

# DIATHONITE EVOLUTION

*Breathable, eco-friendly thermo-plaster*

**Diathonite Evolution is an eco-friendly Exterior Insulation Finishing System – EIFS. This premixed plaster is reinforced with granulated recycled cork (grain size 0-3 mm – 0-0.12 in), clay, diatomaceous powders and natural hydraulic lime (NHL 3.5). Diathonite Evolution is a ready-to-use highly breathable natural compound, designed for the realization of thermal coatings and dehumidification for indoor and outdoor. It is indeed a product that merges the ability of cork to insulate from cold and that of stone, which is the insulation from heat. The product has an excellent fire reaction performance (non-combustible) and it is recyclable as an inert at the end of its life cycle. The porosity of cork and the presence of lime inside the plaster make Diathonite Evolution bacteriostatic and anti-mould.**

## BENEFITS

- Insulates from cold and heat, ensuring good dynamic phasing parameters, up to 12 hours depending on the wall characteristics.
- High breathability.
- Avoids mould and condensation.
- Absorbs and releases the excess humidity.
- Ideal for historic restoration.
- Protects masonry in time.
- Ecologic.
- Fast construction system (*thermal brick + thermal plaster*), and quick application (plastering machine).
- Made of natural hydraulic lime NHL 3.5 (EN 459-1).
- Excellent compression resistance.
- It can be applied on top of old plasters.
- Reaction to fire: class A1.
- External insulation with no need for joints.
- Product with double CE (EN 998-1, EN 998-2) and UKCA certification (BS EN 998-1, BS EN 998-2).

## YIELD

3.70 kg/m<sup>2</sup> (±10%) per cm of thickness.  
1.92 lb/ft<sup>2</sup> (±10%) per inch of thickness.

## COLOUR

Light grey.

## PACKAGING

18 kg (39.68 lb) paper bag.  
Pallet: n° 60 paper bags (1080 kg – 2381 lb).

## APPLICATION FIELDS

Premixed thermo-plaster for indoor and outdoor applications, suitable for the realization of thermal insulation and dehumidification. *Diathonite Evolution* solves the problems related to thermal bridges and moulds induced by humidity, ensuring a healthy environment and a high living comfort. In addition, *Diathonite Evolution* is a natural compound and it is suitable where environmentally friendly materials are mandatory.

## STORAGE

Store the product in its original containers tightly closed, away from sun, water and frost,



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and kept at temperature higher than +5°C / +41°F. Storage time: 12 months.

## PREPARATION OF THE SUPPORT

The support must be completely hardened and solid. The surface must be thoroughly cleaned, dry, well-bonded, without crumbly and inconsistent parts, perfectly levelled, and free of dust and dirt.

Before applying the product, it is recommended to cover each element that should not be coated.

Potential lesions or damaged parts of the support must be restored before the application of the product.

### Bricks

Primer is not needed, *Diathonite Evolution* can be applied directly to the substrate.

### Concrete

In case of distressed and crumbly concrete, restoration with suitable cement mortar should be planned. For the treatment of reinforcing steel bars apply suitable anti-corrosion products.

**Smooth:** apply the *Aquabond* primer (see technical data sheet).

**Rough:** primer is not needed, apply the plaster directly to the substrate.

### Cellular Concrete

*Diathonite Evolution* can be applied over cellular concrete panels without primer.

### Masonry

If necessary, clean the surface with water jet cleaner or brush the surface.

Check the masonry, restore damaged or not fixed bricks and stones. If there is salt efflorescence, apply *Diathonite Regularization* (see technical data sheet).

To uniform the substrate, use a lime-based mortar to keep breathability.

### Old plaster

Ensure that the plaster is consistent and well attached to the support, otherwise provide for partial or total removal. Whenever salts efflorescence is present, remove the damaged plaster and apply the *Diathonite Regularization* (see technical data sheet).

With painted plasters, given the wide variety of paints on the market, it is recommended to make an adhesion test to verify the suitability for the application or the need to use the primer *Aquabond*.

