



---

**LAUNCHING ITS NEW TOTAL  
PROTECTION FOR CONCRETE**

---



# Waterproofing and deterioration protection for concrete

Contemporary waterproofing systems are varied, different in terms of technical performance, application methods and characteristics.

Liquid sheaths, bituminous conglomerates, waterproofing membranes, impregnating and smotic agents, are only a few types of waterproofing systems present in the building sector.

The choice is wide and varied, but it is not about choosing a system or a product in the hope that it is the appropriate treatment for that particular application; it is about choosing a waterproofing system that ensures functionality and effectiveness over time.

Water is the agent that undermines buildings the most. The combined action of water and time corrodes rock, cement, concrete and even steel. It is able to irreversibly compromise waterproofing systems; It erodes, digs and creeps into the thinnest cracks of artefacts and buildings, causing extensive damage, as in the case of moisture sweating and infiltrations.

Deterioration is an almost inevitable phenomenon. Not only the action of atmospheric agents, but also time and wear can compromise the structure itself.

Besides designing the structure of the building, it is also necessary to study an appropriate waterproofing system that will not fail, ensuring the durability of the structure.

That is why it is necessary to protect the building materials. Some of the technologies used until now had a short lifetime in regards to waterproofing, but were not able to contrast deterioration phenomena.

From 1918 onwards, an innovative technology has been perfected which both waterproofs structures and tackles deterioration phenomena.

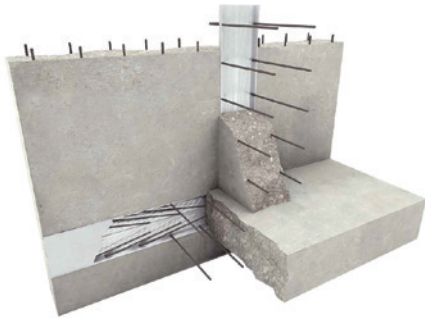
**Vetrofluid**, developed thanks to Ecobeton's experience and to studies carried out in the United States, is the only product able to combine protection and waterproofing. **Vetrofluid** waterproofs and consolidates permanently and indefinitely, making the support durable over time.



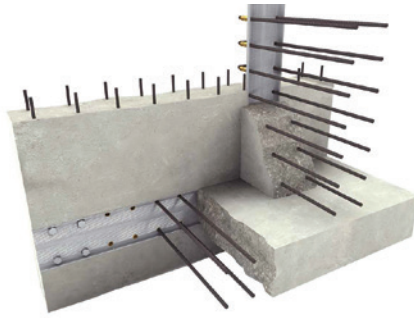
# CONSTRUCTION ACCESSORIES

THE COMPLETE PACKAGE FOR ALL YOUR ACCESSORY NEEDS

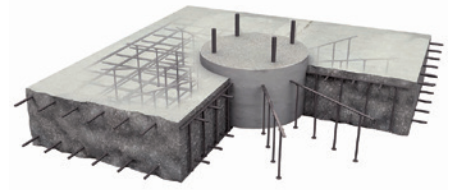
## MANUFACTURED SOLUTIONS



STARTABOX®



COUPLERBOX®



SHEARTECH®

## PRECAST SYSTEMS



CAPSTAN ANCHOR SYSTEM



THREADED SYSTEM



SPREAD ANCHOR SYSTEM



UTILITY ANCHOR

## CONSTRUCTION ACCESSORIES

### WATERPROOFING

- Waterproof Membranes
- Waterstops
- Liquid Applied Membranes
- Joint Fillers and Sealants

### REINFORCEMENT ACCESSORIES

- Tying Wire & Spacers
- Slab Accessories
- Remedial Couplers
- Test Equipment

### FORMWORK PRODUCTS

- Tie Bar Systems
- Corrugated Formwork
- Column Formers
- Hyrib Permanent Formwork

### CHEMICALS

- Formwork Treatments
- Cementitious Repair
- Curing & Retarder Products
- Sealing & Coating Products

### PRECAST ACCESSORIES

- Fixing Systems
- Channelling
- Plastic Accessories
- Well Void Tube

### GROUND ENGINEERING

- Gabions, Galfan & PVC
- Geotextiles

ORDER ONLINE AT [WWW.RFA-TECH.CO.UK](http://WWW.RFA-TECH.CO.UK)  
FOR MORE INFORMATION CALL 0870 011 2881

# Waterproofing treatment

Glass is a recyclable (but not a biodegradable) material that begins to decay after 400 years.

From the early twentieth century to the present day, a series of studies have been carried out that have led to the creation of a product capable of vitrifying in concrete, endowing it with the same waterproofing properties as glass.

