



Evaluation Report CCMC 13209-R Delta Drain (Standard) Drainage

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1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Delta Drain (Standard) Drainage”, when used as a foundation wall drainage material in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the Ontario Building Code 2012:

- Clause 1.2.1.1.(1)(a), Division A, using the following acceptable solutions from Division B:
 - Clause 9.14.2.1.(2)(b), Foundation Wall Drainage

This opinion is based on CCMC’s evaluation of the technical evidence in Section 4 provided by the Report Holder.

Ruling No. 07-13-171 (13209-R) authorizing the use of this product in Ontario, subject to the terms and conditions contained in the Ruling, was made by the Minister of Municipal Affairs and Housing on 2007-04-05 (revised on 2013-07-11) pursuant to s.29 of the *Building Code Act*, 1992 (see Ruling for terms and conditions). This Ruling is subject to periodic revisions and updates.

2. Description

The product is a geocomposite drainage system composed of a high-density polyethylene, quasi-rigid plastic sheet core membrane that is extruded in such a way that results in a dimpled surface on one side and a smooth surface on the other. A polypropylene heat-bonded geotextile filter fabric is attached to the raised dimples.

The product sheet is 0.6 mm thick and is available in rolls 20 m long and 1.8 m or 2.45 m wide.

To ensure correct application, the product's geocomposite drainage system includes a range of accessories such as fasteners and molding strips.

The product’s geocomposite drainage system is installed with the geotextile surface facing away from the foundation wall against the surrounding soil. The geotextile acts as a filter to prevent suspended soil particles from clogging the flow passages in the dimpled core. Illustrations of the front and back of the product are shown in Figures 1 and 2 and the anchor is illustrated in Figure 3.

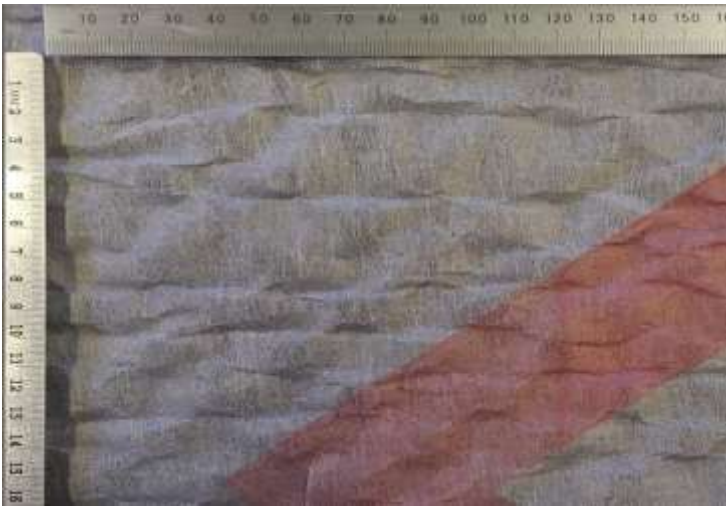


Figure 1. Side-facing soil

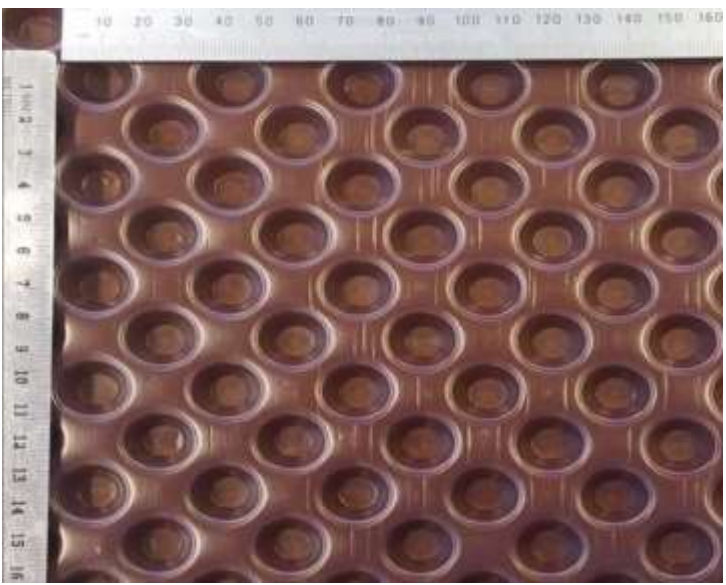


Figure 2. Side-facing wall



Figure 3. Anchor

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the "Delta Drain (Standard) Drainage" being used in accordance with the conditions and limitations set out below.

