGE SYSTEM SPECIFIED IN THIS SECTION PROVIDES VERY ECONOMICAL WALL DRAINAGE SYSTEM. CHIMNEYS ARE PLACED ON 4' TO 6' CENTERS.

SWD-6 CAN ALSO BE USED TO REPLACE PIPE COLLECTION SYSTEM WHEN USED IN CONJUNCTION WITH 200/220 & 400/420 WALL DRAINAGE SYSTEMS.

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

USE AT DEEPER FOUNDATIONS REQUIRE CONSULTATION WITH **JDR INDUSTRIES** 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 150' rolls.
 3. Core:
 - a. Material: High impact polyethylene.
 - b. Type: Formed dimpled core.
 - c. Compressive strength: 9,500 PSF (454 kN/m²).
 4. Geotextile:
 - a. Material: Non-woven needle punch polypropylene.
 - b. Weight: 4.0 oz. per square yard (94.8 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. Transmissivity or Flow Q of composite construction, geotextile bonded to core when tested in accord with ASTM D4716-95 with hydraulic gradient of 1 with confining stress of 3600 PSF: 170.0 gallons/min/ft. (2100 lpm/m)
 7. Furnish system manufacturer's standard polyethylene 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.



VCS CAN BE USED TO REPLACE PIPE COLLECTION SYSTEM WHEN USED IN CONJUNCTION WITH JDRAIN 200/220; 300/320, 400/420, AND 700/720 WALL DRAINAGE SYSTEMS.

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

- E. Vertical collection drainage system material, characteristics:
1. Type: JDR Enterprises, Inc.; J-DRain®; VCS Collection System.
 2. Size: 12" high by 1" thickness by 50' rolls.
 3. Core:
 - a. Material: High impact polyethylene.
 - b. Type: Formed dimpled core.
 - c. Compressive strength: 9,500 PSF (454 kN/m²).
 4. Geotextile:
 - a. Material: Non-woven needle punch polypropylene.
 - b. Weight: 4.0 oz. per square yard (94.8 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. Transmissivity or Flow Q of composite construction, geotextile bonded to core when tested in accord with ASTM D4716-95 with hydraulic gradient of 1 with confining stress of 3600 PSF: 170.0 gallons/min/ft. (2100 lpm/m)
 7. Furnish system manufacturer's standard polyethylene 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.



USE FURRING STRIPS IF METHOD 2 INSTALLATION IS INDICATED ON DRAWINGS FOR VERTICAL INSTALLATION.

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

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

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

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

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.

HORIZONTAL APPLICATION **NOT PREFERRED** TO 400, 402, AND 700 SERIES.

- 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.
 - 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.

USE ABOVE IN CONNECTION WITH VERTICAL COLLECTION SYSTEM INDICATED BELOW.



BELOW IF ONLY PERFORATED DRAINAGE PIPING USED AND DSPECIFIED 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 manufacturer's indicated and reviewed installation instructions.

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.



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 manufacturers 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.

C. Modular chimney 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 vertical chimney sections in accord with manufacturer's installation instructions; tie into continuous horizontal footing drain.
- 4. 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.



D. Vertical collection 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® VCS.

END OF SECTION 02621

Specifications prepared for:

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