Based on waterglass and selected silicates, Vetrofluid is a special waterproofing and anti-deterioration product for concrete. Its specific catalyst allows the product to penetrate up to 40mm in concrete and to become a waterproofing barrier, permanent and definite over time.

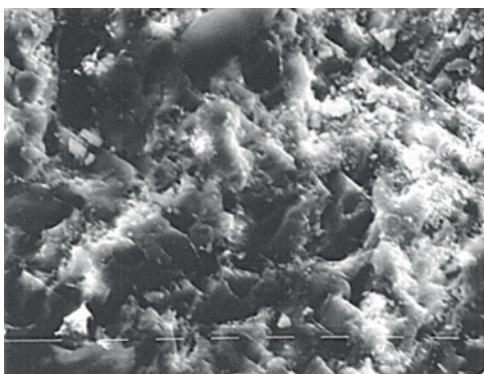
Vetrofluid is colourless and does not leave any films or foils on the surface of the support. Consequently, the concrete maintains its natural aspect.

It replaces all other technologies (bituminous membranes, water-repellent products, impregnating agents) and can be used on all sorts of concrete artefacts and installations, both vertically and horizontally.

It is also effective in negative pressure (up to 10 atm), for waterproofing from within or for waterproofing when building a retaining wall or a structure in contact with soil.

## Vetrofluid characteristics

- It is a permanent and definitive treatment
- It penetrates up to 40mm into the concrete
- It creates a permanent and definitive waterproof barrier, even in negative pressure (up to 10atm)
- It seals the internal porosity of the concrete
- It consolidates the concrete
- Applied on foundations and bed castings, it blocks rising damp
- Resistant to chemical aggression
- It is environmentally friendly and non-toxic, safe for humans and for the environment
- It has an excellent resistance to cycles of freezing and thawing and to de-icing salt aggression
- It bears the CE marked in conformity with the UNI EN 1504-2 (certificate number GB08/76012 issued by SGS United Kingdom Ltd.)
- It is marked EPD - Environmental Product Declaration - Certificate number S-P-00143, [www.environdec.com](http://www.environdec.com)



Untreated cement material

## What is waterglass?

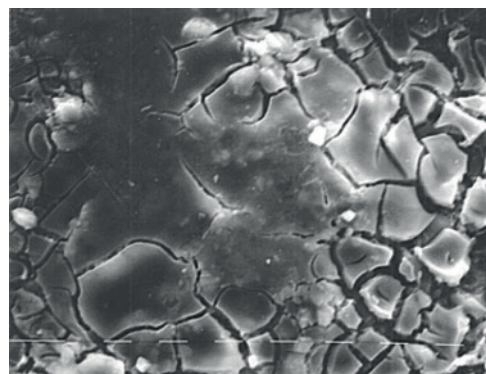
Waterglass is a chemical substance that has been known for centuries and since 1825, thanks to Johan Nepumuk von Fuchs, the industrial production of water-soluble sodium silicates, that have become known as "liquid glass" (waterglass).

Waterglass, otherwise known as liquid glass, or soluble glass, is nothing more than sodium silicate ( $x\text{SiO}_2 \cdot n\text{Na}_2\text{O}$ ), where the ratio between sodium and silicate (x) can vary between 0.50 and 3.75 on a molar basis. Soluble glass used for applications on concrete has a  $x=3.25$ .

The chemical reaction impregnates the porous areas in the concrete with liquid glass and leads to the formation of a calcium silicate and lye based gel.  $\text{Ca}(\text{OH})_2 + \text{Na}_2\text{O} \cdot x\text{Si} = \text{O}_2 + 2\text{NaOH}$ .

The reaction occurs thanks to the presence of free calcium hydroxide present in the composition of concrete, reducing the average pore section, sleaving and protecting them from water and deterioration phenomena.

Vetrofluid, in the same way as waterglass, reacts with the cement material triggering the vitrification reaction: the pores and micropores in the concrete are sealed and the concrete is waterproofed, while maintaining its breathability.



Cement material treated with Evercrete Vetrofluid

# Consolidating treatment

A good waterproofing system must not come before the conditions of the concrete.

The natural deterioration phenomena, combined with a badly made concrete, human errors in design and use of concrete, can compromise the effectiveness of waterproofing. That is why it is necessary to protect and consolidate it.

Concrete is a material with a continuous porosity. Lack of protection may cause crumbling, fissuring, detachments, expulsion of the concrete cover, carbonation, corrosion of rebars and make it subject to accelerated deterioration in time.

The costs in terms of time and money for the refurbishment of deteriorated concrete are expensive.

The innovation of Vetrofluid lies in its double waterproofing and consolidating function. By penetrating up to 40mm in depth, it seals the pores permanently and definitively, creating a resistant, consolidated, waterproof barrier against water and moisture.

