Protectosil® - Hydrophobizing agents for concrete

Basic introduction

Protectosil®

EVONIK
Leading Beyond Chemistry

Content

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

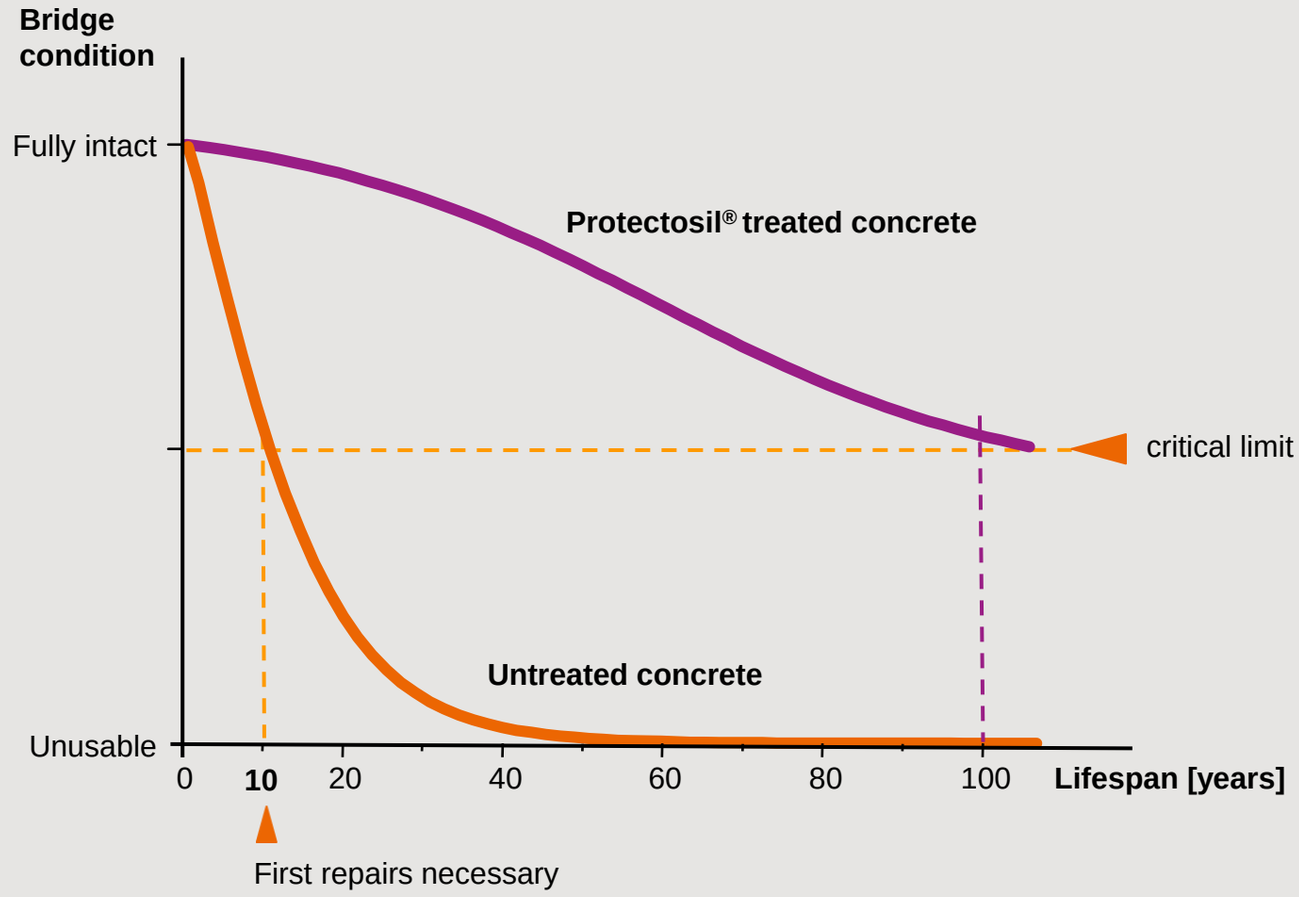
Protectosil® significantly prolongs the service life of concrete leading to large savings in maintenance costs

Independent studies have shown:

Silanes can prolong the service life of concrete structures by decades

[1]L. Schueremans et al.: Chloride penetration in RC-Structures in marine climates.Proc., Int. Workshop on durability of reinforced concrete (2005 Qingdao, China), p. 169-179.

