

Protectosil® for fiber cement boards

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Basic introduction


Protectosil®



Content

- **Description**
- Basic product recommendation
- Application-/ Testmethods
- Performance data

Protectosil® products can render your fiber cement boards resistant against water making them long lasting and optically unchanged.

Protectosil® for fiber cement boards...



Problem

Fiber cement boards are very susceptible to damages caused by water and UV light (e.g. efflorescence, discoloration, delamination).



Offering

Fiber cement boards become more resistant, durable and stay optically unchanged.



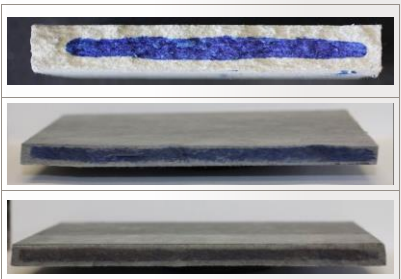
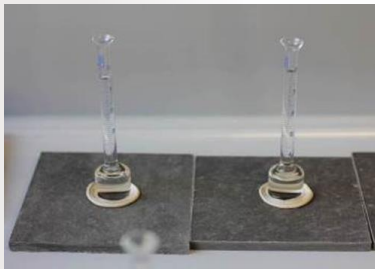
Experience

Protectosil® brand offers several tailor made solutions for the fiber cement board industry.

Our Performance!

Reduction of water uptake

Protectosil® products are able to reduce the water uptake of fiber cement boards up to 90 %



Penetration depth

Protectosil® offers a penetration depth from >1 mm to full penetration, depending on board type, product choice and consumption rate

Key benefits of Protectosil®

Efflorescence control

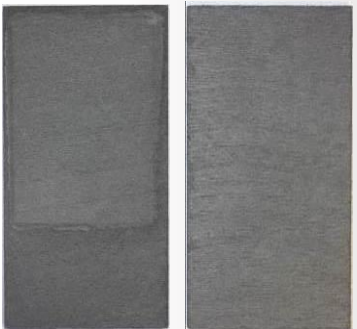
Protectosil® effectively protects fiber cement boards from efflorescence



Untreated Treated

Prevention of discoloration

Protectosil® prevents discoloration of fiber cement boards over time



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Product recommendation

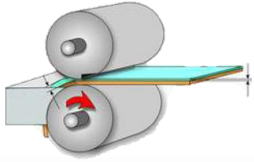
Fiber cement boards

	Protectosil® grade	Effect			Processability	
		Reduction of water uptake	Prevention of discoloration	Beading effect	Solvent for dilution	Recommended dilution rate
pure silane systems	008	✓			organic solvent	pure – 1:9
	009	✓		✓	organic solvent	pure – 1:9
	100 NK	✓		✓	organic solvent	pure – 1:9
water based	WS 340	✓			water	1:1 – 1:3
	WS 410	✓			water	1:1,5 – 1:4
	WS 602	✓			water	1:1 – 1:4
	WS 610	✓		✓	water	1:1,5 – 1:4
	WS 670	✓			water	1:1,5 – 1:4
	SC CONCENTRATE		✓	✓	water	pure – 1:10

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Application methods for Protectosil® and possible tests



Means of immersion/roller application

- Suitable for emulsions (water based products)
- Amount can be optimized by immersion time and concentration

Available testing methods

- Reduction of water uptake by means of immersion
- Reduction of water uptake with RILEM tube
- Surface properties & Abrasion test
- QUV accelerated weathering
- Penetration depth (every side)
- Outside weathering test (prevention of algae growth)

Application methods



Spraying

- Suitable for every product
- Amount can be optimized by times of spraying, number of application steps as well as concentration

Available testing methods

- Reduction of water uptake with RILEM tube
- Surface properties & Abrasion test
- QUV accelerated weathering
- Penetration depth (front side)
- Outside weathering test (prevention of algae growth)

