



H Y D R O S T A R

P R O D U C T S

HydroDRAIN 6000 DB Series GeoComposites Drainage MEMBRANE
*Section 07 10 00 – Dampproofing and Waterproofing 07 13 00 – Sheet Waterproofing –
07 13 54 Thermoplastic Sheet Waterproofing*

NOTE TO SPECIFIER: These specifications were current at the time of publication but are subject to change at any time without notice. Please confirm the accuracy of these specifications with the manufacturer and/or distributor prior to installation.

PART I GENERAL

1.1 SECTION INCLUDES

- A. Below grade waterproofing and dampproofing w/ subterranean drainage.

1.2 RELATED SECTIONS

- A. Section 02 80 00 – Facility Remediation
- B. Section 03 31 00 – Cast-In-Place Concrete
- C. Section 31 00 00 – Earthwork
- D. Section 31 23 16 – Excavation
- E. Section 31 23 23 – Fill: Backfilling
- F. Section 33 40 01 – Storm Drainage
- G. Section 33 46 00 – Sub drainage
- H. Section 07 00 00 – Thermal & Moisture Protection
- I. Section 07 10 00 – Dampproofing & Waterproofing
- J. Section 07 13 00 – Sheet Waterproofing
- K. Section 07 13 54 – Thermoplastic Sheet Waterproofing
- L. Section 07 26 00 – Vapour Retarders

1.3 REFERENCES

- A. ASTM Standards:
 - i) ASTM D1621 - Standard Test Method for Compression of Rigid Cellular Plastics
 - ii) ASTM D1777 – Standard Test Method for Thickness of Textile Materials
 - iii) ASTM D3776/D2776M – Standard Test Methods for Mass per Unit Area (Weight) of Fabric
 - iv) ASTM D3786/3786M – Standard Test Method for Bursting Strength of Textile Fabrics/Diaphragm Bursting Strength Tester Method
 - v) ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arch Type Apparatus
 - vi) ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - vii) ASTM D4533 – Standard Test Method for Trapezoidal Tearing Strength of Geotextiles

- viii) ASTM D4632 – Standard Test Method for Grab Tensile Breaking Load and Elongation of Geotextiles
- ix) ASTM D4716 – Standard Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geotextile Using a Constant Head
- x) ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile
- xi) ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
- xii) ASTM D5261 – Standard Test Method for Measuring Mass per Unit Area of Geotextiles
- xiii) ASTM E96/96M – Standard Test Method for measuring Water Vapor Transmission of Materials
- xiv) ASTM D6241 – Standard Test Method for Static Puncture Test of Geotextiles and Geotextiles Related Products using a 50 mm Probe
- xv) ASTM D6364 – Standard Test Method for Determining Short-Term Compressive Behaviour of Geosynthetics
- xvi) ASTM D5199 – Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- xvii) ASTM D3816/3816M – Standard Test Method for Water Penetration Rates of Pressure Sensitive Tapes

B.--CCMC Evaluation – Not Required for this product – use beyond Part 9 of Building Code

C.--ICC-ES Evaluation – Not required for this product – use beyond IRC

D.--AASHTO – AASTHO M-288 (Fabric Only) with Survivability Class 1,2,3

E. CGSB 19-GP-14M – Sealing Compounds, Single Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- 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 instructions.
 - 4. Product warranty.
- C. Samples: 12 by 12 inch (300 by 300 mm) piece of sheet; minimum 12 inch (300 mm) long piece of trim; each type of fastener.
- D. Test Reports: Evaluation service reports or other independent testing agency reports (ASTM) showing compliance with specified requirements.
- E. Installer Qualifications: Include minimum of 5 project references.
- F. Executed warranty.
- G. LEED Submittals: Provide documentation of how the requirements of Credit will be met.
- H. Provide and have on site a 3 m x 3m Mock-up of the membrane installation as shown or directed by the manufacturer's installation instructions and the consultant's assembly design with materials that show the actual intended *installed* conditions that are expected to be in place at the completion of the geo-composite construction. This Mock-up shall be used (once approved by the Consultant) as a reference for all site work and construction quality that shall be followed and implemented throughout the construction project.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this type and approved by the membrane manufacturer. Installer certificates of qualification (if applicable) shall be provided.
- 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. Provide final letters of compliance to manufacturers installation guidelines and drawings (when required).
- C. Pre-Installation Meeting – A pre-installation meeting scheduled at least 2 weeks prior to the actual installation to take place (with possible site attendance if necessary) to verify project requirements, substrate conditioning, co-ordinate with subtrades and take into account any sensitivities of the construction schedule and review the manufacturer's installation instructions with meeting attendees for a complete construction team understanding of membrane installation, methods used and cautions that need to be put in place to ensure the membrane is properly installed and protected during the construction process.