Schematic degradation of concrete constructions over their life time[1]



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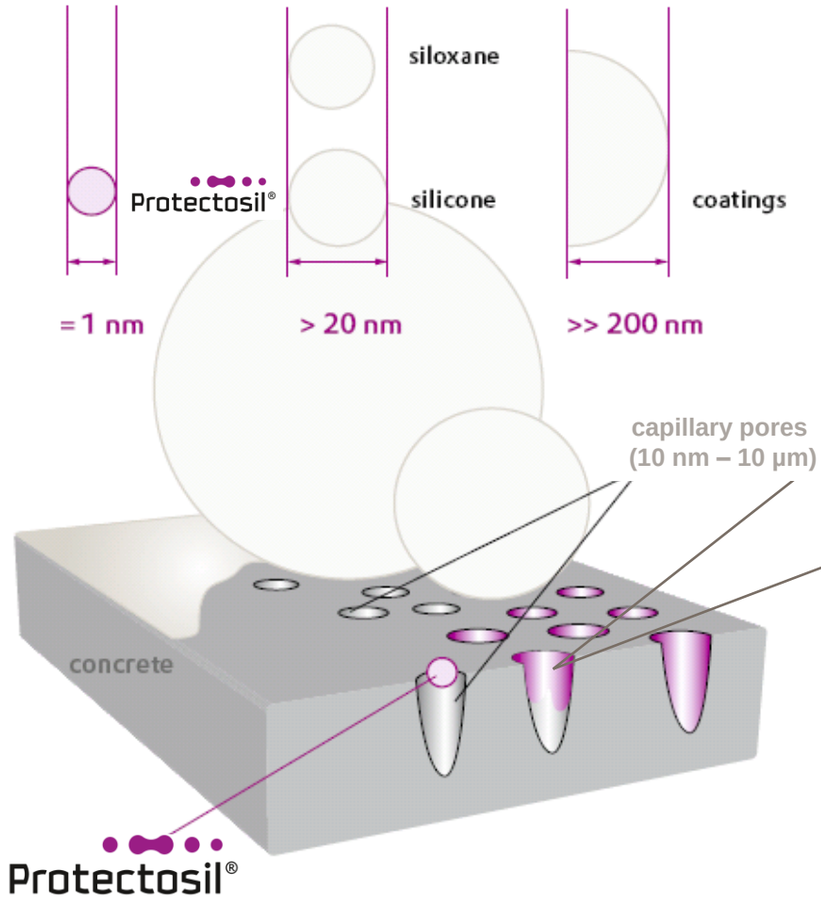
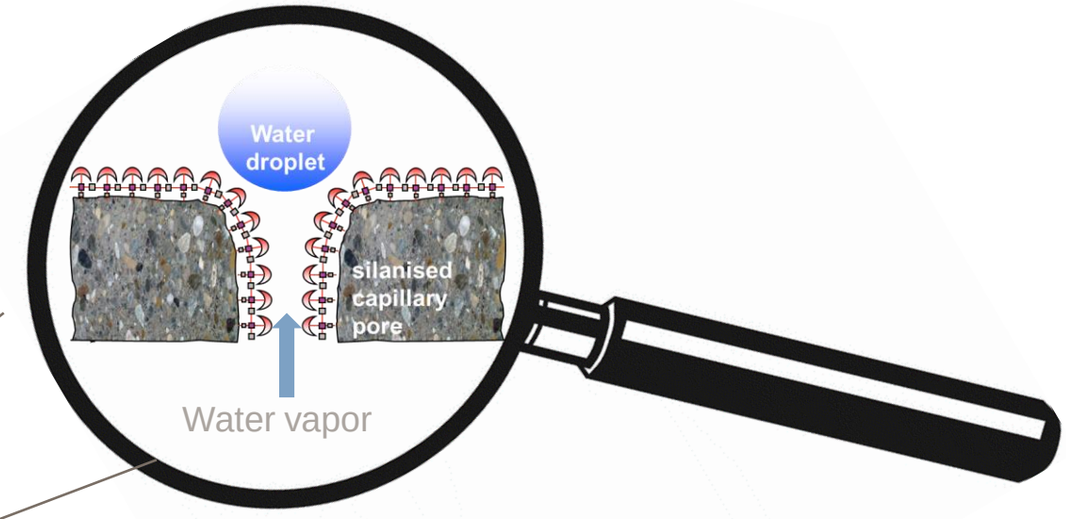
Small silane molecules penetrate deep into the substrate and provide effective protection against the ingress of water