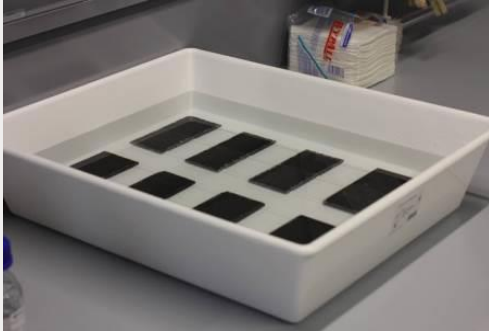
Performance testing



Applied test methods

Our service

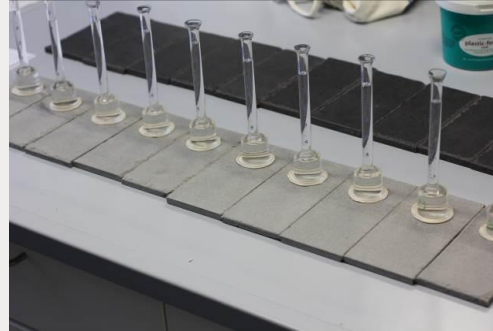
Reduction of water uptake - I



A modified **DIN EN 13580** is used to evaluate the performance of the water repellent treatment. The water uptake is measured by total submersion of a hydrophobized sample and the reduction of water uptake is calculated in comparison to the untreated reference sample.

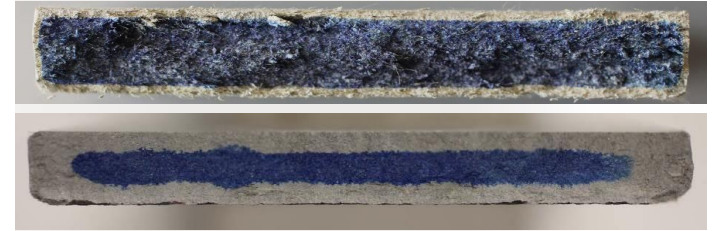
Samples are covered with about 2.5 cm of water. After 24 h of submersion, water adhering to the surface of each sample is gently wiped away with a paper cloth and the samples weighed to the nearest 0.1 g.

Reduction of water uptake - II



The **RILEM Test Method II.4** is used to evaluate the performance of the water repellent treatment. For this purpose a measuring tube is affixed by interposing a tape of putty between the flat, circular brim of the pipe and the surface of the material to be tested. Water is then added through the upper, open end of the pipe until the column reached the "0" gradation mark. The quantity of water absorbed by the material after 0.5 h, 2.0 h, 6.0 h and 24.0 h is read directly from the graduated tube in regular intervals.

Penetration depth



Treated test samples are split with a hammer and chisel. A water based ink is then applied onto the fracture surface to visualize the penetration depth. The inner part of the roofing tiles where the concentration of the water repellent is not high enough to repel the water will become colored, while the outer part near the substrate's surface will not absorb the colored water.

The penetration depth is measured with a vernier caliper from the surface of the sample to the colored area at two different points on each of the 4 sides. The average penetration depth is then calculated from the 8 values obtained.

Applied test methods

Our service
















QUV accelerated weathering



In order to determine the durability of the Protectosil® products treatment, the protected roof tiles are placed into a QUV accelerated weathering machine. Subsequently the samples are subjected to cyclic UV-irradiation and water spray according to **EN ISO 11507**. After certain time periods the samples are taken out of the QUV machine and the reduction of water uptake, beading effect and flow property is determined.

300 h of QUV accelerated weathering correspond to about one year of outside weathering in climatic conditions found in Southwest Germany.

