

DELTA®-DRAIN 9000

Section 07 10 00 – Dampproofing and Waterproofing

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Below grade waterproofing.
- B. Below grade drainage sheets.
- C. Plaza deck and planter drainage sheets.

1.2 RELATED SECTIONS

- A. Section 07 11 13 - Bituminous Dampproofing.
- B. Section 07 12 00 - Built-Up Bituminous Waterproofing.
- C. Section 07 13 00 - Sheet Waterproofing.
- D. Section 07 14 00 - Fluid-Applied Waterproofing.
- E. Section 07 16 13 - Polymer Modified Cement Waterproofing.
- F. Section 07 16 16 - Crystalline Waterproofing.
- G. Section 07 16 19 - Metal Oxide Waterproofing.
- H. Section 07 17 13 - Bentonite Panel Waterproofing.
- I. Section 31 223 16 - Excavation.
- J. Section 31 23 23 - Fill: Backfilling.
- K. Section 33 46 00 - Sub drainage: Foundation perimeter drainage.

1.3 ALTERNATIVES

- A. See Section 01230 - Alternatives, for product alternatives affecting this section.
- B. This section describes a base bid product; refer to Section [_____] for an alternative product.
- C. This section describes an alternative product; refer to Section [_____] for the base bid product.

1.4 REFERENCES

- A. AATC 127 - Water Resistance: Hydrostatic Pressure Test; 1998.

- B. ASTM C 1311 - Standard Specification for Solvent Release Sealants; 2002.
- C. ASTM D 1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics; 2004a.
- D. ASTM D 1777 - Standard Test Method for Thickness of Textile Materials; 1996 (Reapproved 2002).
- E. ASTM D 3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric; 1996 (Reapproved 2002).
- F. ASTM D 3786 - Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method; 2006.
- G. ASTM D 4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2005.
- H. ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2004).
- I. ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2004.
- J. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 1991 (Reapproved 2003).
- K. ASTM D 4716 - Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head; 2004.
- L. ASTM D 4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2004.
- M. ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products; 2000.
- N. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- O. CCMC Technical Guide for Foundation Wall Drainage Systems – Dimpled Membranes. Master Format Section 02622.1; (Oct. 11, 2006).
- P. CCMC Technical Guide for Rigid Polyethylene or Polystyrene Dampproofing Membrane. Master Format Section 07111; (Oct. 11, 2001).
- Q. CGSB 19-GP-14M - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing; 1984.
- R. ICC-ES – Evaluation Guidelines for Rigid Polyethylene Below Grade, Dampproofing and Wall Waterproofing Material EG 114; (Mar. 1, 2004)

1.5 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.

- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Samples: 4" by 4" (100mm by 100 mm) piece of each type of sheet; minimum 12" (300 mm) long piece of each type of strip; each type of fastener.
- D. Test Reports: Evaluation service reports or other independent testing agency reports showing compliance with specified requirements.
- E. Installer Qualifications: Include minimum of 5 project references.
- F. Executed warranty.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this type and approved by the membrane manufacturer.
- B. Manufacturer's Field Services: Provide the services of a representative accredited by the sheet manufacturer to examine substrates before starting installation, periodically review installation procedures, and review final installed systems.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to project site in original packaging with labels intact.
- B. Store products in manner acceptable to membrane manufacturer.
- C. When products must be stored for extended periods, keep out of direct sunlight and at temperatures above minus 22 degrees F (minus 30 degrees C).
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 WARRANTY

- A. 20 year product warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. All Products of This Section:
 - 1. Cosella-Dörken Products Inc: www.cosella-dorken.com
 - 2. Substitutions: [[See Section 01600 - Product Requirements]][Not permitted]].

2.2 APPLICATIONS

- A. Foundation Wall Drainage Sheet: Install drainage sheet over [[waterproofing] [dampproofing]] installed by others, from bottom of wall to grade level, and in locations indicated on the drawings.

- B. Split Slab Applications: Install horizontal application drainage sheet between mud slab and finish slab.
- C. Planters: Install drainage sheet inside planters, over waterproofing by others.
- D. Lagging Walls: Install drainage sheet on entire surface of walls prior to installation of foundation wall.
- E. Tunnels and Similar Applications: Install drainage sheet over waterproofing membrane by others at top and sides. For Pan Lining Applications, follow manufacturer's recommendations for anchoring.
- F. Plaza Decks: Install horizontal application drainage sheet over waterproofing membrane by others.

2.3 MATERIALS

- A. Drainage Sheet for Vertical and Horizontal application: High density polypropylene sheet, dimpled throughout field of sheet; polypropylene filter fabric adhered to top of dimples.

1.
 - i)

a. Product:	Cosella-Dörken DELTA®-DRAIN 9000
b. Color:	Black
c. Working Temperature Range:	Minus 22 degrees F (minus 30 degrees C) to 176 degrees F (80 degrees C)
d. Dimpled Thickness:	0.40 inch (10 mm)
e. Compressive Strength:	ASTM D 1621: Approximately 18,000 psf (862 kN/m ²)
f. Dimpled Sheet Weight:	ASTM D 3776: 3.05 oz/ft ² (750 g/m ²)
g. Water Flow Rate in Vertical Orientation:	ASTM D 4716: 27 gal/min/ft (334 L/min/m)
h. Water Flow Rate in Horizontal Orientation:	ASTM D 4716: 5.4 gal/min/ft (67 L/min/m)
 - ii)