- form stable chemical bonds with mineral substrates
- penetrate deeply even in dense substrates
- provide UV-stable protection

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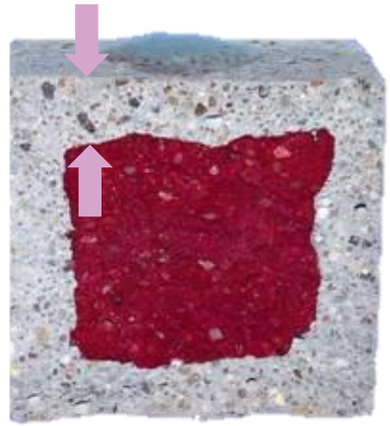
High penetration depth = long service life

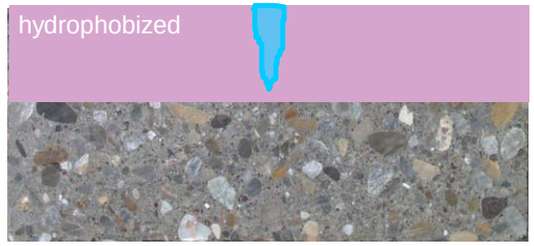
High penetration of the silane Protectosil® BHN into dense concrete

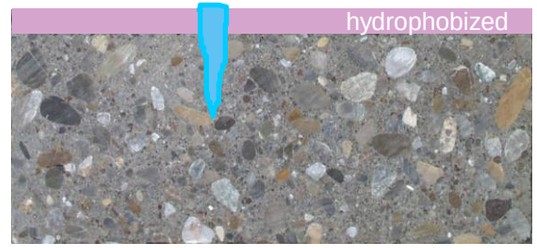


No significant penetration of a silicone resin leads to

- surface modification (visual beading only)
- can cause adhesion issues of a top coating
- allows water to by-pass hydrophobized area

Only a deep penetrating silane can protect micro-cracked concrete





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Product recommendation
Hydrophobizing agents for concrete (CE labeled)

EN 1504-2 approved	Protectosil® grade	Typical area of application			Properties		
		New bridges & parking decks	Against alkali-silica reaction	Primer under topcoats	Active content	Appearance	Application
pure silane systems	**BHN**	✓	✓	✓	> 98 %	colorless	ready to use
water based	**WS 410**	✓		✓	50 %	milky-white	dilutable
water based (paste)	**WS 770 P**	✓			70 %	milky-white	ready to use

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Application methods for Protectosil® and possible tests