- Based on the evidence provided, the product has been classified as Type 2, Class A (descriptions below).
- The product must be installed in accordance with the manufacturer's instructions.
- The product was evaluated for use against cast-in-place concrete and concrete block foundations only.
- The product is a dimpled membrane drainage product designed to act as a protective layer or a capillary breaking layer against the foundation wall to protect the wall against transient or intermittent water that may come in contact with the surface of the wall.
- The product has been evaluated for use in vertical applications in depths of 3.7 m (Type 2) below grade. Applications greater than 3.7 m are considered to be outside the scope of this Evaluation.
- The product is only one portion of the total foundation drainage system, which consists of a combination of design and construction processes that use different products. In particular, it must be bent at the footing to guide water past the cold joint to a drainage pipe located outside of the footing at the bottom of the wall. This pipe will drain the water collected by the product toward an outflow (i.e., sewer). The product relies on a foundation wall drainage system that conforms to Subsection 9.14.3., Drainage Tile and Pipe, or to Subsection 9.14.4., Granular Drainage Layer, of Division B of the OBC 2012.
- The placement and grading of backfill must conform to the requirements of Subsection 9.12.3., Backfill, of Division B of the OBC 2012. It is recommended that an impervious "topping off" layer of clay or silt material be placed on top of the backfill with a positive slope leading surface water away from the building.
- The product must be protected from exposure to ultraviolet (UV) sunlight within a maximum of 30 days of its installation.
- Class "A" products (geotextile facing the soil), must be backfilled before runoff water hits the geotextile (e.g., during a heavy rainfall) to prevent clogging of the filter by fine particles of the soil carried by the running water.
- Long-term performance of a drainage system will depend on local conditions such as the soil type, hydrogeology of the site, mineralogy and presence of microorganisms in the soil (i.e., iron ochre), as well as compatibility of the filter with the soil, among other issues. There should be a proper engineering design for the drainage system.
- The performance of fixtures used to anchor the product in the wall was evaluated for a single anchor. It is the manufacturer's responsibility to define the pattern and spacing of anchors considering the anchor strength as well as site-specific issues such as the type of soil, how it will interact with the product, and the backfilling method used.
- The top of the membrane and all vertical joints and terminations must be mechanically fastened and sealed to prevent soil particles from entering behind the membrane. Accessories used to anchor the product are part of the Evaluation.
- The product must be labelled with the manufacturer's name or logo and the phrase "CCMC 13209-R."

4. Technical Evidence

The Report Holder has submitted technical documentation for CCMC's evaluation. Testing was conducted at laboratories recognized by CCMC. The corresponding technical evidence for this product is summarized below.

4.1 Performance Requirements

Table 4.1.1 Results of Testing the Performance Requirements of the Product

Property		Unit	Requirement	Result
Compressive strength (initial)		kPa	150	269
Dynamic impact resistance (mean failure energy)		J	≥ 2.45	2.6
Creep resistance (residual thickness at 25 years/10°C)		%	≥ 50% at 25 years/10°C	81.6
Cold bending at -30°C		N/A	No visible crack	No visible crack
Tensile strength	at yield	kN/m	≥ 8	XD 15.1 ⁽¹⁾
	elongation at break	%	≥ 25	XD 34.3
	Anisotropy Ratio		≥ 0.5	1.0
Heat aging for 8 weeks	dimensional change	%	≤ 1	MD -0.8, XD -0.2
	weight change	%	≤ -0.1	-0.1
	residual compression strength	%	≥ 80 of initial	100.2
Resistance to alkaline environment	appearance	N/A	No visible crack	No visible crack
	residual compression strength	%	≥ 80 of initial	100.4
	bending resistance	N/A	No visible cracks	No visible crack
Geotextile fabric properties	grab tensile	N	≥ 500	MD 650, XD 713
	puncture resistance	N	≥ 100	236
	trapezoid tear resistance	N	≥ 180	MD 301, XD 320
	filtration opening size by hydrodynamic sieving	µm	≤ 180; Report value	120
	permittivity	s-1	≥ 0.5; Report value	1.5
	UV resistance (retained strength)	% retained	> 50% after 500 hours	MD 78.2, XD 88.8
Hydraulic transmissivity (flow rate)		m ³ /h.m	1.33	4.9
Geometrical Properties:				
Orientation of the dimples		-	Report value	Diagonal
Number of dimples per unit area		dimples/m ²	Report value	1 554
Overall thickness		mm	Report value	8.67
Sheet thickness		mm	Report value	0.51
Hollow core thickness		mm	Report value	8.16
Anchorage performance	anchorage efficiency	kN/anchor	Report value	1.13

Note to Table 4.1.1:

(1) "MD" refers to the machine direction of the product; "XD" refers to cross direction of the product.

Report Holder

Dörken Systems Inc.
4655 Delta Way
Beamsville ON L0R 1B4

Telephone: 905-563-3255

Fax: 905-563-5582

Email: info@dorken.com

Web: www.dorken.com

Plant(s)

Beamsville, ON

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