The site meeting attendees should include at a minimum the following:

- a) Owner or Owner's representative
 - b) Consultant (Architect, Engineer, Specialist)
 - c) Drainage Geo-composite Installer
 - d) Manufacturer's Technical Representative
- D. Health & Safety – The following documentation shall be provided at or before the Pre-Installation Meeting:
- a) Membrane Product Data Sheets
 - b) Membrane Installation and Accessories Instructions
 - c) MSDS Data Sheets
 - d) Submit (if applicable) all Evaluation Reports or Product Approvals

1.6 DELIVERY, STORAGE, PROTECTION and HANDLING

- 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. Provide temporary cover for products while stored on site before installation, protected from direct sunlight and UV exposure.
- E. Store and dispose of solvent-based material, or materials used with solvents in accordance with local jurisdiction requirements.
- F. Dispose of salvage from membrane material in accordance with local recycling facility requirements
- G. Ensure site is made completely clear of all excess materials from membrane installation process

1.7 PROJECT CLOSEOUT

- A. Provide complete list of materials used in membrane installation to Owner's representative
- B. Provide certificate of completion
- C. Provide Warranty Certificate to Owner or their representative

1.8 WARRANTY

- A. Manufacturer's 20 year limited product warranty.
- B. Manufacturer's Optional performance warranty.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. All Products of This Section:
1. **Alexwill Distribution Inc.:** 4034 Mainway, Unit C Burlington, Ontario Canada
Tel: 905-547-9727. Fax: 905-332-1125. www.hydrostarag.com.
 2. Substitutions: Not permitted.

2.2 MATERIALS & PERFORMANCE CRITERIA

- A. Waterproofing or Dampproofing Membrane: Dimpled polypropylene membrane with a dimples and geotextile on one side.

GEOCOMPOSITE CORE

- a. Product: Hydrostar Drain – Hydrostar Drain 6000DB™
- b. Color: Black.
- c. Thickness: 1.0± mm in flat area; 0.8 mm in dimpled area – ASTM D5199
- d. Compressive Strength: 718 kN/m². (15,000 lbs/ft²) – ASTM D6364/ASTM D1621
- e. Weight: 800± g/m²
- f. Material: Polypropylene.
- g. Material Quality: Meeting the requirements of ASTM.
- h. Roll dimensions: 457mm±, 15.21 m long, and 1.2 or 1.98 m wide. (Dimple height is 10 mm/~ 0.393")

GEOTEXTILE

- c. Material – Polypropylene – Needle Punched Non-Woven
- d. Geotextile Flow Rate¹ – 6113/L/min/m² (150 gal/min/ft²) – ASTM D4716
- e. Grab Tensile Strength – 512 N (115 lbs) – ASTM D4632
- f. CBR Puncture Strength – 1.41 kN (320 lbs) – ASTM D6241
- g. Apparent Opening Size (AOS) – 0.210 mm (70 sieve) – ASTM D4751
- h. Permittivity – 2.4 sec⁻² - ASTM D4491
- i. Grab Elongation – 70% - ASTM D4632
- j. UV Resistance – 70% at 500 hrs – ASTM D4355

(1) – In-Plane flow rate measured at 172 kPa (3600 psf) compressive load w/ hydraulic gradient of 1.0 (Vertical)

B. Accessories.

- a. Hydrostar Molding Strip™
- b. Hydrostar Washers™
- a. Other accessories including 2" inch coated nails (for lagging walls), 1 3/4" concrete nails for concrete and concrete block foundations as recommended by product manufacturer's installation instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Ensure the foundation is clean at the grade level (concrete or concrete masonry)
- B. Clean substrate of all protrusions, defects that would affect the installation.
- C. Ensure you have adequate drainage or a functioning drainage system is installed at the footing level.
- D. Do not begin installation until substrates have been properly prepared (i.e. waterproofing installed where applicable), form ties removed and sealed, soil anchors and other structural elements completed (blind siding)
- E. If substrate preparation is the responsibility of another trade, notify Architect or Consultant of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