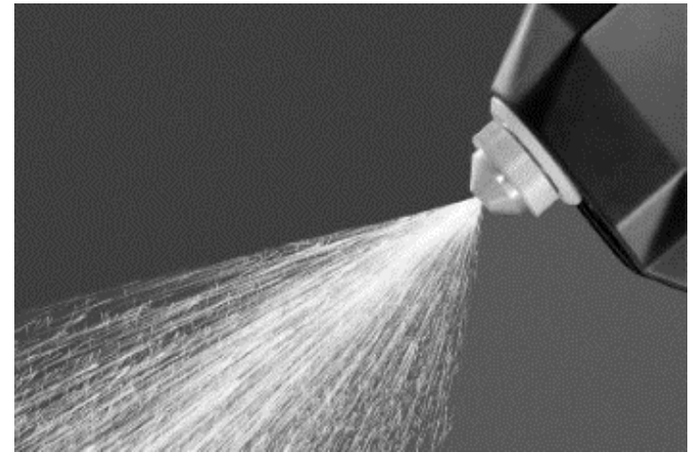
Application methods

Airless spraying

- Suitable for liquid water repellents
- Amount according to our guideline in Product Information

Trowel & roller

- Suitable for pasty water repellents
- Amount according to our guideline in Product Information



Performance testing

Available testing methods

- Reduction of water uptake with RILEM tube
- Penetration depth
- Surface properties
- QUV accelerated weathering

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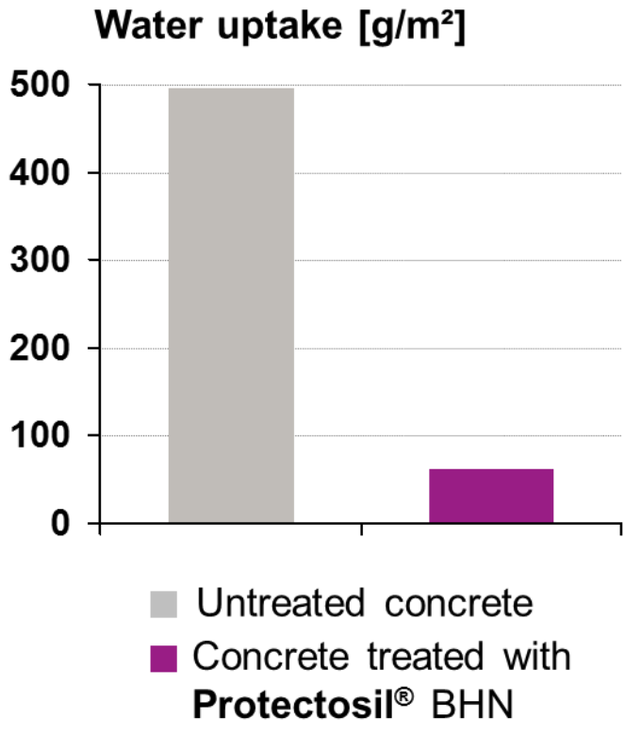
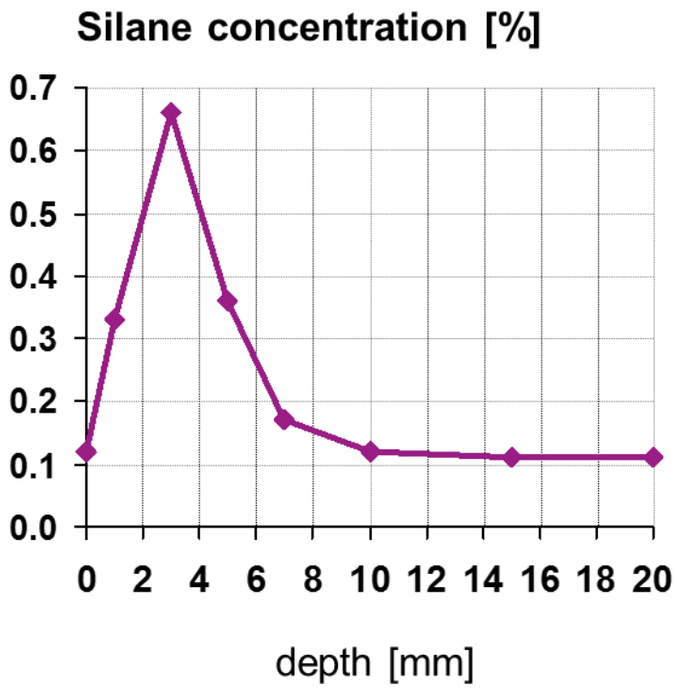
Storebelt West Bridge (DK)