On smooth plasters apply the *Aquabond* primer or, if necessary, perform a staking of the support. On rough plasters proceed with the direct application of *Diathonite Evolution*.

Before the application, it is always necessary to verify that the existing plaster is compatible with the characteristics and composition of *Diathonite Evolution*; in case of gypsum-based plasters, it is recommended the complete removal before the application of cork based thermal plaster, in order to avoid compromising the stability of the system due to material incompatibility.

### Panels

*Diathonite Evolution* can be applied on untreated cork panels without using a primer.

Due to the wide variety of panels available on the market, it is recommended to carry out an adhesion test to verify the suitability for the direct application of *Diathonite Evolution* or the need to first use the *Aquabond*.

To ensure best results, make sure that the panels are installed tightly.

### Wood

On non-treated wooden supports, proceed with the direct application of *Diathonite Evolution* plaster. With smooth or treated wood, first

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proceed with priming the surface with *Aquabond*.

## MIXING

Depending on the degree of water absorption of the support, and also taking into account the environmental conditions, it is recommended to dose the right amount of water needed for achieving the correct adhesion.

Therefore, the amount of water specified is indicative.

If mixed with a **concrete mixer** or a **mixing drill**, add 11 - 14 L of clean water for each bag of *Diathonite Evolution* (18 kg). **Do not mix more than 3-4 minutes**. Load the contents of the bags inside the hopper and adjust the flow meter of the machine: firstly, set it to **400-600 L/h** to moisten the tube, and then adjust the flow to **250-300 L/h** to proceed with the application.

- The blend must present a foamy consistency
- Do not add external compounds to the mixture.

## APPLICATION

### Application by hand

1. It is **essential** to wet the support, especially in summer and in case of walls directly exposed to the sun. In case the surfaces were primed beforehand, it is not necessary to wet the support.
2. Create reference points or bands to obtain the required thicknesses. Points or bands can be made with *Diathonite Evolution* plaster or with aluminium or wood profiles. In the latter case, bands must be removed immediately after the application of the last layer.
3. Corner sections can be placed together with reference bands, in any case

always before the application of the last coat.

4. To secure corners and edges provide for the use of aluminium corner guards. These aluminium guards must be fixed with *Diathonite Evolution* to avoid thermal bridges.
5. It is essential to wet the plaster before applying each layer.
6. With a masonry trowel apply a layer of *Diathonite Evolution*, taking care to create a thickness that can reach up to 4 cm (1.6 inches).
7. If the desired thickness can't be reached with the first coat, when the underlying layer is consistent to the touch and visually lighter (after about 12/24 hours) proceed with the application of one or more layers of *Diathonite Evolution* until the specified thickness is reached. In any case make sure to maintain for each applied coat a thickness  $\leq 4$  cm (1.6 inches).
8. At 60 mm thickness or more, a mesh such as *Polites 140* (see technical data sheet) must be included in the middle of the total thickness. *Polites 140* must be used independently of the thickness for applications on panels, wood, plasterboard or on supports subject to movement.
9. Alongside beams and pillars, the mesh shall lean on both sides of the concrete element by at least 15 cm (5.9 inches).
10. While smoothing the plaster, do not compress *Diathonite Evolution* to preserve the porosity of the product. Use an H-shape or a knife to obtain a smooth surface, with fluid horizontal and vertical movements.

### Application by plastering machine

*Diathonite Evolution* can be applied with plastering machines for lightened premixed products. The setting can change depending on the machine chosen.

It is possible to use three-phase plastering machines (similar to PFT G4) equipped with a



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rotor stator D6-3, a semi-closed mixing shaft, and a conical spraying gun with a diameter of 35/25 mm, a nozzle of 14 or 16 mm.

