DIATHONITE EVOLUTION

Eco-friendly, breathable and thermo-insulating plasters

Fiber-reinforced, pre-mixed plaster based on cork (grain size 0–3 mm), clay, diatomaceous earth, and NHL 3.5 natural hydraulic lime. A natural, highly breathable, ready-to-use compound for External Thermal Insulation Composite Systems (ETICS) and dehumidification interventions, suitable for both indoor and outdoor applications. The formulation integrates the cold-insulation properties of cork with the thermal lag (phase shift) and heat protection typical of mineral materials, ensuring living comfort in all seasons. It features good reaction to fire characteristics and is reusable as an aggregate at the end of its life cycle. The microporous structure and the presence of lime provide the plaster with natural bacteriostatic and anti-mould properties.

YIELD

3.70 kg/m² (±10%) per cm of thickness.
1.92 (±10%) per inch of thickness.

PACKAGING

18 kg paper bags.
Pallet: 60 bags (1080 kg).

APPEARANCE AND COLOR

Powder	Light Grey

STORAGE

Store the product in its original, tightly closed packaging, appropriately protected from direct sunlight, water, and frost, at temperatures between +5°C and +35°C. Shelf life: 12 months.

FIELDS OF APPLICATION

Pre-mixed plaster for indoor and outdoor use, suitable for thermal insulation and dehumidification interventions.
It contributes to the reduction of thermal bridges and the prevention of condensation and mould phenomena related to humidity, improving the healthiness of the environments and the thermo-hygrometric comfort. Formulated with natural components, it is recommended for interventions where eco-friendly materials are required.

BENEFITS

- Insulates against both cold and heat, ensuring excellent dynamic parameters for thermal lag (phase shift), up to 12 hours depending on the wall characteristics.
- High breathability.
- Prevents mould and condensation.
- Absorbs and releases excess humidity.
- Ideal for historical restoration.
- Preserves the masonry over time.
- Eco-friendly.
- Fast construction system (thermal masonry + thermal plaster).
- Can be applied to old plasters.
- Fire-resistant.
- Seamless system.
- Double CE marking (EN 998-1, EN 998-2).

CONTRIBUTES TO BREEAM® | CONTRIBUTES TO WELL® | CONTRIBUTES TO LEED® | IMPROVES INDOOR AIR QUALITY

UKCA BS EN 998-1 | UKCA BS EN 998-2 | CE EN 998-1 | CE EN 998-2

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PREPARATION OF THE SUPPORT

The substrate must be fully cured and have sufficient strength. The surface must be thoroughly clean, dry, well-consolidated, free of friable and loose parts, and perfectly levelled. Any cracks, discontinuities, or degraded portions must be repaired beforehand. Before application, protect all elements that are not to be affected by the coating. For substrates not listed in the technical data sheet, please contact the Diasen technical office.

Bricks/Blocks

No primer is required; the application can be carried out directly onto the brick substrate.

Concrete

In the presence of damaged and friable concrete, proceed with the restoration using a suitable cement-based repair mortar. Any exposed reinforcing bars must be previously treated with specific passivating and/or anti-corrosive products suitable for structural repair.

- **Smooth Concrete**: provide for the application of *Aquabond* primer (refer to the product's technical data sheet).
- **Rough Concrete**: no primer is required; the application can be carried out directly onto the substrate.

Cellular Concrete

Diathonite Evolution can be applied directly onto aerated concrete substrates, without the need for a primer.

Hemp-lime or hemp-concrete blocks

Application on hemp-lime or hemp-concrete blocks is possible only if *Diathonite Evolution* is reinforced with *Polites 140* fibreglass mesh (refer to the product's technical data sheet).

Masonry

If necessary, clean the surface using a high-pressure water cleaner or by brushing. Check the condition of the masonry and restore any damaged or unstable bricks or stones. If salts are present, provide for the application of *Diathonite Regularization* or, alternatively, *Diathonite Deumix+* (refer to the products' technical data sheets). On substrates that require levelling, use lime-based mortars to preserve breathability, such as *Diathonite Regularization* or *Calce Storica* (refer to the product's technical data sheet).