- **reduction of water uptake of appr. 90%**
- **high penetration depth**

⇨ **long lasting protection with Protectosil® BHN**

Info Storebelt West Bridge:

- Built in 1992-98
- Length: appr. 6,6 km
- Treated with **Protectosil®** BHN (150 g/m²) in 1993

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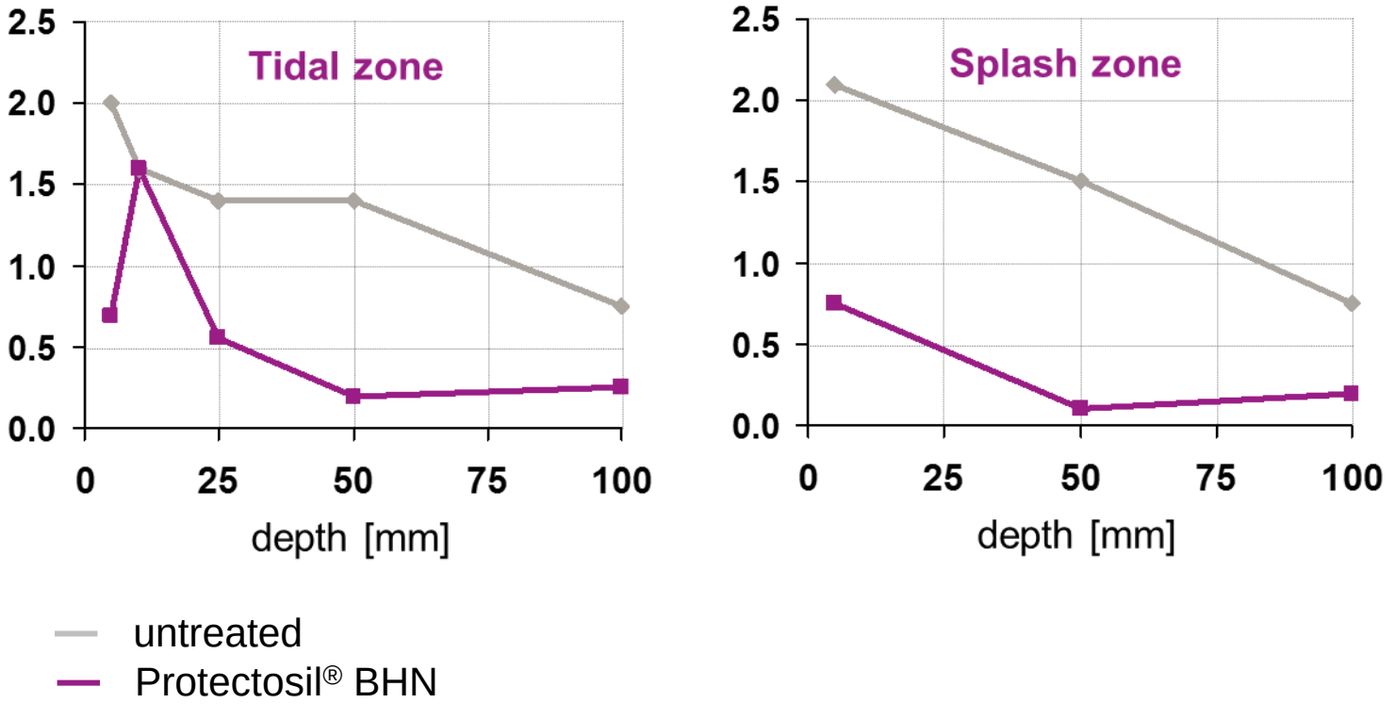
Containerterminal Zeebrugge (BE)