1. It is **essential** to wet the support, especially in summer and in case of walls directly exposed to the sun. In case the surfaces were primed beforehand, it is not necessary to wet the support.
2. Create reference points or bands to obtain the required thicknesses. Points or bands can be made with *Diathonite Evolution* plaster or with aluminium or wood profiles. In the latter case, bands must be removed immediately after the application of the last layer.
3. Corner sections can be placed together with reference bands, in any case always before the application of the last coat.
4. To secure corners and edges provide for the use of aluminium corner guards. These aluminium guards must be fixed with *Diathonite Evolution* to avoid thermal bridges.
5. Wet the plaster before applying each layer. Load the contents of the bags inside the hopper and adjust the flow meter of the machine. Regulate water pressure through the flow meter, starting from a high dosage and decreasing the water flow until the consistency is suitable for the perfect grip of the material.
6. Spray the product downside up, thus applying a first coat of *Diathonite Evolution*, and always making sure to create a thickness that can reach up to 4 cm (1.6 inches).
7. If the desired thickness can't be reached with the first coat, when the underlying layer is consistent to the touch and visually lighter (after about 12/24 hours) proceed with the application of one or more layers of *Diathonite Evolution* until the specified thickness is reached. In any case make sure to maintain for each applied coat a thickness  $\leq 4$  cm (1.6 inches).
8. Spray *Diathonite Evolution* with as few interruptions as possible. If the interruptions require long waiting times, soak the nozzle in clean water to prevent the formation of a hard plug in the gun.
9. At 60 mm thickness or more, a mesh such as *Polites 140* (see technical data sheet) must be included in the middle of the total thickness. *Polites 140* must be used independently of the thickness for applications on panels, wood, plasterboard or on supports subject to movement.
10. Alongside beams and pillars, the mesh shall lean on both sides of the concrete element by at least 15 cm (5.9 inches).
11. While smoothing the plaster, do not compress *Diathonite Evolution* to preserve the porosity of the product. Use an H-shape or a knife to obtain a smooth surface, with fluid horizontal and vertical movements.

## Application for ventilated façade systems

1. After preparing the substrate, install and fasten the elements that make up the substructure of the ventilated façade to the wall according to the project specifications;
2. Successively, depending on the type of substrate, assess the possible need to apply *Aquabond* primer;
3. Apply *Diathonite Evolution* according to the above-mentioned application specifications until the project thickness is reached;
4. After the necessary drying time, apply the water-repellent *BKK Eco*;
5. It is recommended to pay particular attention to the points where *Diathonite Evolution* is more subject to hygrometric stresses, such as at the base of the wall near the ground or in the joints between the flat roof slab and the external walls. At these points, the use of suitable flashings and/or localised waterproofing is highly recommended;



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- Conclude with the installation of the superstructure and all other elements necessary for the completion of the ventilated façade according to the project specifications.

## DRYING TIME

At a temperature of 23 ° C and relative humidity of 50% the product dries in 10-15 days.

- Drying times are affected by relative humidity and temperature of the environment, and can also vary significantly.
- If *Diathonite Evolution* is applied in high thicknesses, the drying time is considerably longer.
- Protect *Diathonite Evolution* from frost, direct insolation and wind while it is still curing.
- In case of high temperatures, hot sun or strong ventilation it is necessary to wet the plaster even 2/3 times a day for the first 2/3 days after application.
- At temperatures above 28 °C (+ 83 °F) wet the plaster every 2 hours to avoid cracks.
- If applied indoors, aerate as much as possible the environment during application and during drying of the product.
- As soon as *Diathonite Evolution* has dried, it is recommended to cover the plaster using the chosen finishing system.
- If applied outdoors, in order to avoid prolonged exposure to harsh weather conditions, it is essential to proceed as follows: after applying the last layer of *Diathonite Evolution* and waiting for its complete curing (not earlier than 10-15 days), it is recommended to cover the plaster with the chosen smoother. When the latter is fully cured (not earlier than 7 days), apply the finish.

For smoothing the plaster, both indoors and outdoors, it is possible to use *Argatherm* (to

obtain medium rough surfaces with particle size 0-0,6 mm or 0–0,02 inches) and *Argatherm Ultrafine* for perfectly smooth surfaces.