NOTE TO SPECIFIER: These instructions are a guideline for installation. Experienced installers may choose to use different accessories or install the product in a way that is acceptable to both the owner/the owner's representative, the manufacturer and site conditions, however if these guidelines are not followed, liability for the warranty becomes the responsibility of the installer. **Refer to manufacturers' installation instructions.**

- A. General Sheet Installation:
 - 1. Snap a chalk line one inch below grade level on the foundation wall, or at protection level required by architect, engineer or site superintendent as the final grade mark.
 - 2. Roll out a small amount of Hydrostar DRAIN 6000DB™ with the top of the membrane lining up with the chalk line for *concrete/masonry* foundations. Keep the membrane as smooth as possible, without large wrinkles, creases or tears. Depending on depth of excavation installer may install membrane horizontally or vertically over the walls surface.
 - 3. Install the Hydrostar Drain 6000DB™ over the substrate and waterproofing with the flat side of the sheet facing the structure for *concrete/masonry* foundations, and with the dimple side of the membrane facing the substrate or lagging walls for *blind siding* applications. All interfacing of sheets shall be with a butt joint application only, *do not overlap* successive sheets.
 - 4. Secure the membrane to the substrate or foundation wall with Hydrostar Washers™ and appropriate nails. Please note, steel washers are not recommended for use in the dimpled section of membrane, unless they are installed with a rubber or PVC insert.
 - 5. Position the Hydrostar Washers™ in the negative side of the membrane (*blind siding*) and in the fabric side of the membrane (*concrete/masonry* foundations), with 1 ¾" inch concrete nails (*concrete/masonry* foundations), 2" coated nails for (*blind siding*).
 - 6. Install Hydrostar Washers™ in the dimpled section, approximately 24" to 28" o/c in each row (2 top rows spaced 12" apart for shallow foundations) for a fastener every 12" to 14" o/c, and 12" to 14" o/c throughout the sheet with successive rows spaced not more than 24" o/c apart (for Deep foundations and *Blind Siding*) for even distribution of weight of sheet and application of backfill material or concrete.
 - 7. In heavy clay soil for exterior of shallow *concrete/masonry foundations* over waterproofing insert a third row of Hydrostar Washers™ 24" to 28" o/c (staggered pattern) 12" below the 2nd row of washers.
 - 8. Insert a final row of Hydrostar Washers™ approximately 12 inches above the footing spaced approximately 10 feet apart. This final row of washers will prevent the crushed stone or concrete (*blind siding*) from getting under the membrane.
 - 9. Refer to our website blind side drawings for more detail at www.hydrostarag.com.

- B. Corner Installation: (Concrete and Masonry Foundations)
1. Fit the membrane tightly to corners. Fasten the membrane near the top and bottom by inserting Hydrostar Washers™ at least 6 inches (15 cm) back from outside corners and 6 inches (15 cm) from inside corners. Fastening the membrane too close to outside corners can cause the concrete corner to chip on building foundations.
- C. Joining Rolls:
1. When joining two pieces of Hydrostar Drain 6000 DB™ vertically butt them together, then seal the seams with a moisture proof/vapour proof tape (*Blind Siding*). It is not necessary to caulk the joint. Insert Hydrostar Washers™ along the seam area staggered every 6 inches (15 cm) o/c.
 2. If you are joining two pieces of membrane horizontally, install the lower piece first. The upper piece is to be butt joined to the lower section, and fabric must cover the joint between the two sections in a *shingle* fashion and continue in succession throughout the installation, for *concrete/masonry* foundations. Install Hydrostar Washers™ every 6 inches staggered along the butt joint. For *Blind Siding* the use of butt joints, taped and sealed is acceptable, with the installation of Hydrostar Washers™ at 6" intervals staggered along the butt joint with a 2" offset.
- D. Windows/Terminations/Top of Membrane:
1. For windows or other openings in the foundation, cut the membrane 2 to 4 inches (5 to 10 cm) back from the edge. Lap extra geotextile from Hydrostar Drain 6000DB™ over the exposed core and behind the core, then fasten the membrane to the foundation wall under the opening using Hydrostar Washers™ as usual. Install Hydrostar Molding Strip™ to seal the cut edges and any terminated ends or top not protected. Fasten molding strip with nails at 6" to 8" o/c.
- E. Service Entrances:
1. Caulk around the service that is penetrating the foundation (shallow foundations), bentonite or swelling compound pack for blind side applications with fabric containment in all gaps.
 2. Cut the membrane vertically so that it goes past the service at least 6 inches (15 cm).
 3. Cut the membrane to fit as tightly as possible around the service.
 4. Caulk around the service again. (Now there will be caulking around the service both under the Hydrostar Drain 6000DB™ and on top of it.) (Bentonite or swell compound pack w/fabric on blind side applications).
 5. Start the next piece of membrane 6 inches (15 cm) BEFORE the service. (The idea is to have a 12-inch (30 cm) overlap at the service.)
 6. Cut the top layer of membrane to fit as tightly as possible around the service.
 7. Caulk around the service again. (Now there will be caulking under and on top of each layer for good protection.) (Bentonite or swell compound pack for blind side applications).
 8. Insert Hydrostar Washers™ along the overlapped membrane every 6 inches (15 cm) in a staggered pattern.