Flow property and beading effect

Beading effect				
Hours of QUV weathering				
0 h	300 h	900 h	1500 h	2100 h
				
				
				

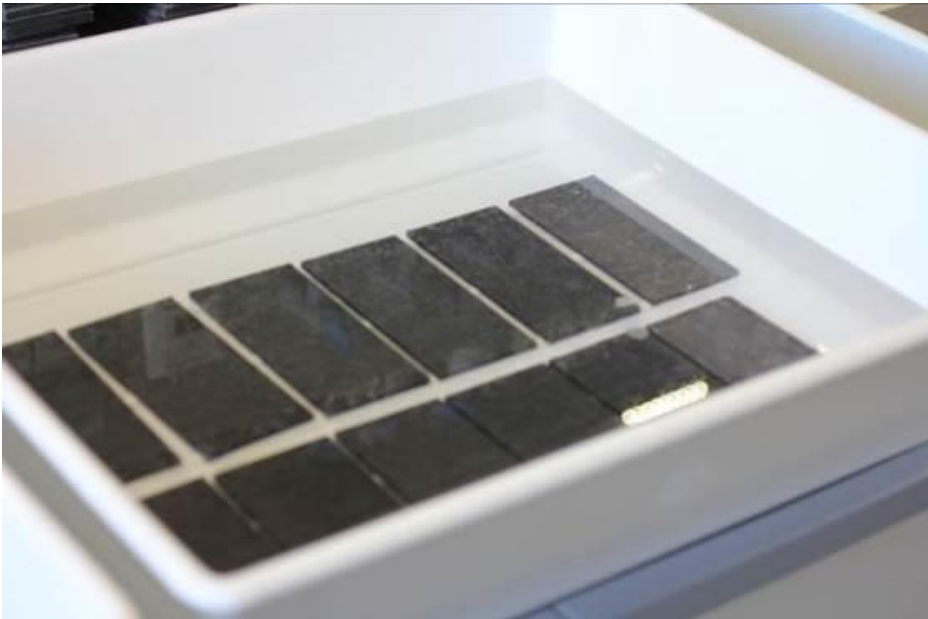
The flow property of a water droplet on the treated surfaces, as well as the degree of wetting after 10 min is evaluated visually according to defined criteria.

Content

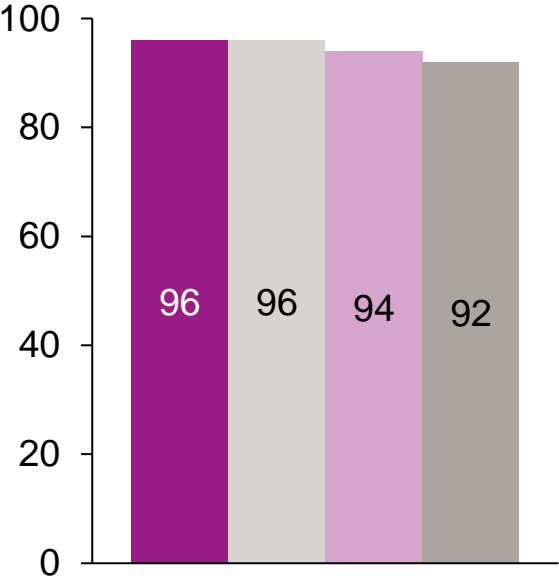
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Determination of reduction of water uptake

Reduction of water uptake - I



Reduction of water uptake [%]



Application method:

