



Introduction

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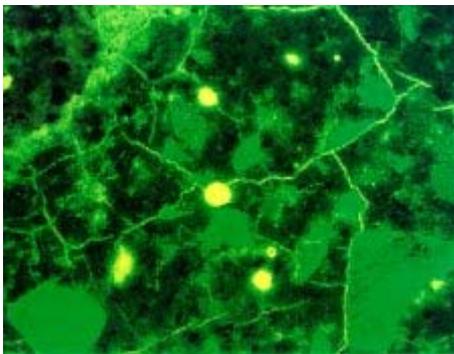
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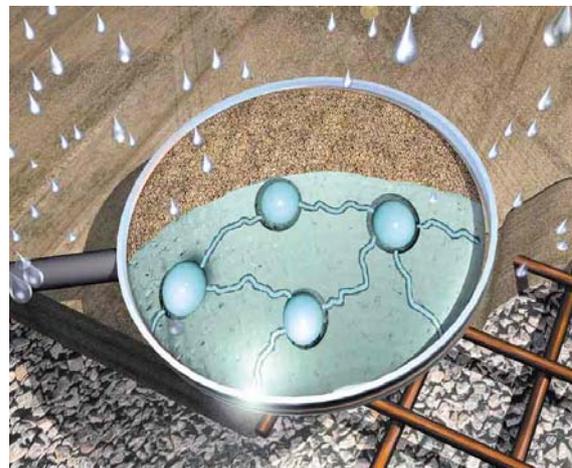
Introduction to Controll®Innerseal

All concrete contains tremendous amount of tiny pores and pockets, which are all connected with each other by capillary. This creates a highly effective transport system for leakage that brings along pollution like acidic precipitation, salts, chlorine and acids, which all together weakens the concrete quality. By treatment with Controll®Innerseal the pores, pockets and capillaries are filled permanently. Controll®Innerseal finds the pockets by a special admixture that makes the product very penetrative.



*Cross section of concrete.
The area is 1x 1 mm, where the yellow/light colours represent capillaries, pores and pockets.*

Controll®Innerseal belongs to a new generation of environmental friendly treatment for all concrete and concrete products. The treatment penetrates actively and deeply into the concrete, and effectively stops leakage, arm corrosion and calcium washout. Controll®Innerseal gathers dust, expels oil and grease, and is also a splendid transition for additional surface treatment. Further more, Controll®Innerseal has a restraining effect on fungus, moss and growth of alga. Using this product is highly cost effective and has achieved great references.



Thanks to Controll®Innerseal's adjustment to material used in concrete and other concrete products, abilities like colour, consistent and appearance of concrete will remain the same. The treatment leaves a clear and natural surface, without pellicle or film. Controll®Innerseal prevents corrosion attack on steel reinforcement, as well as ensures the exact pH-level. This is very important to avoid deterioration.

The silicates

The producing and selling of "silicate of soda" (sodium silicate) started in 1861 to replace resin in soap formulations. When the American Civil War cut off supplies of resin from the pine forests in the southern states to soap-makers in the North, silicate sales grew rapidly.

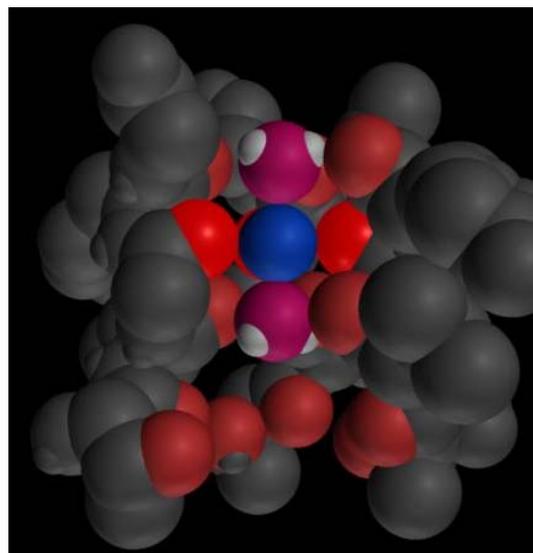
Sodium silicate was made then as now by fusing sand and sodium carbonate in a high-temperature furnace. Markets for sodium silicate soon expanded beyond soap making to silicate adhesives for corrugated paperboard and many other applications.

In the twentieth century, the industry has grown by development of a lot of new products. Through advanced research and development efforts, it has been introduced novel products, including silica gels, silica catalysts, hollow micro-spheres, synthetic zeolites, zeolites catalysts, and other complex silica derivatives.

The silicates have many useful properties and meets a wide range of characteristics to various applications needs. These characteristics are expressed as several basic properties, principally $\text{SiO}_2:\text{K}_2\text{O}$ / $\text{SiO}_2:\text{Na}_2\text{O}$ ratio, with different percent of solutions, solids, density, and viscosity.