3.3 SEALING TERMINATIONS AND THE TOP OF THE MEMBRANE

- A. If the core and geotextile have been cut away, such as on a sloped grade or around windows, use Hydrostar Molding Strip™ to seal this area. Set the Hydrostar Molding Strip™ against the edge or top of the membrane placing the molded edge of the molding against the substrate and nail every 6 to 8 inches o/c (15 cm). Wrap extra geotextile around and over top or exposed edge of the dimpled core prior to application of the mold strip to protect the drainage core.

3.4 SEALING THE END OF THE ROLL

- A. If you are not wrapping the entire foundation or blind side application with Hydrostar Drain 6000DB™, such as when there is an attached garage or buttress, you need to seal the vertical ends of the Hydrostar Drain 6000DB™. Anchor the membrane vertical edge to the foundation

using Hydrostar Washers™ at 6 to 8 inches o/c (15 cm) with a 3" offset on the vertical edge, install a vertically oriented mold strip along the exposed edge as indicated in 3.3 A above, fastening it to the substrate with nails at 6 to 8 inches o/c (15 cm). This stops the migration of soil particles from clogging the drainage core.

3.5 FIELD QUALITY CONTROL

- A. Request inspection by manufacturer's representative prior to and immediately after placing membrane and before/after placing backfill/concrete for both concrete or masonry foundations or blind side installations for correctness and suitability. A completion report of the inspection or re-inspection is to be prepared and provided to the Owner or their representative, Site Superintendent, Consultant(s), Membrane Installer, and other affected trades for scheduling purposes of other work. (Care must be exercised by the concrete contractor when *blind siding* not to damage the membrane during concrete placement). Backfilling foundations must be controlled so damage to the drainage membrane is avoided.
- B. Repair any damage noted during the quality inspection process using methods and materials as specified by the manufacture.

- C. Obtain the following services by the manufacturer for field quality control application:
 - a) Have manufacturer's representative review site work involved in handling, installation, protection and cleaning of drainage membrane and accessories, submit written reports in acceptable format related to compliance of work to contract conditions
 - b) Have the manufacturer's representative perform inspection of the pre-installation site conditions for acceptability, and perform periodic inspections throughout installation to ensure the manufacturer's installation requirements are being met at the following frequencies,
 - i) Twice during installation of the membrane at 25% and 60% complete
 - ii) At completion of the work for compliance of installation technique
 - iii) Complete inspection reports, send to Consultant within 72 hours of completion regarding any deficiencies

3.5 PATCHING THE MEMBRANE

- D. If you need to patch the membrane because of a tear, use an extra piece of membrane (core and fabric) that is at least 12 inches larger than the tear. Mesh the dimples as close as practically possible, seal any open voids left between the patch and the original membrane core materials and install Hydrostar Washers™ in the corners or perimeter of the patch.
- E. Completely seal all edges of the patch using a moisture proof vapour tape extending 4" beyond the joint. Fill any voids between the patch and the main membrane with Bentonite packing or Swell compound. The joint should be relatively water tight prior to the backfill or concrete pour.

3.6 BACKFILLING

- A. Prior to backfilling, inspect membrane for tears and other damage and repair.
- B. Take care when backfilling or pouring concrete to avoid damage to membrane; replace membrane damaged during backfilling.
- C. Cover drainage or drainage system with approved granular or filter material.
- D. Carefully backfill the balance of the excavated area. Use a shoot or pumping for concrete placement on blind sides to reduce the risk of damage to the membrane.
- E. Make sure the finished grade is just slightly above the top of the Hydrostar Drain 6000DB™ .

END OF SECTION