Old plaster

Ensure the plaster is sound and well-adhered to the substrate; otherwise, provide for partial or total removal. In the presence of salts, provide for the removal of the damaged plaster and the application of *Diathonite Regularization* or *Diathonite Deumix+*. On smooth plasters and in the case of painted plasters, given the wide variety of paints on the market, it is recommended to remove the paint or to scabble the substrate, and then provide for the application of *Aquabond* primer. On rough plasters, proceed with the direct application of *Diathonite Evolution*. Before application, always verify that the existing plaster is compatible with the characteristics and composition of *Diathonite Evolution*. For gypsum-based plasters, complete removal is recommended to avoid compromising the stability of the system due to material incompatibility.

Panels and wood

On untreated **cork** or **lime-hemp panels**, apply *Diathonite Evolution* without a primer. On **wood panels** (OSB, CLT, wood fiber), **fiber cement boards** (e.g., Aquapanel), and **exterior gypsum boards**, the use of *Aquabond* primer is necessary. For a professional result, ensure that the panels are tightly joined together and that

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the mechanical fastening is capable of supporting the weight of the plaster. In any case, provide reinforcement with a fiberglass mesh such as *Polites 140* at half the thickness of *Diathonite Evolution*.

APPLICATION BY PLASTERING MACHINE

Suggested plastering machines

The indicated plastering machines represent only some of the models available on the market. Other models with equivalent characteristics and performances can be used. All recommended models use screw or rotary systems, but the speed, mixer size, and screw geometry differ. Therefore, the consistency and flow of the plaster may require minor adjustments to the water/material ratio to achieve optimal results.

- *PFT G4*
- *PFT Ritmo XL*
- *Imer Koine 4*
- *Turbosol Giotto 4*
- *Putzmeister MP 25*

In the case of application with the aforementioned *three-phases* plastering machines, the ideal equipment includes the installation of a new **D6-3 stator/rotor (screw pump)** and a solid blade mixer. The setup must be completed with a tapered hose (**Ø 35/25 mm**) and a **14 or 16 mm** nozzle to ensure the correct projection of the product.

- *PFT G5*

In the case of application with the aforementioned plastering machine, the ideal equipment includes the installation of a **D6 – 2L stator/rotor (screw pump)** and a **solid blade mixer**.
The setup must be completed with a **tapered hose** (length 150 mm, Ø 35/25 mm) and a **16 mm nozzle** to ensure the correct projection.

- *Putzmeister SP 11 LMR*

For this diesel plastering machine, the setup must include a **2L6 screw pump (stator/rotor)**, a **250 mm** long hose with a **35 mm diameter**, and a **spray gun** with a **16 mm** nozzle.

Mixing

Load the contents of the bags into the hopper. Adjust the machine's flow meter first to **400-600 L/h** to moisten the hose, then to **200-300 L/h** for regular application. The mixture must appear as a **light and foamy mass**, characterized by a widespread and homogeneous micro-alveolar structure, and must be *matte* (free from shine). To avoid altering the chemical-physical balance of the compound, the addition of any foreign product is strictly prohibited. Depending on the water absorption rate of the substrate and the environmental conditions, it is recommended to dose the correct amount of water necessary to achieve proper adhesion. The specified water quantity is indicative.

Application

1. It is essential to moisture the substrate, especially during the summer period and on masonry exposed to the sun. If the surface has already been primed, proceed directly with the application.
2. Create reference points or screed strips to achieve the required thicknesses. Points or strips can be made using *Diathonite Evolution* or with aluminium or wooden profiles. In the latter two cases, the strips must be removed immediately after applying the last layer of plaster and filled with *Diathonite Evolution*.
3. Corner profiles (made of PVC, stainless steel, or CMP | in any case lime-resistant) can be positioned together with the screed strips, but must always be placed before applying the final coat.

