SiliBond®SI 711

Silicate injection gel for large area sealing

SiliBond®SI 711 is a silicate gel with new, hitherto unknown properties of silicate gels. The gel is physiologically harmless, environmentally neutral and easy to work with.

SiliBond® gels are based on an aqueous alkaline solution of silica and a water based reactive material. The dissolved silica precipitates from the neutral to weakly acidic reacting solution in a defined time as a water-containing silica gel and then reacts very slowly to polysilica. During precipitation, the water present in the solution is trapped in the gel, but not chemically bound. In SiliBond®SI 711 the precipitated silica is thus stabilised. The precipitated gel is largely free of syneresis. In a moist environment, it forms permanently stable bodies with very good strength.

In the air and in dry environment in the loosely bound water in the gel evaporates, the silica gel looses water proportional to loss of volume. The volume lose is irreversible, dehydrated silica gels cannot again swell in water.

In case of fast dehydration, silica gels disintegrate (depending on the solids content) into either hard fractions, crumbs, or powder of insoluble, Armorph silica (SiO_2).

Application

SiliBond®SI 711 is designed for injections in civil engineering, to stabilise gravel layers or to establish waterproof barriers underground ("sealing soles") .

SiliBond®SI 711 replaces, under ecological and technical advantages, in these applications the classical soluble sodium silicate injection. It is almost completely free of ecologically harmful substances and largely pH-neutral. The water glasses typical, high alkalinity is completely eliminated in this injection material.

The stabilised SiliBond®SI 711 gel also offers more security than the conventional hard and soft gels, especially when long-term water tightness is expected.

There are no differences in application technology between injections with SiliBond® and the known products and processes.
Silibond®SI 711 can be adapted to existing equipment, so that work can be carried out with existing equipment and with known technology.

When sealing fissured rock or structures with cavity-rich backfill materials, pre-injections with SiliBond®SI 711 can be used to fill cavities safely, easily and inexpensively and reduce the consumption of expensive primary injection materials.

Injections with SiliBond®SI 711 are less complex than pre-injections with cement and therefore less cost-intensive. And silicate gels made of SiliBond® are compatible with all known organic injection resins and gels, so there are no compatibility problems.
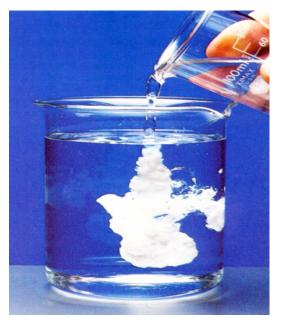
Double step injection:
An efficient way to minimise cost of curtain injections

SiliBond®SI 711, in combination with organic injection material, is ideally suitable for curtain application ("gel curtain") for post-construction, outer surface sealing.

In many cases, this method fails due to the high and noncontrollable and unpredictable cost related to the consumption of acrylate or PUR-gels injected into high void substrates / backfills.

A two-stage injection - pre-injection with SiliBond®SI 711 to fill the voids and pre-injection with polymer gel * for the actual waterproofing membrane - is an elegant and simple solution to this problem.

Fast setting if required :

SiliBond®-branded gels are available for short or long setting time.

Setting times in the range of seconds are available as well as of 4 or 5 hours.

* For the post-injection in the two-stage process, we recommend the proven AR-CAN **HydroBloc®Polygel 530**. A polyacrylatgel according to the guidelines of Deutsche Bahn and tested accordingly. **HydroBloc®Polygel PU 660**, a highly elastic polyurethane hydrogel or **FLEXILITH®322** based on PMMA.

SILIBOND® as binding agent

SiliBond®SI 711 is also used as a - if required fast reacting - temporary binder. Mixed with this product, water or water-containing suspensions of any substances are transformed into compact masses in a short time, which are easy to move, handle and transport.

SiliBond®SI 711 is used to consolidate sludges, organically and inorganically polluted waters and any other mixture of substances containing water in significant quantities or which can be mixed with SiliBond®SI 711.

The two Silibond® components are added to the material to be bonded, either pre-diluted with water as a premix, or separately in the delivery form. The setting time of such mixtures depends on the concentration and amount of the Silibond® reactive. It can range from a few minutes up to several hours. Special machines or equipment are not necessary for processing, the mixing ratio of the two components is not critical and can be varied within wide ranges.

