



Evaluation Report CCMC 12788-R

Delta®-MS

MasterFormat:	33 46 23.01
Evaluation issued:	1997-01-09
Re-evaluated:	2018-05-15

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that “Delta®-MS,” 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) of 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. 98-02-52 (12788-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 1998-02-17 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 high-density polyethylene, quasi-rigid, plastic sheet membrane that is extruded in a manner that results in a dimpled surface on one side and a smooth surface on the other. The sheets have 8-mm-deep dimples and are available in rolls that are 0.6 mm thick, 20 m long and in widths ranging from 1.07 m to 3.0 m. The dimpled surface is installed facing the foundation wall to provide a capillary breaking layer that protects against transient or intermittent water.

“DELTA®-MS” profiles and anchors are illustrated in Figures 1, 2 and 3.

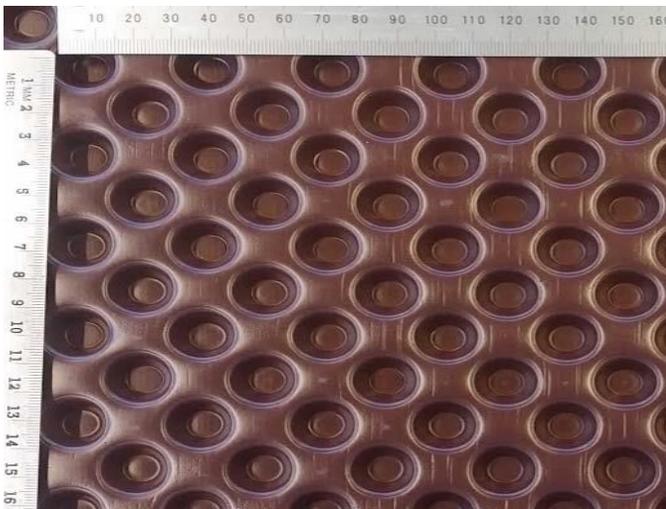


Figure 1. “DELTA®-MS” drainage membrane – face in contact with the soil



Figure 2. “DELTA®-MS” drainage membrane – face in contact with the wall



Figure 3. “DELTA®-MS” drainage membrane – anchor

3. Conditions and Limitations

CCMC’s compliance opinion in Section 1 is bound by the “Delta®-MS” 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 (applications up to depths of 3.7 m), Class B (cups facing soil).
- 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 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, the product 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 Subsections 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.
- 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 12788-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

4.1.1 Technical Evidence

Table 4.1.1. Test Results for “DELTA®-MS” Drainage Membrane

Property		Unit	Requirement	Result
Compressive strength (initial)		kPa	150	223
Dynamic impact resistance (mean failure energy)		J	≥ 2.45	8.3
Creep resistance (residual thickness at 25 years/10°C)		%	≥ 40% at 25 years/10°C	77.5
Cold bending at -30°C		N/A	No visible crack	No visible crack
Tensile strength	at yield	kN/m	≥ 8	XD ⁽¹⁾ 8.1
	elongation at break	%	≥ 25	XD 29.8
	Anisotropy ratio	N/A	≥ 0.5	1.1
	tensile strength in print area	%	≥ 90% of tensile strength	100%
Heat aging for 2 weeks	dimensional change	%	≤ 1	MD ⁽¹⁾ -0.6, XD -0.5
	weight change	%	≤ -0.1	0.0
	residual compression strength	%	≥ 80 of initial	107.8
Resistance to alkaline environment	appearance	N/A	No visible crack	No visible crack
	residual compression strength	%	≥ 80 of initial	101.5
	cold bending at -30°C	N/A	No visible crack	No visible crack
Geometrical properties:				
Orientation of the dimples		-	Report value	Diagonal
Number of dimples per unit area		dimples/m ²	Report value	1 560
Overall thickness		mm	Report value	8.43
Sheet thickness		mm	Report value	0.48
Hollow core thickness		mm	Report value	7.95
Anchorage performance	anchorage efficiency	kN/anchor	Report value	0.95

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

Plant(s)

Beamsville, ON

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Date modified:

2018-05-23