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4. In the case of applications on multi-storey buildings, use aluminium corner beads to secure the corners; these must be fixed with the plaster itself to avoid thermal bridges.
5. Moisten *Diathonite Evolution* before the application of each coat.
6. Spray the product from bottom to top, applying a first coat of *Diathonite Evolution*, taking care to create a thickness of **up to 40 mm**.
7. If the design thickness is not reached with the first coat, apply additional layers of *Diathonite Evolution* only when the underlying layer is dry to the touch and visually lighter in colour (approx. 12–24 hours), maintaining a thickness of **≤ 40 mm** per coat.
8. Spray *Diathonite Evolution* with as few interruptions as possible. Otherwise, soak the nozzle in water to prevent the formation of a clog (material plug) inside the spray gun.
9. For thicknesses **exceeding 60 mm**, it is mandatory to incorporate *Polites 140* fibreglass mesh at approximately mid-thickness of the overall layer. Regardless of the thickness, the use of the mesh is also recommended on panels and wooden substrates, on surfaces subject to movement, on composite materials other than those mentioned, and at critical points such as doors, windows, and openings.
10. In correspondence with beams and columns, the mesh must overlap onto both sides of the concrete element by at least *150 mm*.
11. During the levelling phase, do not compress *Diathonite Evolution* to preserve the product's porosity. Use an H-profile straight edge or a knife-edge screed, working in both horizontal and vertical directions until a regular surface is obtained.

APPLICATION BY HAND

Mixing

If mixed in a cement mixer or with a drill mixer, add **10,5-14,5 L** of clean water for each bag of *Diathonite Evolution* (18 kg). Do not mix the compound in the cement mixer for more than **3-4 minutes**. Depending on the water absorption rate of the substrate and the environmental conditions, it is recommended to dose the correct amount of water necessary to achieve proper adhesion.
The specified water quantity is indicative.

Application

1. It is essential to moisten the substrate, especially during the summer period and on masonry exposed to the sun. If the surface has already been primed, proceed directly with the application.
2. Create reference points or screed strips to achieve the required thicknesses. Points or strips can be made using *Diathonite Evolution* or with aluminium or wooden profiles. In the latter two cases, the strips must be removed immediately after applying the last layer of plaster and filled with *Diathonite Evolution*.
3. Corner profiles (made of PVC, stainless steel, or CMP | in any case lime-resistant) can be positioned together with the screed strips, but must always be placed before applying the final coat.
4. In the case of applications on multi-storey buildings, use aluminium corner beads to secure the corners; these must be fixed with the plaster itself to avoid thermal bridges.
5. Moisten *Diathonite Evolution* before the application of each coat.
6. Apply with a trowel a coat of *Diathonite Evolution*, taking care to create a thickness of **up to 40 mm**.
7. If the design thickness is not reached with the first coat, apply additional layers of *Diathonite*

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Evolution only when the underlying layer is dry to the touch and visually lighter in colour (approx. 12–24 hours), maintaining a thickness **of ≤ 40 mm** per coat.

8. For thicknesses **exceeding 60 mm**, it is mandatory to incorporate *Polites 140* fibreglass mesh at approximately mid-thickness of the overall layer. Regardless of the thickness, the use of the mesh is also recommended on panels and wooden substrates, on surfaces subject to movement, on composite materials other than those mentioned, and at critical points such as doors, windows, and openings.
9. In correspondence with beams and columns, the mesh must overlap onto both sides of the concrete element by at least 150 mm.
10. During the levelling phase, do not compress *Diathonite Evolution* to preserve the product's porosity. Use an H-profile straight edge or a knife-edge screed, working in both horizontal and vertical directions until a regular surface is obtained.

APPLICATION FOR VENTILATED FACADE SYSTEMS

After preparing the substrate, proceed with the installation and wall-fixing of the substructure components for the ventilated façade, according to the project specifications.