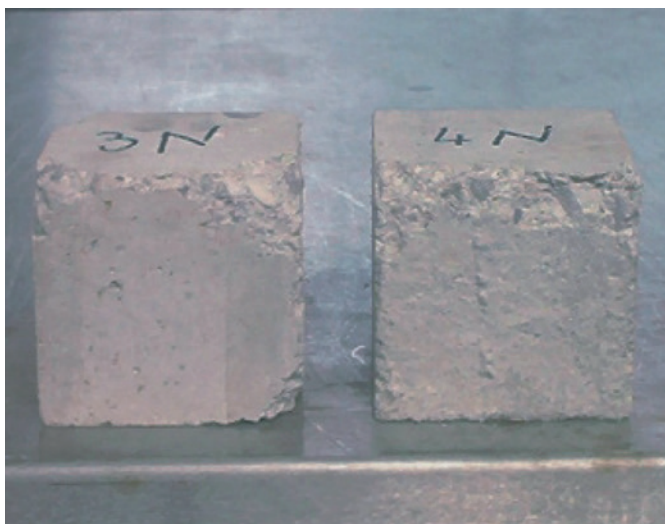
Concrete remains intact, healthy, consolidated and breathable thanks to the action of Vetrofluid.

## Vetrofluid..

- Increases the concrete's cortical compressive strength by 30%;
- Has a resistance in the negative pressure of 1 MPa - ca 10atm;
- Resists without being damaged to 300 freeze-thaw cycles;
- Reduces 70% of the absorption of water under pressure.



A concrete wall. As it sets, concrete diminishes in volume by 1%



Untreated concrete subject to 300 freeze-thaw cycles



Concrete treated with Vetrofluid and subject to 300 freeze-thaw cycles

# Treatment against carbonation

The most common aggressive agent is carbon dioxide, which is the main cause of the phenomenon known as carbonation.

Carbonation is a chemical phenomenon, caused by the carbon dioxide present in the air, that negatively affects the concrete rebars causing them to oxidise - or rather, rust.

Concrete forms a protective environment for the rebars, as the calcium hydroxide it contains is highly alkaline; this allows the development of rebar passivation conditions.

But, carbon dioxide chemically combines with the lime present in the concrete, turning it into calcium carbonate (limescale) and water vapour.

This causes a drastic fall of the pH, so when the value goes below 11, the environment becomes hostile for the rebars de-passivate, i.e. become vulnerable to the aggression of oxygen and water and start rusting, giving way to the expansive reaction typical of rust.

This phenomenon causes the reduction of the original diameter of the rebar and tension within the concrete cover, causing fissures and detachments.

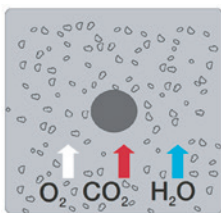
The damage is not only aesthetic but above all structural: the rebars, as well as losing their original diameter, are fully exposed to external agents (e.g. chlorides, among the most frequent and dangerous), with consequent costs for repairing the deteriorated concrete.

Vetrofluid is able to prevent the carbonation phenomena and the detachment of the concrete cover, keeping the concrete intact and preserved.

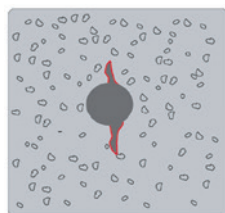
In fact, the treatment blocks the passage of moisture and carbon dioxide avoiding the triggering of carbonation reaction.



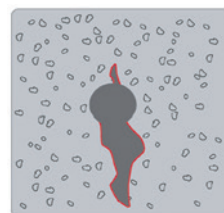
Exposed rebars due to the effect of carbonation



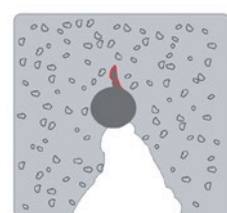
Untreated concrete is attacked by elements such as water, oxygen and carbon dioxide, which triggers the carbonation process.



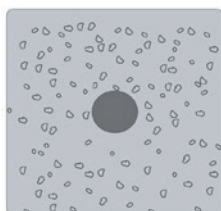
The rebar oxidises starting to cause fissures.



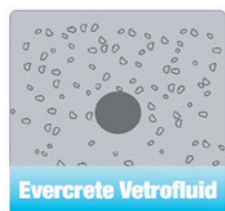
The fissures increase in volume due to the expansive reaction of iron oxide, involving the entire concrete cover.



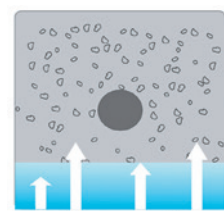
Due to the internal tensions caused by the oxide expansion, the concrete cover is expelled.



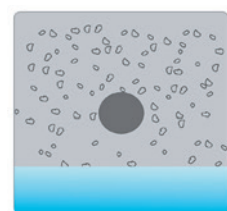
Spray application of Vetrofluid.