Simple and multiple applications

Applications for this binder can be found wherever water, water-containing waste materials and also loose solids are to be temporarily solidified to make them easier to transport or to prevent such mixtures from flowing off. Fine solids are immobilised with SiliBond®. For example, impregnation with SiliBond® water mixtures can prevent sands from being eroded by fast flowing water. As an additive in drilling fluids or in cooling water for cutting tools in mining, SiliBond® prevents uncontrolled run-off of these fluids from the tool. The cooling capacity is thus improved without affecting the cutting performance of the tools. Once bonded, SiliBond® can be easily removed from the tools without leaving any residue.

In tunnelling and mining, SiliBond® can be used to consolidate waste water or slurries and mixtures containing water so that they can be conveyed or transported away like solid materials. For this purpose, SiliBond® is either mixed into the mass as a premix of the two components, or the components are added individually to the water or water-containing mixture, most simply by pouring a spray or similar. The reaction of the two components takes place without heat development and without by-products being created and released. The reaction product itself is water-containing, environmentally neutral Silica.

Water - solidified by SiliBond® Si 711 „semi-rigid".

Types

Silibond®SI 711 s available with different setting times. All standard types are pre-formulated ready for processing in mixing ratio 1.1. Special settings with different MV and other reaction times are possible.

SiliBond®SI 711

**Field of application :
Injection material for
building protection and
reinforcement**

Component A	Solution of Sodium silicate , 38/40 °C
Presentation	Clear or opaque , oily liquid
pH	11 - 12 (20 °C)
Content SiO_2	34 - 36
Density	1,3 - 1,4 g/ml (20 °C)
Viscosity	Approx. 300 mPa.s +/- 200 (20 °C)
Setting time (1:1:6)*	30 - 40 min. at 20 °C

Component B	Water soluble , inorganic liquid
Presentation	Transparent , aqueous liquid
Odour	Low level, specific
Dispersion and solution agent	Water
Density	1,1 - 1,15 g/ml (20 °C)
pH	0,4 - 0,8 (20 °C)
Viscosity	Approx. 10 - 20 mPa.s (20°C)

*solution of each one part **Silibond®**Si 711 A + B-Component and 6 parts of water

SiliBond®SI 711

Field of application:

**Civil engineering,
mixed with water for
soil/ground injection**

Component A	Preparation of Sodium silicate
Presentation	Clear or opaque , oily liquid
pH	11 - 12,5 (20 °C)
Content SiO_2	36 - 40
Density	1,35 - 1,5 g/ml (20 °C)
Viscosity	Approx. 500 mPa.s +/- 200 (20 °C)
Setting time (1:1)	40 - 60 seconds

Component B	Water soluble , anorganic liquid
Presentation	Transparent , yellow-green aqueous liquid
Odour	Low level, specific
Dispersion and solution agent	Water
Density	Approx. 1,10 g/ml
pH	0,4 - 0,8
Viscosity	Approx. 20 cStk (20 mPa.s)

**Test reports
Certifications
Safety at work
Storage**

Silibond®SI 711 has been tested by the Hygiene Institute Gelsenkirchen/Germany. Approval (# 84.12.22.61 - 2002-1) by the Miners Health Protection Regulation (GesBergV) of 31.07.1991 in Germany under mining law as a binder.

The components of Silibond®SI 711 do not contain any toxic ingredients, no solvents and are not flammable. However, the components may irritate the skin and mucous membranes, as supplied (unmixed). Similar to chalk and cement, there is a risk of permanent damage in case of contact with the eyes! Protective gloves and goggles must therefore be worn during processing. We also recommend keeping an eye rinsing bottle with water during application.

In the original containers and tightly closed, the components have a shelf life of at least 12 months after delivery. Silibond® must be stored in plastic containers (e.g. PE), stainless steel or coated steel. Contact with base metals (aluminium, iron, copper, zinc etc.) and their alloys must be avoided.

The Silibond® components must be protected from frost and stored in such a way that they are not accessible to unauthorised persons, especially children. They must not be mixed with foreign substances. Individual components pre-diluted with water must not be stored for more than 30 days. Material filled into foreign containers must be marked in accordance with the original.

Clean water is sufficient for cleaning/rinsing equipment and machines.

These technical information describe the present-day state of knowledge these product. They should only inform about the possibilities of application and could not release the applicator of his commitment to check the possibility to use the product for the required application. Information for processing can be found in processing instructions of our product. Information about safe handling can be found in our current safety data sheet.

ATI-Silibond®SI 711 |11|2019
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passion to invent