1. Depending on the type of substrate, evaluate the potential need to apply *Aquabond* primer.
2. Apply *Diathonite Evolution* following the specifications mentioned in the paragraphs above (either "**Application by Plastering machine**" or "**Application by hand**") until the design thickness is reached.
3. Once the necessary drying times have elapsed, apply the *Revela Zero* water repellent (refer to technical data sheet).
4. It is recommended to pay particular attention to the points where *Diathonite Evolution* is most subject to hygrometric stress, such as the base of the wall near the ground or the joints between the flat roof slab and the external walls. At these points, the use of appropriate flashings and/or localized waterproofing is recommended.
5. Conclude with the installation of the cladding system (outer skin) and all other elements necessary to complete the ventilated façade according to the project specifications.

CEILING APPLICATION

For ceiling applications, *Diathonite Evolution* must be applied using plastering machines.

1. If the surface is not primed with *Aquabond*, moisten the substrate.
2. Create screed strips to achieve the desired thickness, as specified in the previous paragraphs.
3. Apply *Diathonite Evolution* in layers with a maximum thickness of 20 mm.
4. Embed *Polites 140* fibreglass mesh at mid-thickness of the total layer, applying it while the product is still fresh, ensuring an overlap of **150 mm** at the joints. Avoid the formation of ripples or bubbles.
5. Apply the second coat of plaster only when the underlying layer has sufficiently hardened, ensuring that the reinforcement mesh is completely embedded and without leaving any holes on the surface. On unstable substrates or for high thicknesses, it is advisable to secure the mesh with plugs or nails.
6. The screed strips must be removed when the plaster surface is compact and not moisten to the touch. The

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voids left by the strips must be filled with *Diathonite Evolution*.

7. During the levelling phase, do not compress *Diathonite Evolution* to preserve the product's porosity. Use an H-profile straight edge or a knife-edge screed. The product must not be trowelled or floated.

DRYING TIMES

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

- Drying times are influenced by the relative humidity of the environment and the temperature, and can vary significantly.
- When applied in high thicknesses, drying times increase significantly.
- During the curing phase, protect *Diathonite Evolution* from frost, wind, direct sunlight, and adverse weather conditions.
- It is necessary to moisten the plaster 2–3 times a day for the first 2–3 days following application.
- In general, at temperatures above 28°C, moisten the plaster every 2 hours to prevent cracking.
- If applied indoors, ventilate the room as much as possible during the application and drying phases.
- When applied outdoors, in order to avoid prolonged exposure to adverse weather conditions, it is essential to proceed as follows:
  - after applying the final coat of *Diathonite Evolution* and waiting for complete curing (not before 10–15 days), it is recommended to coat the plaster with the chosen finishing skim coat.
  - once the latter is fully cured (not before 7 days), apply the finishing coat.

SANDED DIATHONITE

Carefully protect floors, window frames, and other elements using protective sheets or masking tape. To prepare the floors, use a single-disc floor machine equipped with a diamond disc to remove irregularities and prepare the substrate.
On large wall surfaces, the use of a long-reach sander with a low-speed disc is recommended, such as the **LHS 2 225 EQI-Plus PLANEX** (Power: 400 W; eccentric motion[1]; speed: 5,000 – 8,500 rpm; sanding stroke: 4.00 mm; backing pad diameter: 220.00 mm; abrasive diameter: 225.00 mm; length: 1.2/1.65 m; dust extraction connection Ø: 36/27 mm).
During the process, proceed with uniform and light movements, avoiding concentrated pressure on a single point to prevent creating hollows. Any protrusions or excess material must be removed, periodically checking the flatness and regularity of the treated surface. To remove the most evident irregularities, initially use coarse-grained sandpaper (40–60 grit), then complete the operation with fine-grained sandpaper (80–120 grit) to achieve a surface that is perfectly smooth to the touch before the final coating. After sanding, carefully remove the dust produced using soft brushes or a professional vacuum cleaner, always ensuring adequate ventilation in indoor environments to promote the dispersion of volatile residues. As a final step, protect the surface by applying *Revela Color* (see technical data sheet), following the instructions in the relevant technical data sheet.