10 sec immersion

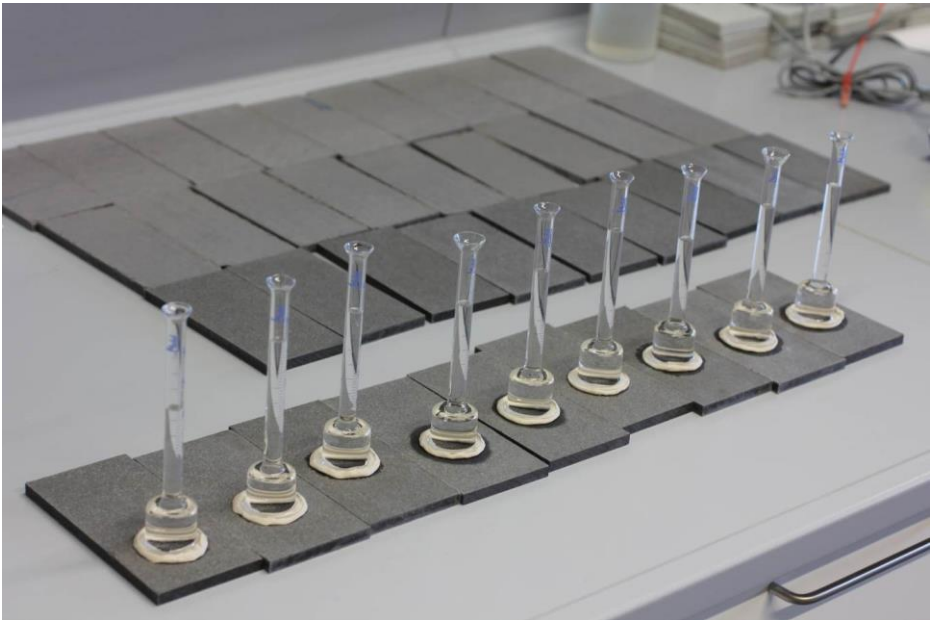


Applied products:

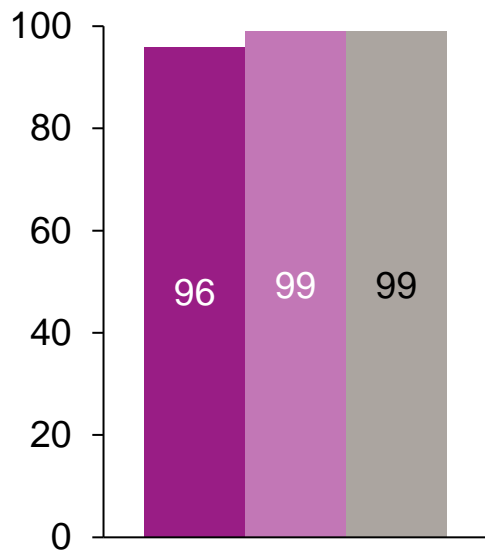
- Protectosil® 100 NK
- Protectosil® 008
- Protectosil® WS 410 (1:1.5)
- Protectosil® WS 410 (1:4)

Determination of reduction of water uptake

Reduction of water uptake - II



Reduction of water uptake [%]



Application method:

