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*EVALUATION
REPORT*

DIVISION 07191

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Graftex®

Protection Hydrofuge
8810 Duceppe
St-François (Québec)
H7A 1R3

Tel.: (450) 666-6099
Fax: (450) 666-6199

Plant: Ewald Dörken AG
58313 Herdecke
Germany

1. Purpose of Evaluation

The proponent sought confirmation from the Canadian Construction Materials Centre (CCMC) that "Graftex®" can serve to repel water and to provide protection against graffiti for exterior walls.

2. Opinion

Test results and assessments provided by the proponent show that "Graftex®" complies with CCMC's Technical Guide for Penetrating Water Repellents for Concrete and Masonry Surfaces, Masterformat number 07191, dated 1998-07-07.

The National Building Code of Canada, (NBC) 1995 has no specific requirements for such a product. If used in accordance with the limitations and conditions stated in this report, "Graftex®" provides added protection against moisture intrusion, chemical attacks (sulfuric/nitric acids), and pollution (carbon dioxide) on above-ground clay brick exterior walls, and provides protection against graffiti for clay brick, concrete and concrete block surfaces.

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Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the *National Housing Act*.

3. Description

"Graftex®" is a clear, water-based, acrylic emulsion, water-repellent coating that provides added protection against moisture intrusion, chemical attacks (sulfuric/nitric acids), pollution (carbon dioxide) and facilitates the removal of graffiti.

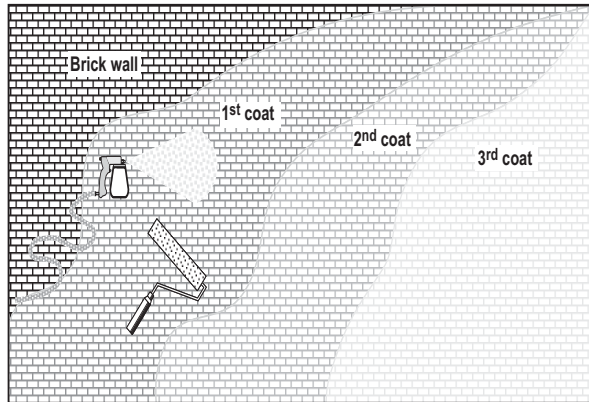


Figure 1 "Graftex®" Application Methods

4. Usage and Limitations

"Graftex®" may be used on clay brick surfaces subject to the following conditions:

"Graftex®" must be applied by qualified and certified installers, under the supervision of "Protection Hydrofuge". The product must be applied in conformance with the manufacturer's installation manual, dated 10 January 2001.

"Graftex®" must be applied on damp surfaces in three coats, where each coat must be allowed to dry completely before the application of the following coats. Each coat is left to dry for 15 - 60 minutes before application of the next consecutive coat. (Depending on porosity of the substrate and the atmospheric conditions at time of application.) The expected coverage rate varies between 5 - 10 m²/l depending on the porosity of the substrate.

Note: The test results indicated in this report have been obtained based on three-coat application with the consecutive concentrations of 50%, 80% and 80%. Different concentrations and/or number of coats might be required depending on the coefficient of water absorption of the substrate which is required to be tested for, prior to the application of "Graftex®," as indicated in the manufacturer's installation manual.

"Graftex®" must not be applied when the ambient temperature and/or the substrate temperature is less than 5°C. In addition, "Graftex®" must not be applied when the ambient relative humidity (RH) is greater than 90%.

"Graftex®" must be applied on clean surfaces free of oil, dust and deposits of moss and algae.

In order to obtain the cleanability rating indicated in Table 3, re-application of "Graftex®" is required on areas where graffiti has been removed.

The efficiency of water repellents is time-dependent, as it is affected by solar radiation and other atmospheric conditions. Re-application of the product might be necessary to maintain the desired level of repellency.

Although "Graftex®" is considered to be clear, its application could darken the surface or give it a glossy appearance.

Test data on brick specimens coated with "Graftex®" indicated an average reduction in water vapour permeance in excess of 20%. Depending on the water vapour permeance of the brick, "Graftex®" may reduce the water vapour permeance of the brick to less than 60 ng/(Pa s m²). The application of "Graftex®" on exterior brick walls must be carefully assessed before use.

Note: The water repellent will restrict entry of moisture through the plane of the wall, but in applications not having a drained air space, it will also restrict drying of the wall should moisture get in behind the wall.

5. Performance

The established levels of performance are based on a survey of documentation from research projects that were conducted on a large number of products intended for such usage.

Testing of “Graftex®” was conducted at an independent laboratory recognized by CCMC.

The corresponding test results for “Graftex®” are summarized in tables 1, 2 and 3.