SMOOTHING AND FINISHING

For plaster smoothing, in both indoor and outdoor environments, it is possible to use the following finishing compounds: *Argatherm, Argatherm Ultrafine*, *Argatherm Color*, and *Argatherm Deco*. For application methods, drying times, and

[1] Eccentric movement

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recommended thicknesses, please refer to the respective technical data sheets.

Outdoor Applications

For the finishing of skim coats in outdoor environments, use products such as *Decork Façade, Decork Façade Reflex, Decork Mediterraneo Fine, Acrilid Protect Coating*, or *Plasterpaint* (refer to the products' technical data sheets), always ensuring the use of breathable and water-repellent finishes.

Indoor Applications

For indoor environments, the use of finishes such as *Decork Mediterraneo Fine, Decork Mediterraneo Deep, C.W.C. Stop Condense*, or *Limepaint* (refer to the products' technical data sheets) is recommended, always prioritizing breathable products. In any case, it is advisable to refer to Diasen finishing systems.

FINISHING LAYERS

As with all plasters in the *Diathonite* range, *Diathonite Evolution* must be reinforced with *Polites 140* fiberglass mesh when the installation of coatings such as tiles, stones, stoneware, or similar materials is planned, following the application methods described in the previous paragraphs. Subsequently, the surface must be finished with *Argatherm* finishing plaster, as indicated in its technical data sheet. To increase the system's resistance, *Argatherm* must be installed using *Polites 80* reinforcement mesh (refer to technical data sheet) with a sandwich system (*Argatherm + Polites 80 + Argatherm*). In wet areas, before laying the tiles, apply *WATstop* over *Argatherm*[2] following the instructions in the technical data sheet. It is recommended to observe a maximum interval of 24 hours between successive coats and to complete the application of the final layer within 48 hours. The maximum permitted weight for tiles is 45 kg/m².

SUGGESTIONS

- Do not apply when ambient or substrate temperatures are below +5°C (41°F) or above +30°C (86°F).
- During the summer season, apply the product during the coolest hours of the day, sheltered from direct sunlight.
- Do not apply if there is an imminent risk of rain or frost, in conditions of thick fog, or when relative humidity exceeds 70%
- Where deemed necessary, and only after contacting the Diasen Technical Department, it is possible to apply a first coat of *Diathonite Evolution* by hand or spray to serve as a scratch coat (spatter-dash).
- It is recommended to waterproof and protect the points most subject to hygrometric stress, such as the base of the wall near the ground or the joints between flat roofs and external walls.
- If applied internally, it is essential that the external surface does not absorb water. Otherwise, treat the surface with *Revela Zero*.
- In the event of application where *Diathonite Evolution* is left exposed, it is mandatory to protect the product with one of the *Revela* transparent protective coatings, depending on the area of application.
- In case of doubt regarding the consistency of the substrate and/or any potential physical-chemical and mechanical incompatibilities between *Diathonite Evolution* and the substrate, it is recommended to carry out an adhesion test, identified and coordinated by the Site Management of the project in question.

[2] Argatherm helps control absorption and ensures more efficient coverage of WATstop.

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- If the total thickness of the application exceeds *120 mm*, it is necessary to provide for the insertion of at least two reinforcement meshes.
- The positioning of the meshes and the choice of the technical configuration must be confirmed by the Site Management, also based on the assessment of structural movements and stresses of the support.

CLEANING

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

SAFETY

While handling the product, use personal protective equipment and comply with the instructions provided in the product's Safety Data Sheet (SDS).

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TECHNICAL SPECIFICATIONS

* The reported data, although obtained using standardized testing methodologies, are indicative and may be subject to change depending on specific site conditions.