For finishing these skim coats, use products such as *Decork Façade*, *Acrilid Protect Coating*, and be sure to use only breathable and water-repellent finishes for **exterior** applications. For **indoor** applications, use instead finishes such as *Decork Design*, *C.W.C. Stop Condense*, *Limepaint*, or in any case breathable finishes. It is always recommended to prefer Diasen finishes.

## SUGGESTIONS

- Do not apply at environmental temperature or at support temperature lower than +5°C (34°F) and higher than +35°C (95°F).
- During summer season, apply the product in the cooler hours of the day, away from sunlight.
- Do not apply with imminent threat of rain or frost, in conditions of strong fog or with relative humidity higher than 70%.
- Where it is considered necessary, and only after contacting the technical office of the Diasen, it is possible to proceed with the application, by hand or by machine, of a first layer of *Diathonite Evolution* as a rough coat.
- Diathonite Evolution* can be used with plastering machines for ceiling applications. Hand application is not recommended.
- If applied indoors, it is **essential** that the external surface does not absorb water. Otherwise, treat the surface with *BKK Eco*.
- In case of exposed walls, apply a water-repellent and breathable BKK transparent siloxane product, such as *BKK Eco*.
- It is strictly recommended to waterproof and protect the areas which are mostly subject to hygrometric stress, such as at the bottom/base of the façades where it meets the ground, the joints between the



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flat roof slab and the façades and any part around windows and doors which may be subject to water infiltrations.

- Whenever there are doubts about the consistency of the substrate, it is recommended to make an adhesion test area.
- The test area should allow to verify any chemical, mechanical and physical incompatibilities between *Diathonite Evolution* and the support.

## CLEANING

The equipment used can be washed with water before hardening of the product.

## SAFETY

While handling, always use personal protective equipment (PPE) and respect the instructions described in product safety data sheet.

\* These data, even if carried out according to regulated tests, are indicative and they may change when specific site conditions vary.

## Technical Data\*

Features		Unit
Yield	3.70 (±10%) for each cm of thickness	kg/m <sup>2</sup>
	1.92 (±10%) per inch of thickness	lb/ft <sup>2</sup>
Aspect	powder	-
Colour	light grey	-
Density	360 ± 20	kg/m <sup>3</sup>
	22.5 ± 1.25	lb/ft <sup>3</sup>
Grain size	0 – 3	mm
	0 - 0.12	in
Water to add to the mixture	0.60 – 0.80 L/kg	L/kg
	11 - 14 L for each 18 kg bag	
Application temperature	0.072 – 0.096 gal U.S. per paper bag (39.68 lb)	gal U.S. / lb
	+5 / +30	°C
Workability time (UNI EN 1015-9 – method B)	+41 / +95	°F
	40	min
Minimum thickness for application	1.5 / 0.6	cm / inches
Maximum thickness for each layer	4 / 1.6	cm / inches
Drying time (T=23°C; U.R. 50%)	10-15	days
Storage	12	months
Packaging	18 kg (39.68 lb) paper bag	kg