Together with expertise, experience and advice from leading Norwegian universities and PQ Norge Silicates AS, Maynor AS has gained very high quality proven products.

With this high level of innovation, we can guarantee that our products are of consistently high quality. All raw materials are of Norwegian origin, made from well-tested components and purchased from well-reputed ISO-approved suppliers.



Why Controll®Innerseal?

Controll®Innerseal has a biochemical reaction to concrete and creates new material inside the substrate. This material contains the best abilities to prevent penetration of moist, corrosion, acid attack and salt.



Controll®Innerseal was originally developed and specialized for industrial and professional use, and the mixture contains exclusively components from well-known suppliers with ISO-certification. The chemical recipe have been developed by experts, and all products have been tested repeatedly. Approved and well recognized institutions like Sintef and Byggforsk have verified the effects of Controll®Innerseal. By this we can guarantee that use of Controll®Innerseal a effective problem solver/-prevention for all concrete constructions.

Economy

Controll®Innerseal is applicable both from the inside and from outside of construction. Excavation is often time consuming, comprehensive and expensive. Since Controll®Innerseal is simple to use, effective and permanent to apply, it makes it cost effective and one of the most wanted product on the marked of its kind today.

Simple and effective application

Concrete is treatable also when moist/wet. The appliance and use of product is so simple that almost anyone can do it.

Durability

Treatment with Controll®Innerseal gives a permanent protection.

Sealing

Moist penetration (capillarity suction) is a challenge often met concerning concrete terrace plates and foundation walls. Controll®Innerseal also has a restraining effect on the formation of mould, fungus and corrosion damage on armour inside the concrete.

Environmental

Controll®Innerseal is non-toxic, friendly to the environment and may be used everywhere, inside and outside. The product is non-toxic, non combustible, odour- and colourless and contains no solvents.

Strength

Controll®Innerseal has a strengthening, sealing, hardening and a dust-closing effect on all concrete products. Besides improving the concrete quality, Controll®Innerseal will also prolong and amend the effect on duration of paint.

While Controll®Innerseal allow the concrete to breath and evaporate humidity (diffusion open), the product will still stop water, oil, acids and other demolishing substances from penetrating. Even though diffusion opening is of vital significance to keep an all over satisfactory quality on concrete, this ability is not characteristic for a whole lot of the products on the marked.



Approach to exposed areas

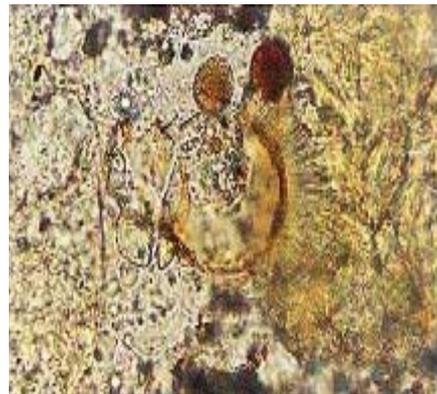


Water

Water penetration is among the major problem makers when it comes to concrete. Water transports subversive substances like chlorine and acids through the concrete, and therefore push valuable elements like calcium out of the concrete. (Calcium works like glue.) Water also accelerates frost dispersal and corrosion on reinforcement armour. Controll®Innerseal fills up capillarity, prevents water to pass and thereby the problem to arise or aggravate.

Carbonisation and rust

Carbon dioxide (CO₂) penetrates, responds to water and brakes down the concrete. The pH-value is reduced in this process. Healthy concrete contains a pH-value of approximately 13. If the value sinks to under 9,2 it will provoke a corrosion attack on reinforcement armour, which will swell and cause cracks. Controll®Innerseal prevents both carbonisation and rust.



Frost

When there is damage and dissolution on concrete surface caused by frost, you will find the source in water expanding inside the concrete pores and pockets. When water freezes it dilates approximately 9 %, which is more stress than most concrete can handle. The same stress increases when water freezes and melts over and over again. If you also salt is added, the demanded volume is doubled. The result is further damage, dissolution and cracks. Because Controll®Innerseal fills pores and pockets water penetration is stopped. Ice covers the concrete surface and therefore prevents damage inside the concrete.