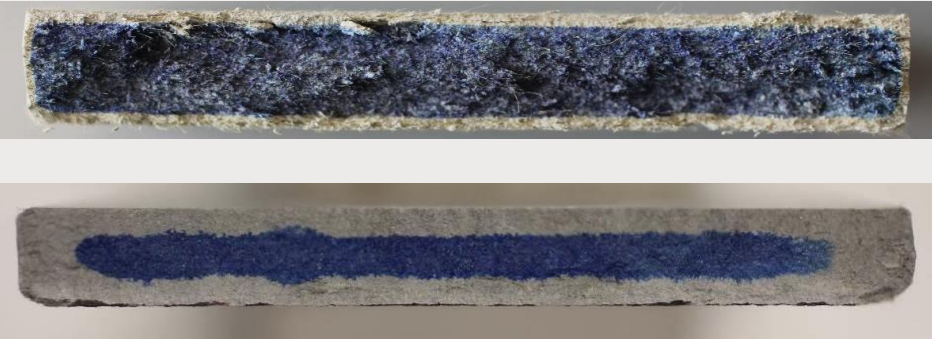
1 x spray



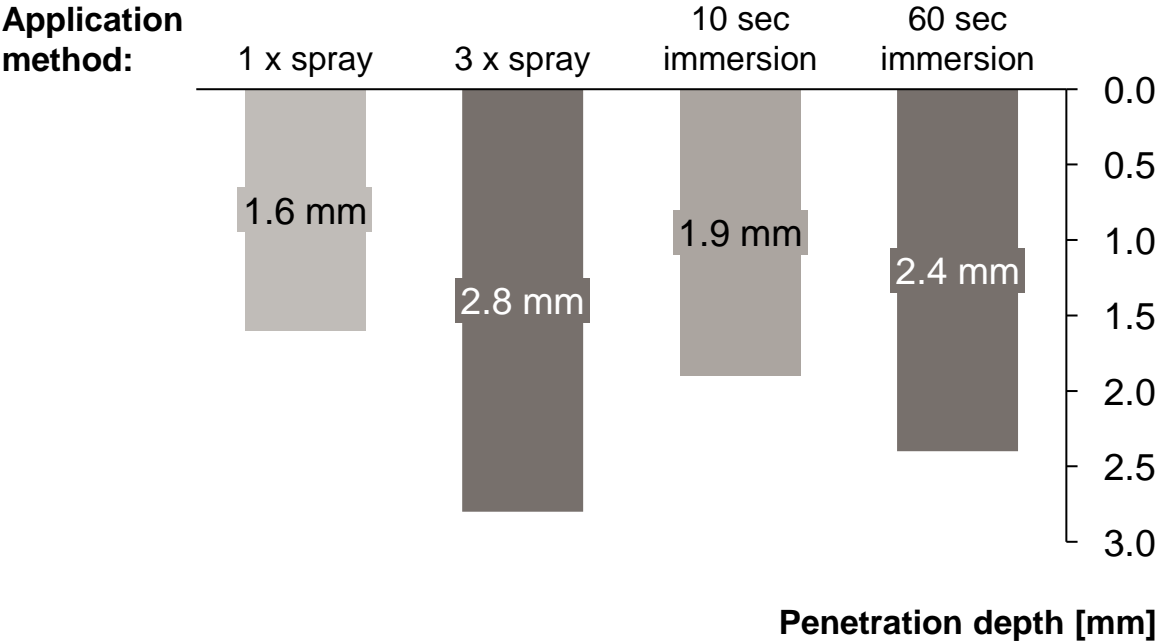
Applied products:

- Protectosil® 100 NK
- Protectosil® 009
- Protectosil® WS 410 (1:4)

Determination of penetration depth



Applied product:
Protectosil® 008



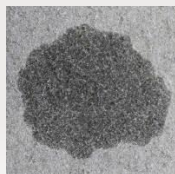
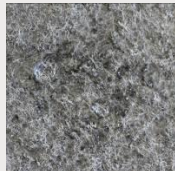
Determination of surface properties

14 days after treatment and curing at room temperature, the flow property of a water droplet on the treated surfaces, as well as the degree of wetting after 10 min was evaluated visually according to the criteria described below.

Beading effect

Evaluation of the beading effect

Rating	Description		
0	perfect beading		
1	droplets not absorbed	→	no wetting
2	droplets not absorbed	→	contact area is partially wetted
3	droplets not absorbed	→	contact area is fully wetted
4	droplets slightly absorbed	→	darkening of contact area, contact area is fully wetted
5	droplets partially absorbed (50%)	→	darkening of contact area
6	droplets totally absorbed	→	darkening of contact area, Time range given "after 1-10 min"



Flow property

Evaluation of the flow property

Rating	Description		
0	perfect beading		
1	droplets may drain freely	→	no traces left
2	droplets may drain	→	weak traces left
3	droplets may drain	→	strong traces left
4	droplets partially absorbed	→	drainage still possible, strong traces left
5	droplets totally absorbed	→	no drainage possible