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Final performances		Unit	Regulation	Results
Reaction to fire	class A1	-	UNI EN 13501-1	-
Compressive strength	2.95	N/mm <sup>2</sup>	EN 998-1	category CSII
	427.9	lbf/in <sup>2</sup> (psi)		
	6.161×10 <sup>4</sup>	psf	EN 998-2	M 2.5
Flexural strength	1.5	N/mm <sup>2</sup>	UNI EN 1015-11	-
	217.6	lbf/in <sup>2</sup> (psi)		
	3.13 ×10 <sup>4</sup>	psf		
Dried mortar porosity	71.64% (17.83% macroporosity and 54.94% microporosity)	-	-	-
Vapour permeability coefficient (μ)	μ = 4	-	UNI EN 1015-19	highly breathable
	WVT = 14	grains/h·ft <sup>2</sup>	ASTM E96	
Thermal conductivity (λ)	0.045	W/mK	UNI EN 1745	category T1
Thermal resistance (R) <i>for 1 cm/ 0.4 in thickness</i>	0.222	m <sup>2</sup> K/W	UNI 10355	-
Specific heat capacity (c)	1000	J/kgK	UNI EN 1745 UNI EN 10456	-
	0.239	kcal/kg °C	-	-
Thermal diffusivity (a)	0.125 x 10 <sup>-6</sup>	m <sup>2</sup> /s	UNI TS 11300-1	-
Water absorption by capillarity	0.40	kg/m <sup>2</sup> min <sup>0.5</sup>	UNI EN 1015-18	category W1
Water penetration depth <i>(after 90 minutes)</i>	40	mm	UNI EN 1015-18	-
	1.57	in		
Adhesion onto the support <i>(brick)</i>	0,10	MPa = N/mm <sup>2</sup>	UNI EN 1015-12	break type B mortar break
	14.5	lbf/in <sup>2</sup>		
Adhesion on <i>tuff</i>	0.201	MPa = N/mm <sup>2</sup>	UNI EN 1015-12	-
	29.15	lbf/in <sup>2</sup>		
Adhesion on wood fibres panels	-	-	UNI EN 1015-12	good
Marble adhesion onto <i>Diathonite Evolution</i>	0.241	MPa = N/mm <sup>2</sup>	UNI EN 1015-12	-
	34.95	lbf/in <sup>2</sup>		
Stone adhesion onto <i>Diathonite Evolution</i>	0.241	MPa = N/mm <sup>2</sup>	UNI EN 1015-12	-
	34.95	lbf/in <sup>2</sup>		
Tensile secant modulus	742	N/mm <sup>2</sup>	UNI 6556	highly elastic
	107618	lbf/in <sup>2</sup>		

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\*\*\* Credits valid only for LEED standard for Schools, LEED for Core & Shell, v. 2009.

LEED® credits		
***Standard LEED for New Construction & Major Renovation, LEED for Schools, LEED for Core & Shell, v. 2009		
Thematic area	Credit	Score
Energy & Atmosphere	EAp2 - Minimum energy performance	mandatory
	EAc1 – Optimize Energy Performance	from 1 to 19
Materials & Resources Energy & Atmosphere	MRc2- Construction Waste Management	from 1 to 2
	MRc4 – Recycled Content	from 1 to 2
	MRc5 – Regional Materials	from 1 to 2
	MRc6 - Rapidly Renewable Materials	1
Indoor Environmental Quality	IEQc3.2 - Construction Indoor Air Quality Management Plan—Before Occupancy	1
	IEQc4.2 - Low Emitting Materials - Paints and Coatings	1
	IEQc11 - Mold Prevention**	1




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## Indoor Air Quality (AIQ) Certification

### Evaluation of the results

Regulation or protocol	Version of regulation or protocol	Conclusion
French VOC Regulation	Decree of March 2011 (DEVL1101903D) and Arrêté of April 2011 (DEVL1104875A) modified in February 2012 DEVL1133129A)	
French CMR components	Regulation of April and May 2009 (DEVP0908633A and DEVP0910046A)	Pass
Italian CAM Edilizia	Decree 11 October 2017 (GU n.259 del 6-11-2017)	Pass
AgBB/ABG	Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes, ABG May 2019, AgBB August 2018	Pass
Belgian Regulation	Royal decree of May 2014 (C-2014/24239)	Pass
Indoor Air Comfort®	Indoor Air Comfort 7.0 of May 2020	Pass
Blue Angel (DE-UZ 113)	DE-UZ 113 for “Low-Emission Floor Covering Adhesives and other Installation Materials” (Version January 2019)	Pass
BREEAM International	BREEAM International New Construction v2.0 (2016)	Exemplary Level
BREEAM® NOR	BREEAM-NOR New Construction v1.2 (2019)	Pass
LEED®	“Low-Emitting Material” according to the requirements of LEED v4.1	Pass
CDPH: Classroom scenario	CDPH/EHLB/Standard Method V1.2. (January 2017)	Pass