Chloride concentration [% cement content] in 2005



- **with Protectosil® BHN protection the chloride content was significantly lower after 12 years in service**
- **the service life was prolonged to over 100 years**

Info Containerterminal Zeebrugge

- Start of construction1992
- Application of **Protectosil®** BHN in 1993
- Consumption 120-150 g/m² applied in 2 coats with a drying period of 7 days (total amount applied: appr. 300 g/m²)

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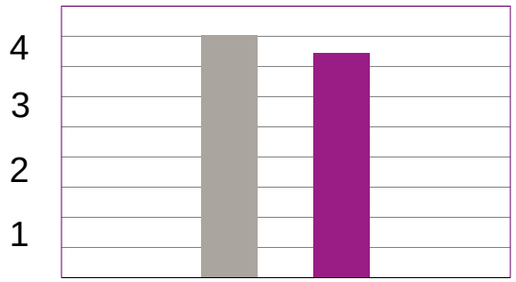
Protectosil® BHN used as a primer under coatings

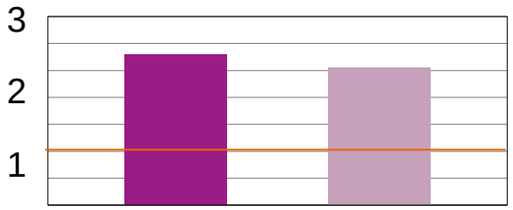
DIN 51220 and ZTV-SIB 90

Peel strength [N/mm²]



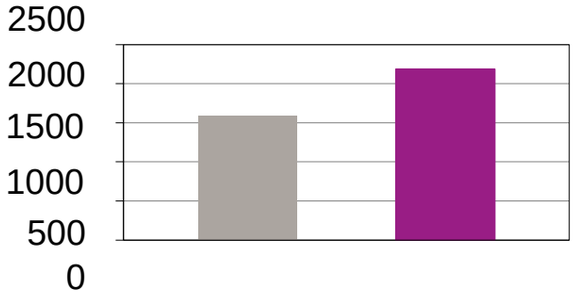
- Untreated concrete, epoxy coating 1
- **Protectosil® BHN** treated concrete, epoxy coating 1

EN 1504-2



- **Protectosil® BHN** treated concrete, styrene dispersion
- **Protectosil® BHN** treated concrete, solvent based PMMA
- minimum requirement

EN ISO 527



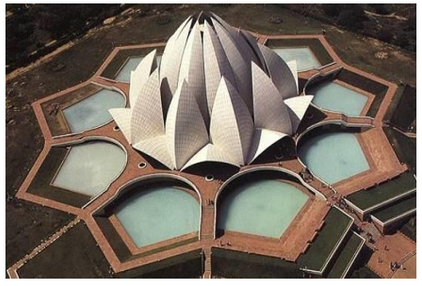
- Untreated concrete, primer, 1-K PU sealant
- **Protectosil® BHN** treated concrete, primer, 1-K PU sealant

Protectosil® BHN references worldwide (excerpt)

Storms River Bridge (RSA)
Treated with **Protectosil®** BHN in 1987

Sydney Opera (AUS)
Treated with **Protectosil®** BHN in 1991

Container Terminal (CN)
Treated with **Protectosil®** BHN in 1997



Bahai Temple (IND)
Treated with **Protectosil®** BHN in 1999

Traneberg Bridge (S)
Treated with **Protectosil®** BHN in 2005

Manifah Causeway (KSA)
Treated with **Protectosil®** BHN in 2008

Hang Zhou Bay Bridge (CN)
Treated with **Protectosil®** BHN and CIT in 2008

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Talk to our experts to receive your individualized product recommendation

We are happy to support you

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