Vetrofluid creates a barrier that repels water and carbon dioxide.



Vetrofluid lets the concrete breathe allowing the passage of oxygen.



Vetrofluid maintains the concrete consolidated and intact.

# Anti-acid treatments

Many industrial, chemical and agricultural activities produce and make use of organic and inorganic acid substances.

The day-to-day use and accidental spillages of these substances can compromise the aspect of the concrete and lead to structural deterioration phenomena, even a short while after commissioning the artefact.

Chemical industries, biogas plants, waste containment tanks, wastewater tanks, pits and livestock farms can finally be protected against the corrosive action of acids, thanks to Vetrofluid.

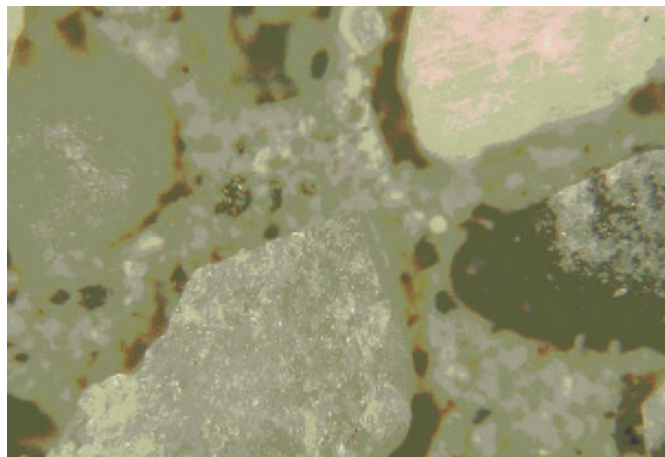
Vetrofluid is a permanent and definitive anti-acid treatment: it penetrates into the pores of the concrete, it enhances the concrete by making it more resistant to the corrosive effect of acid substances and it ensures its durability in time.

## Vetrofluid resists...

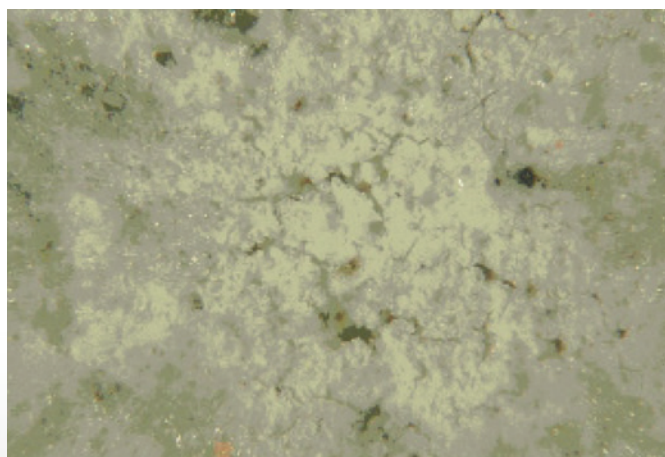
- Sulphuric, nitric, hydrochloric acids;
- Acetic acid;
- Salts;
- Chlorides and sulphates;
- Other acids of organic origin.

## Vetrofluid is used...

- In cellars in contact with liquids produced by fermented grapes;
- In barns and stables in contact with the chemical and natural substances;
- On concrete of biogas tanks;
- On concrete of horizontal silos and of trenches in contact with biomasses;
- In industries that make use of corrosive substances;
- On concrete in contact with de-icing salts;
- In refuse storage centres;
- On roads, bridges, tunnels, underpasses;
- On wastewater pits and tanks.



80x enlargement. Untreated sample subject to aggression by concentrated hydrochloric acid (36-38%)



80x enlargement. Sample treated with Vetrofluid and then subject to aggression by concentrated hydrochloric acid. On the whole, the sample has maintained its integrity.

Vetrofluid protective anti-acid treatment inside a trench used for biomass storage.



### Northern Region Office

RFA-Tech Ltd, Eastern Avenue  
Trent Valley, Lichfield  
Staffordshire, WS13 6RN

Telephone: 0870 011 2881  
Fax: 0870 011 2882

Email: [sales@rfa-tech.co.uk](mailto:sales@rfa-tech.co.uk)  
[www.rfa-tech.co.uk](http://www.rfa-tech.co.uk)

### Southern Region Office

Unit 3, Thurley Farm Business Units  
Pump Lane, Grazeley, Reading  
Berkshire, RG7 1LL

Telephone: 0118 372 1164  
Fax: 0870 432 6061

### Manufacturing Plant:

RFA-Tech,  
710 Brightside Lane,  
Sheffield, S9 2SR

Telephone: 01142 317 913