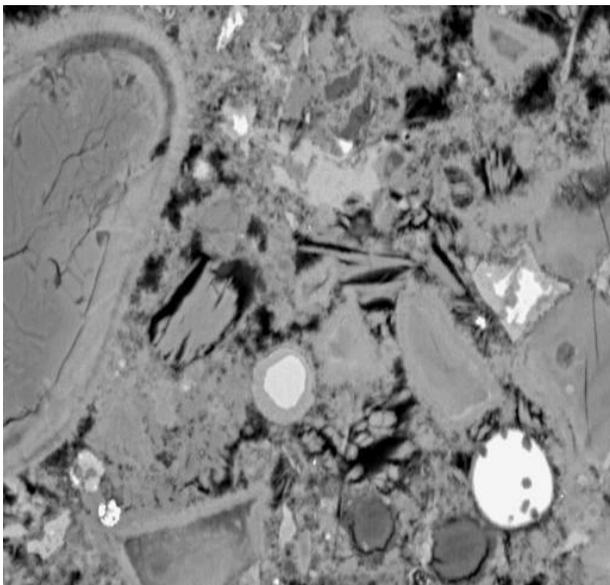


Cracks

Small cracks in concrete are highly exposed to problems, both chemically and mechanically. Controll®Innerseal works effectively with appearances of fissure up to 2 millimetre. Larger cracks is to be treated with proper expertise and immediately added Controll®Innerseal.

Salt flushing

Salt flushing (efflorescence) is a crystal deposit formation on concrete surfaces. These deposits are water dissolvable salts that are transported in the concrete capillary system (see picture main page), and can wander in any direction. When these salts arise to the surface, the water evaporates and leaves behind disfigured white spots. The more porous the concrete, the better the transportation of these salts. By blocking the capillary system with Controll®Innerseal, the problem is effectively terminated. Controll®Innerseal stops water penetration and salt flushing, also in maritime environments.

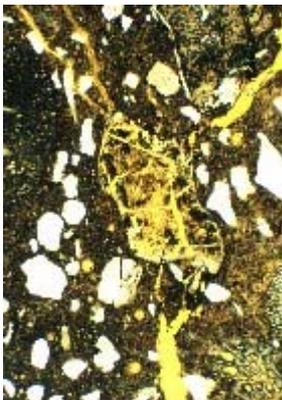
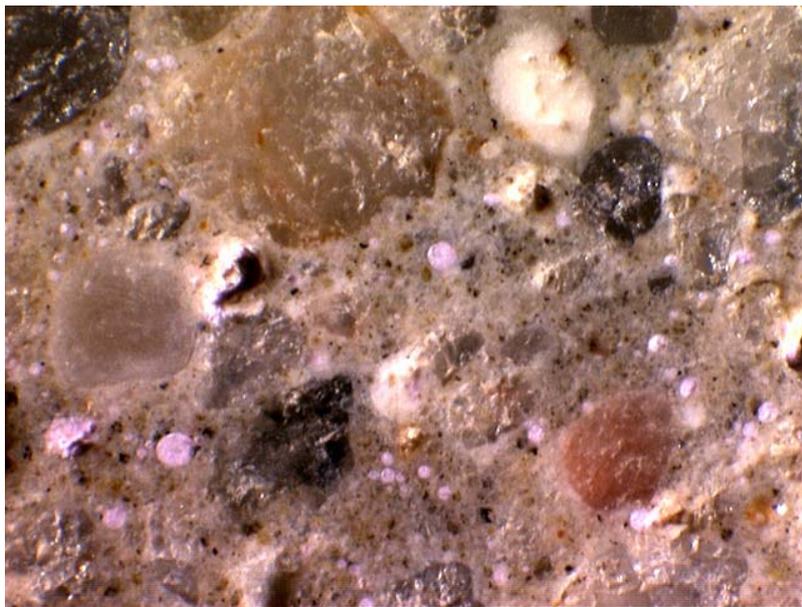


Alkali - Short definition

Alkali is a combination of several elements (hydrogen, lithium, sodium, potassium, rubidium, and caesium). These substances are all eager to react with other elements, especially sodium and potassium. You find them both in the crust of the earth (sodium 2,5 % - potassium 2,6 %). However, since they are always in combination with other elements they are hard to spot. None of these elements can appear separately in ear and moist. Alkalis are resolvable in water, unstable and form salts.

Alkali problems within the concrete

Concrete that are in direct soil contact makes it even more important to understand the connection between alkali and moist, and thereby also understand why problems with paint, cracks, "white spots", smell, mould, etc. develops. "The Alkali problem" is primarily a moist issue. Alkali is present in all concrete, but will not show damage evidence without contact with water. If the concrete is in direct contact with soil or any other exposure to moisture, and there is not efficient ventilation to dry the concrete, moist is brought through the concrete by the capillary system. Moisture develops alkali-problems on the way and also brings them to the surface. It crystallises and presents self like desquamation and salt flushes. Even though the level of moisture and alkali is variable, there are enough moisture in soil and air for the alkali to react. Even concrete that seems dry has shown to store moist underneath paint and covers. You can often spot this as air pockets, desquamation and watermarks by visual inspection.