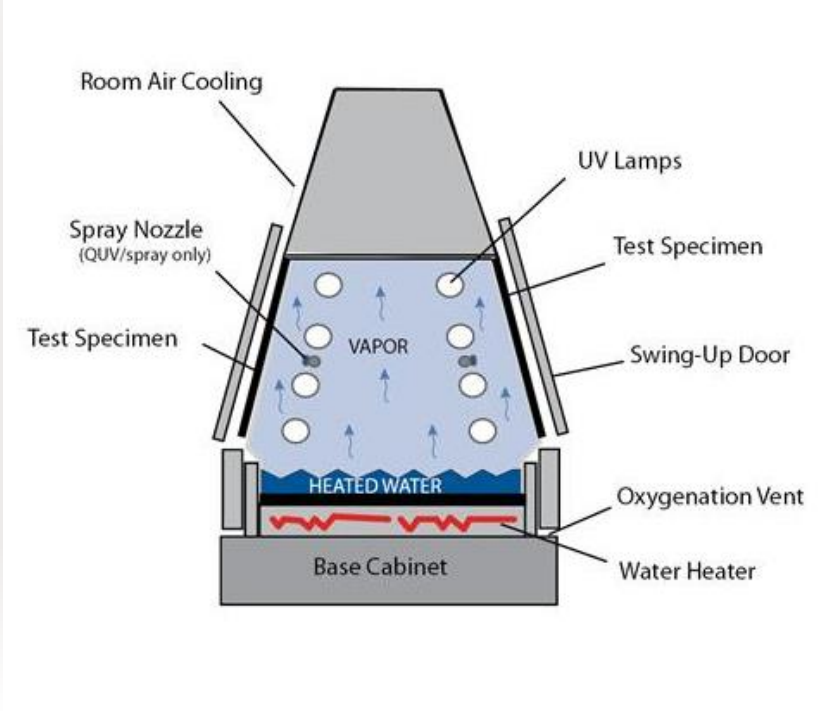
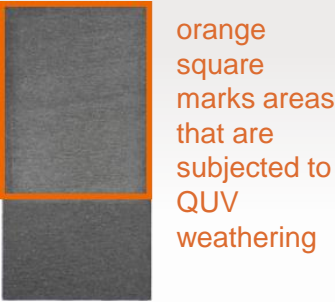
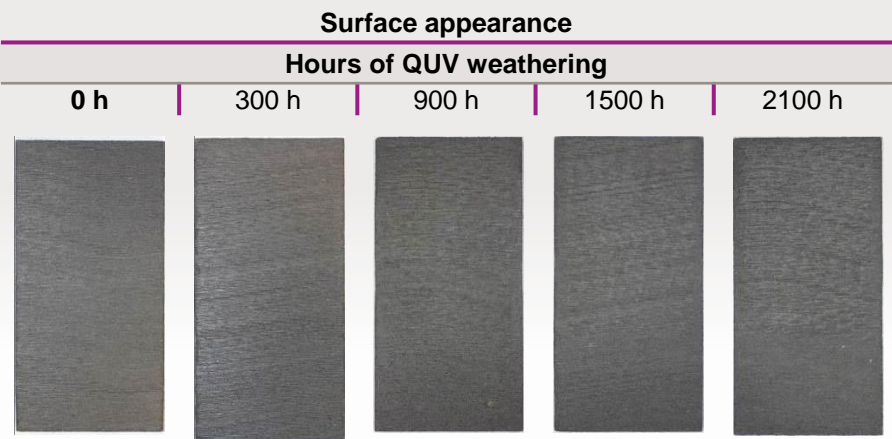


Determination of durability of Protectosil® treatment

Method: QUV accelerated weathering

In order to determine the durability of the **Protectosil®** products treatment, the protected fiber cement boards were placed into a QUV accelerated weathering machine. The samples were then subjected to cyclic UV irradiation and water spray according to EN ISO 11507.

300 h of QUV accelerated weathering correspond to about one year of outside weathering in climatic conditions found in Southwest Germany.



**Talk to our experts to receive
your individualized product
recommendation**

We are happy to support you




Protectosil®



EVONIK

Leading Beyond Chemistry