PHYSICAL / TECHNICAL DATA*		
TECHNICAL DATA	**VALUE**	**UNIT**
Yield	3.70 (±10%) for each cm of thickness	kg/m^2
	1.92 (±10%) per inch of thickness	lb/ft^2
Appearance	powder	-
Colour	light grey	-
Density	360 ± 20	kg/m^3
	22.5 ± 1.25	lb/ft^3
Grain size	0 – 3	mm
	0 - 0.12	in
Mixing water	0,60 - 0,80 L/kg *10,5 – 14,5 L for each 18 kg bag*	L/kg
	0.072 – 0.096 gal U.S. *per paper bag (39.68 lb)*	gal U.S. / lb
Minimum thickness	15 / 0.6	mm / inches
Maximum thickness per coat	40 / 1.6	mm / inches
Maximum thickness per coat *for ceiling applications*	20 / 0.8	mm / inches
Maximum thickness *for ceiling applications*	40 / 1.6	mm / inches
Application temperature	+5 / +30	°C
	+41 / +95	°F
Workability time *(UNI EN 1015-9 – method B)*	40	min
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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R.E.A. Ancona n. 150933 Reg. Imp. Ancona 01553210426
Cap. Soc. € 400.000,00 i.v.

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DIATHONITE EVOLUTION

Breathable, eco-friendly thermo-plaster

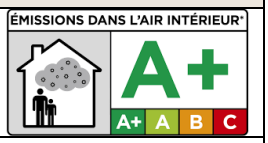
PERFORMANCES*				
FINAL PERFORMANCES	**VALUE**	**UNIT**	**REGULATION**	**RESULTS**
Thermal conductivity ($\lambda_{10,\ dry}$)	0,045	W/mK	UNI EN 1745	category T1
Compressive strength	2,70	N/mm²	EN 998-1 EN 998-2	Category CSII M2,5
	427.9	lbf/in² (psi)		
	6.161×104	psf		
Flexural strength	2,40	N/mm²	UNI EN 1015-11	-
	217.6	lbf/in2 (psi)		
	3.13 ×104	psf		
Thermal diffusivity (a)	0,125 x 10^{-6}	m^2/s	UNI TS 11300-1	-
Vapour permeability coefficient (μ)	μ = 4	-	UNI EN 1015-19	highly breathable
	WVT = 14	grains/h·ft2	ASTM E96	
Water absorption by capillarity	0,40	kg/m² $min^{0,5}$	UNI EN 1015-18	category W1
Thermal resistance (R) *for 1 cm/ 0.4 in thickness*	0,222	m^2 K/W	UNI 10355	-
Specific heat capacity (c)	1000	J/kgK	UNI EN 1745 UNI EN 10456	-
	0,239	kcal/kg °C	-	-
Water penetration depth *(after 90 minutes)*	40	mm	UNI EN 1015-18	-
	1,57	in		
Dried mortar porosity	71,64% (17.83% macroporosity and 54.94% microporosity)	-	-	-
Adhesion onto the support (brick)	0,10	MPa=N/mm²	UNI EN 1015-12	break type B mortar break
	14,5	lbf/in²		
Adhesion on tuff	0,201	MPa=N/mm²	UNI EN 1015-12	-
	29,15	lbf/in²		
Adhesion on wood fibres panels	-	-	UNI EN 1015-12	good
Marble adhesion onto Diathonite Evolution	0,241	MPa=N/mm²	UNI EN 1015-12	-
	34,95	lbf/in²		
Stone adhesion onto Diathonite Evolution	0,243	MPa=N/mm²	UNI EN 1015-12	-
	34,95	lbf/in²		
Tensile secant modulus	742	N/mm²	UNI 6556	highly elastic
	107618	lbf/in²		
Reaction to fire	class A1	-	UNI EN 13501-1	-
Elastic modulus *(average value)*	0,60	GPa	UNI EN 1015-11	-

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INDOOR AIR QUALITY (IAQ) 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

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