Acidic rain

Airborne pollution is one of the largest sources of deterioration on concrete. Sulphuric dioxide in the air is adapted in rainwater and creates sulphuric acid. The sulphuric acid reacts with calcium ingredients in the concrete and is transformed into Calcium sulphate, which develops a thin pellicle on the concrete surface. Behind this film calcium sulphate is crystallising, pulverising the concrete and causes peeling and "depressions". Controll®Innerseal fills pores and pockets in concrete and prevents acidic rain to penetrate.

Paint

There are several reasons for bad paint quality on concrete:

1. Immediate addition of water/moist before, during and after painting is the most common reason. The concrete may be wet on the inside, even if it seems dry on the outside.
2. The surface appears soft and loose. This creates a surface quality that will reject all types of paint.
3. Poor preparation. There can be traces of oil, pollution (traffic film), paint wax, salt and moist.
4. The surface is too slippery to give hold for paint.

Our experience is that it is mainly moisture on its way out of the concrete that causes problems. The moisture brings along alkali and calcium to the surface and creates a reaction to paint adhesion, causes cracks, bubbles and desquamation. Oil and acrylic paint is not made to penetrate and seal within concrete in the same manner as Controll®Innerseal. The best result will be achieved only when paint is used as topcoat after applying Controll®Innerseal. The product is a splendid connection for all types of further surface treatment.



Test results

Institution	Purpose	Method	Result
Byggforsk The Norwegian institute of building research 1995.	Testing the ability of depth impregnation with Controll®Innerseal.	150x150mm sized pools were arranged on top of blocks of concrete with quality C25. The pool was filled with Controll®Innerseal and water, both added colour substance that made it possible to judge the penetration depth after splitting the blocks.	Measured penetration after 72 hours: Controll®Innerseal: 195mm Water: 45mm
Sintef The foundation for industrial and technical research at the Norwegian College of Technology 1990.	Testing the ability of depth impregnation with Controll®Innerseal.	"Reference concrete is of poor quality. It has been stored dry in laboratory atmosphere through several years, and is very porous and therefore an object of water penetration. The concrete is added Controll®Innerseal as shown in Direction of use."	"The originally poor quality concrete achieves abilities that recognises water proof concrete, independent of which side was treated."
Japan Testing Center for Construction Materials 2001	Controll®Innerseal is tested in accordance to the national standards for permeation & water penetration in concrete. The product is found to exceed the requirements described		
Beijing Building Material Quality Supervision Test Centre 2001	By testing, the performance of Controll®Innerseal is found to conform to the Index requirements for qualified products specified in DBJO-2001 Code		

SOME SITE REFERENCES

Company	Problem	Solution	Result
Follo Marine-service 1989	30 years old roof construction. Have tried several different solutions i.e. epoxy, tar, polyurethane etc.	Applied 2 coats of Controll®Innerseal from the inside.	After applying treatment the roof was placed under water for a week. To our great satisfaction the roof showed to be completely sealed.
Retec Skade-service 1994	By applying paint on the concrete outside in Vadmyra Borettslag, (housing cooperative) Bergen. Problems with attachment.	Applied 1 coat Controll®Innerseal before painting.	Easy to spray on and just as easy to paint over. Attachment improved, less amount of paint used than expected. RECOMMENDED!
Norsk Standard Gulv 1994	Recently casted concrete exposed to heavy sunlight, strong heat and powerful wind. Fissure was more or less unavoidable.	Applied 1 coat Controll®Innerseal after the floor being solidified enough to be walk on.	Satisfied expectations. The solidification process proceeded exactly as it was supposed to, without development of fissure. Recommended product!
Gulv og Tak AS 1994	The pores inside the concrete are infected with oil. Impossible to achieve attachment for epoxy and glue.	Treated with Controll®Innerseal.	The oil was clearly forced out of the concrete. Treatment is now being used as standard in system and work procedure.
Balkong-innglassing AS 1995	Advanced carbonation on unprotected concrete cover.	Impregnated with Controll®Innerseal	Concrete protected. No registration of water penetration.
Betongingeniør Njåstad 1994	Water penetration on foundation wall. Appearance of fungus. Solid rock against wall, which leads to lack of draining.	Impregnated with Controll®Innerseal until the concrete was filled.	No traces of leakage after 4 years. This, in addition to earlier experience with the treatment, provides verification of given qualities.
Haugesund Kommune 1994	Porous brick facade treated with Silane based impregnation 8 years earlier. However there are still major moist penetrating problems.	The degree of moist penetration was measured before and after treatment with Controll®Innerseal.	The moist penetration was reduced by over 94% on the areas where the building was treated with Controll®Innerseal.
Clena Fasade AS 1998	Element building of concrete belonging to transport companies in Bergen. Discoloration and depressions caused by exhaust and rain. The building has repeatedly been cleaned. However the problem is still returning.	Cleaned and treated with 2 coats Controll®Innerseal.	1 year later: The surface is stabile, and therefore easier to maintain. Recommended.