Table 1. Test Results for the “Graftex®” on Clay Brick

Test	Requirements	Result
Identification of Constituents	Report analysis	Report on file
Specific Gravity (g/ml)	Report value	1.06
Solid Content (%)	Report value	66.2
Depth of Penetration (mm)	min. 4	No Data ⁽¹⁾
Reduction in Water Absorption (Treated Vs Untreated, %)	< 20	4.93
Water Vapour Permeance (Treated specimen, ng/(Pa s m ²))	> 60	(Passed) ⁽²⁾
Reduction of Water Vapour Permeance (%) (Treated Vs Untreated, %)	< 20	34.9 ⁽²⁾
Resistance to CO ₂ Diffusion <ul style="list-style-type: none"> - Equivalent air layer (S_d)⁽³⁾ (m) - In 2-coat application of 35 μ - In 3-coat application of 40 μ. 	> 50	107 ⁽³⁾ 136 ⁽³⁾
Freeze/Thaw Resistance	Deterioration does not exceed that of untreated samples	Passed
Accelerated Weathering <ul style="list-style-type: none"> - Reduction in water repellency % 	< 20	(9.6 - 0.6) ⁽⁴⁾

Notes to Table 1:

- (1) Measurements could not be taken. The product is considered to be a film. “Graftex®” has been deemed to be in compliance with the intent of Section 5.5 of the Technical Guide, Depth of Penetration, because it meets the thermal coefficient of linear expansion requirements.
- (2) The average water vapour permeance of “Graftex®”-coated brick specimens was 71 (ng/(Pa s m²)) with an average reduction of water vapour permeance of 34.9%. Depending on the original water vapour permeance of the brick wall surface, “Graftex®” may reduce the water vapour permeance of the brick to less than 60 ng/(Pa.s.m²). Therefore, the application of

“Graftex®” on exterior brick walls must be carefully assessed before use. See Section 4 (Usage and Limitations.)

- (3) Criterion for CO₂ barrier is a minimum equivalent air layer (S_d) of 50 m when measured by the Klopfer method. When applied in two coats with a total thickness of 35 μ and 3 coats with a total thickness of 40 μ, “Graftex®” has an equivalent air layer of 107 m and 136 m respectively.
- (4) The Technical Guide requires a reduction in water repellency of less than 20% when subjected to 2000 hours of UV radiation and saturated water vapour. The test was carried out for 3800 hours. The test results indicated a reduction in water repellency of 9.6 % when measured at A₄₈ and 0.6% when measured at A₇₂ (A_{48/72} being the water absorption coefficient at 48 and 72 hours consecutively). The results need to be interpreted, as the efficiency of the water repellent is time dependent. See Section 4 (Usage and Limitations). There is no correlation between the number of hours of accelerated weathering through UV radiation and natural weathering.

Table 2. Acid Rain Resistance

Number of Cycles ⁽¹⁾	Observation	
	Treated	Untreated
25	Nothing	Light craters
50	Nothing	Light craters
75	Light Fluorescence ⁽²⁾	Light craters
100	Light Fluorescence ⁽²⁾	Light craters + Discolouration
125	Light Fluorescence ⁽²⁾	Light craters + Discolouration
150	Light Fluorescence ⁽²⁾	Light craters + Discolouration

Notes to Table 2:

- (1) Cycles consist of 1 hour of rain and 3 hours of IR-radiation. The first 75 cycles are conducted with simulated rainwater with a PH of 5.6, the next 75 cycles are conducted with acid rain water with a PH of 3.5.
- (2) The observed fluorescence on the treated sample was beneath the water repellent.

Table 3. Graffiti Resistance

Type of Substrate	Type of paint	1 cycle	2 cycle	3 cycle	4 cycle	5 cycle
Clay Brick	Acrylic Paint	Very good ⁽¹⁾	Very good	Very good	Very good	Very good
	Cellulose paint	Very good	Very good	Very good	Very good	Very good
	Alkyds	Very good	Very good	Very good	Very good	Very good
	Polyurethane	Very good	Very good	Very good	Very good	Very good
	Permanent Marker	Very good	Very good	Very good	Very good	Very good
Concrete	Acrylic Paint	Very good	Very good	Very good	Very good	Very good
	Cellulose paint	Very good	Very good	Very good	Very good	Very good
	Alkyds	Very good	Very good	Very good	Very good	Very good
	Polyurethane	Very good	Very good	Very good	Very good	Very good
	Permanent Marker	Very good	Very good	Very good	Very good	Very good

Table 3. Graffiti Resistance (cont'd)

Type of Substrate	Type of paint	1 cycle	2 cycle	3 cycle	4 cycle	5 cycle
Masonry Block	Acrylic Paint	Very good	Very good	Very good	Very good	Very good
	Cellulose paint	Very good	Very good	Very good	Very good	Very good
	Alkyds	Very good	Very good	Very good	Very good	Very good
	Polyurethane	Very good	Very good	Very good	Very good	Very good
	Permanent Marker	Very good	Very good	Very good	Very good	Very good

Note to Table 3:

(1) The cleanability rating is based on the following:

Poor	No paint or very little paint removed
Good	Approximately 75% of paint removed
Very good	Virtually all paint removed

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Note: Readers are asked to refer to limitations imposed by NRC on the interpretation and use of this report. These limitations are included in the introduction to CCMC's Registry of Product Evaluations, of which this report is part.

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