a. Filter Fabric: Woven polypropylene.	
b. Apparent Opening Size:	ASTM D 4751: 40 sieve (0.42 mm)
c. Permittivity:	ASTM D 4491: 1.36 sec ⁻¹ ,
d. Water Flow Rate:	ASTM D 4491: 100 gpm/ft ² (4074 L/min/m ²)
e. Ultraviolet Resistance:	ASTM D 4355: 70 percent (500 hr)
f. Breaking Load Strength:	ASTM D 4632: 365 lb (1620 N)
g. Elongation at Breaking Load:	ASTM D 4632: 24 percent
h. Tear Strength:	ASTM D 4533: 115 lbf (511 N)
i. Puncture Strength:	ASTM D 4833: 100 lb (440 N)
j. Burst Strength:	ASTM D 3786: 480 psi (3304 kPa)
k. Weight, Nominal:	ASTM D 5261: 6.5 oz/yd ² (216 g/m ²)

- B. Accessories as recommended by product manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrates are sound enough to retain fasteners and suitable for bonding of sealant.
- B. Verify that there are no active leaks within area to be waterproofed.

- C. Verify that sub drainage system has been properly installed.
- D. Verify that finish grade elevations are clearly marked.
- E. Do not begin installation until substrates have been properly prepared.
- F. If substrate preparation is the responsibility of another trade, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces "broom clean" prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 1. Remove projections larger than 1/4 inch (6 mm); remove sharp edges.
 - 2. In concrete and masonry, patch cracks and holes so that they provide suitable substrate as recommended by membrane manufacturer.
- C. Mark installation locations on walls prior to starting installation.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's recommended procedure.
- B. Do not install when:
 - 1. Ambient temperature is below minus 22 degrees F (minus 30 degrees C).
 - 2. Concrete has been cured for less than 3 days.
 - 3. Standing water is present.
- C. General Sheet Installation: Start at lowest point and work to top, running length of sheets horizontally and overlapping upper sheets in shingle fashion at least 4 inches (100 mm); lap vertical joints at least 6 inches (150 mm).
 - 1. Install sheets without gaps, wrinkles, creases, or tears.
 - 2. Align and interlock overlapping layers.
 - 3. Secure to substrate at edges and in the field of the sheet using fasteners and methods recommended by sheet manufacturer; stagger fasteners in alternate rows.
 - 4. Flash and seal top edges, around openings and penetrations, and other locations recommended by manufacturer, in manner recommended by manufacturer.
- D. Drainage Sheet: In addition to general sheet installation specified above:
 - 1. Install with protruding dimples on side facing substrate.
 - 2. Unless otherwise indicated, fasten dimpled sheets using specified fasteners with dimpled washers interlocked with sheet at not more than 12 inches (305 mm) on center.
 - 3. At all joints, apply continuous bead of sealant between layers and fasten through both layers with specified fasteners with dimpled washers.
 - 4. At vertical joints, overlap sheets at least 6 inches (150 mm) and interlock dimples, making full contact with sealant.

5. At horizontal joints, apply continuous sealant bead between wall and lower sheet and fasten lower sheet along top edge; overlap upper sheet over the lower sheet and fasten through both sheets at lower edge of upper sheet.
6. At interruptions and penetrations, apply continuous bead of sealant between sheet and substrate, fasten sheet around entire opening at not more than 8 inches (100 mm) on center, and cover cut edge with flashing strip sealed to wall and fastened at not more than 8 inches (100 mm) on center.
7. At inside and outside corners, install sheet as close to substrate as possible without breaking and fasten along both sides entire length of corner, not closer than 5 inches (125 mm) to corner.
8. At bottom of walls, extend a single sheet from wall over footing and drainage pipe, if any.

E. Drainage Sheets: In addition to general sheet installation above:

1. Install with protruding dimples and filter fabric on side facing away from substrate, unless otherwise indicated.
2. On lagging, pile, or earth forms, and other "blind" wall construction, install drainage sheet with filter fabric in contact with form; seal joints in dimpled sheet continuously with tape; anchoring to forms may be by adhesive if necessary.
3. On low-slope split slab installations, install with filter fabric side up; seal dimpled sheet overlaps; anchor sheets sufficiently to prevent movement prior to and during installation of cover.
4. At plaza deck, pavers are not to be installed directly on the drainage sheet. A buffer layer between the drainage membrane and the pavers must be installed. Install with filter fabric side up with butt joints rather than overlap joints.
5. Use C-molding to enclose edges of drainage sheets; in fine silty clay soils, wrap exposed edges with filter fabric before installing C-molding.
6. Cover sheet laps with filter fabric and do not leave dimpled sheet exposed.
7. At bottom of walls, extend a single sheet from wall over footing and drainage pipe, if any.

F. Repairs to Dimpled Sheet: Apply patch made of same material interlocked, with continuous sealant bead around tear or penetration.

G. Repairs to Filter Fabric: Tape matching material over damaged area.

H. After installation of reinforcing bars, inspect drainage sheet and repair damaged sheet and fabric.

3.4 FIELD QUALITY CONTROL

- A. Provide the services of a manufacturer's representative to inspect substrates for suitability for installation, to review procedures during construction, and to review the finished work.

3.5 PROTECTION

- A. Do not leave installed membrane exposed to sunlight for more than 30 days after installation; to cover, complete backfill operation or cover with protection board.
- B. Prior to backfilling, inspect waterproofing for tears and other damage and repair.
- C. Take care when backfilling to avoid damage to membrane; replace membrane damaged during backfilling.

- D. Protect installed products until completion of project.
- E. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION