

Injection Products **RASCOflex**



RASCOflex Injection Products



Injection grouts for the maintenance and refurbishment of buildings and infrastructure.

EXPERIENCE

The production and marketing of injection products has for decades been the undivided focus of our company's business activities. As the construction industry's first ever provider of acrylic grouts, RASCOR boasts a longer track record (dating back to 1963) than any other player in the sector in the manufacture of these highly sensitive products.

RESEARCH AND DEVELOPMENT

Advances in construction technology – by paving the way for taller structures, deeper foundations and solutions to increasingly difficult subsoil conditions – have, in turn, imposed ever more complex requirements on injection products. As a result, RASCOR's Research and Development department has seen itself confronted with continually growing demands. An expanding portfolio of special products coupled with refinements to our time-honoured standard products testify to the success of this department.

1 Joint sealing

2 Joint sealing

3 Grout curtains

4 Consolidating injections, ground stabilization, controlled structural lifting

ECOLOGY AND ENVIRONMENTAL PROTECTION

In addition to the demands placed by the wide assortment of grouting applications, injection products are subject to various other requirements that are no less important.

A large number of adequately performing products in use for decades have had to be withdrawn from the market by manufacturers in the recent past, due to their demonstrably negative environmental impact. Preliminary trial versions of all RASCOflex injection grouts are put through wide-ranging environmental hygiene tests prior to their development into marketable products. Indeed, we not only rely on our own in-house test methods. We also commission externally accredited institutes to investigate our materials from a variety of

CHEMICAL RESISTANCE

RASCOflex grouts exhibit an above-average chemical resistance, both in their liquid and polymerized states, i.e. both prior to and during service. They are suitable for use in sewage plants treating domestic waste, applications involving contact with acids and alkalis, and in the chemical industry. In the latter case, however, a prior water analysis is required.

RASCOflex resin grouts can be divided into three main categories – acrylics, polyurethanes and urea-silicates – and their specific chemical resistance varies according to product type. Our acrylic grouts are resistant to most chemical action, including diluted acids and alkalis, rot and bacterial growth – and this without





ecological aspects. As RASCOR, we deliberately set the bar high. We always aim to achieve the maximum possible and not just the minimum necessary.

PERSONAL SAFETY AND SECURITY

Safe product handling and use is a further key issue. In developing our products, we give top priority to safety issues and health-friendly formulations. The necessary personal protective equipment is specified with the utmost care. Moreover, the products are assembled and packaged in such a way as to guarantee customer-friendly shipment and storage.

The specified safety precautions for application are limited to the use of protective clothing, gloves, goggles etc., as is normal for most reactive synthetic resins. For up-to-date information on these precautions, please consult the relevant safety data sheets.





the inclusion of any special protective colloids, fungicides or pesticides in the formulations. It is, however, recommended that the suitability of the selected RASCOflex resin grout always be checked in advance for the relevant application.

FIRE PERFORMANCE

The fire behaviour of RASCOflex acrylic and urea-silicate grouts is uncritical, as certified by the results of the stringent suitability test for products used in the London Underground. RASCOflex acrylic and urea-silicate grouts are non-combustible and release hardly any measurable gases, even under long-term fire exposure.

RASCOflex AY Acrylic Grouts







Situation after injection

Water infiltration through later crack opening

Additional swelling provides reliable seal

Through their extra-low viscosity, high flexibility and hydrophilic properties, RASCOflex AY acrylic grouts seal even the finest cracks against high water pressures.

RASCOFLEX AY ACRYLIC GROUTS

RASCOflex resin grouts are used for the remedial waterproofing of all types of building and civil engineering structure to combat water infiltration, leakages involving other liquids, or merely to consolidate rock and subsoil.

Even wide temperature fluctuations do not significantly affect viscosity, allowing injection even at very low temperatures, i.e. when cracks or concrete construction joints are at their widest. With special formulations, grouting is even possible at sub-zero temperatures, provided the building fabric contains no ice.

PROPERTIES

- Protects steel against corrosion
- Provides reliable seal even in contaminated environments without additional precautions
- Unlimited reversibility of swelling action
- Reinjectable
- High chemical resistance
- Same viscosity as water
- Injectable into smallest capillaries

MECHANISM

A particular feature of acrylic resins is their hydrophilic behaviour. In other words, after polymerization, they swell locally upon contact with water. Hence, for reliable waterproofing, acrylic resins require no adhesion to the joint face. Even soiled cracks and joints can be properly sealed without any additional measures. Nor does the later widening of cracks and joints pose any problems as the acrylic grout simply expands to "fill" the newly resulting void.

Through their high pH value, RASCOflex acrylic grouts also contribute to passive corrosion protection within the building fabric. The grout encloses the steel reinforcement and forms a barrier against corrosion.

APPLICATIONS

- All types of crack and joint
- Injection systems for preventive waterproofing
- Grout curtains/consolidating injections behind structures
- Ground injections and stabilization
- Suitable for use at sub-zero temperatures
- For general building construction/civil engineering
- Tunnelling, hydropower facilities etc.

APPLICATION

The components of all RASCOflex acrylic grouts are mixed in the ratio 1:1 by volume. RASCOR recommends the use of a two-component grouting machine with a 1:1 flow rate. However, provided the material is suitably retarded, it is also possible to inject the acrylic grouts with a one-component machine. RASCOflex acrylic grouts can be accelerated or retarded on site, as required.

PREVENTIVE WATERPROOFING

RASCOflex resin grouts have also been triumphantly used for decades in the provision of designed-in, preventive waterproofing solutions, e.g. to seal construction joints, expansion joints and penetrations using injection channels, injection collars, crack inducers and stop end units. Today, they are an established feature of waterproof concrete basement systems. For further details, please consult the «Injection System RASCOtec» and «White Tank System RASCOR» brochures.



REMEDIAL WATERPROOFING

For remedial work, application is best carried out against water pressure, since this allows immediate confirmation of success. No pre-injections or re-injections are necessary as with other systems. The whole waterproofing process is executed in a single operation and is largely independent of the quantity or pressure of the water encountered.

GROUT CURTAINS, CONSOLIDATING INJECTIONS

Grout curtains and consolidating injections behind/under structures provide a reliable waterproof barrier to the external buried surfaces without the need for elaborate excavations and regardless of masonry type (rubble, clay brick etc.). The injected RASCOflex membrane forms a strong barrier to water infiltration in the problem zone.

GROUND INJECTIONS

RASCOflex AY808 can be used to stabilize and consolidate weak, water-saturated subsoils. By virtue of its high penetration, this acrylic grout is able to completely fill water-saturated soils and bind the water. This stops the ground from collapsing due to water infiltration during later excavation.

- 1 RASCOflex AY108 injected into RASCOtec injection channel
- 2 RASCOflex AY108 injected into wall crack
- 3 RASCOflex AY108 injected into floor crack

- 4 Special formulation for tunnel project
- 5 RASCOflex AY408 injected behind masonry
- 6 RASCOflex AY808 ground injection for large-area stabilization

RASCOflex PU Polyurethane Grouts



RASCOflex PU polyurethanes – versatile grouts with a wide variety of applications.

RASCOFLEX PU POLYURETHANE GROUTS

RASCOflex polyurethanes are formulated so as to foam upon contact with water and thereby halt the water flow. The polyurethane grout injected behind this then gels into a compact PU mass, without any contact with water, to provide a permanent waterproof seal.

RASCOflex polyurethane grouts can be split into two main groups. The PU309 series products form a grout body with rigid elastic properties. The PU110 series, on the other hand, exhibits low viscosity in the liquid state and cures into a "soft", highly flexible mass.

PROPERTIES

- Mixed in ratio 1:1 by volume
- Serves as both preliminary and main injection
- Also cures in the absence of water
- Gel times of only a few seconds are possible
- High final strength or extremely expansible, permanently elastic mass, depending on selected system

APPLICATION

All RASCOflex polyurethane grouts are supplied ready-to-use for mixing in the ratio 1:1 by volume. For rapid-curing materials, RASCOR recommends the use of a two-component grouting machine. The two components are fed separately to a static mixer immediately upstream of the drill hole, where they are blended into a homogeneous mix.

The slow-curing polyurethane grouts can also be injected with a one-component grouting machine. Use of a high-speed stirrer is, however, required to premix the material to a homogeneous consistency in the mixing container.

RASCOFLEX PU110X

This soft, elastic polyurethane resin was specially developed as a permanent, flexible barrier both for remedial crack and joint sealing and for preventive joint waterproofing in conjunction with an injection system in civil engineering applications. The initially injected material foams slightly upon contact with water. The material following behind this then gels to provide a durable seal. For small-scale applications, the two components should be premixed and injected with a one-component machine.

APPLICATIONS

- Sealing of fine cracks and joints
- Injection system for preventive joint waterproofing
- Consolidating injections behind structures and joints
- Durable, permanently elastic waterproof barrier



RASCOFLEX PU309

The polyurethane grouts of the RASCOflex PU309 series can be classified according to their different gel times and viscosities. All grouts, however, have the same B component (isocyanate).

Each system can be additionally fine-tuned through the use of separately obtainable catalysts. While accelerators shorten the gel time and thixotropic additives increase the viscosity of the mix, special foaming agents can be used to achieve a high foam factor. These options provide for a high degree of flexibility in meeting the wide-ranging performance requirements that are often placed on a single product.

RASCOflex PU309 is injected behind the problem area or into the ground using a packer or lance. In some cases, depending on the application, the polyurethane grout follows the water path up to the problem zone, which it then completely seals. In other cases, slowcuring systems permeate the subsoil and bring about a vast improvement in strength and stability.

APPLICATIONS

- Provision of barrier against water infiltration
- Void filling
- Soil stabilization/consolidation
- Soil stabilization/consolidation
- Ballast bonding
- Limited crack and joint sealing

- 1 Grouting of tunnel lining joints with RASCOflex PU110X
- 2 Crack sealing with RASCOflex PU110X
- Pre-injection behind tunnel eye with RASCOflex PU309N 3
- Injection against soil shear failure with RASCOflex PU309S
- Sealing of leakages in contiguous bored piling with RASCOflex PU309V
- Ballast bonding with RASCOflex PU309L 6

RASCOflex US Urea-Silicate Grouts



RASCOflex US urea-silicates – the special-purpose injection grouts.

RASCOFLEX US UREA-SILICATE GROUTS

RASCOflex urea-silicate grouts are used for bonding, stabilizing and void filling applications in all areas of building construction and civil engineering.

These grouts can be split into two groups: foaming and non-foaming materials. Being insensitive to water, they cure equally well regardless of whether they come into contact with water. The foaming process is similarly independent of water contact.

PROPERTIES

- No high curing temperatures
- Structural bonding
- Water-independent injection
- Allows underwater structural injections
- High compressive strength
- High eco-friendliness
- Insensitive to fire
- Foams without water contact

APPLICATION

RASCOflex urea-silicate grouts are generally mixed in the ratio 1:1 by volume. Due to their short gel times, these products must be applied using two-component injection pumps. The A and B components are thus fed separately up to the drill hole, where they are blended – like the two-component polyurethane grouts – in a static mixer.

RASCOFLEX US409

RASCOflex US409 is a non-foaming urea-silicate resin that cures with or without water contact and even underwater. The grout forms a rigid, elastic material with compressive strengths exceeding 30 N/mm², thus making it ideal for structural and stabilizing injections, even in wet environments. The flexibility of the cured resin is a further key advantage. This allows limited amounts of subsequent movement to be accommodated without recurring structural failure.

APPLICATIONS

- Structural crack and joint injections
- Joint sealing
- Injections below concrete slabs to stabilize and lift slabs
- Lifting of road carriageways, with immediate subsequent use
- Consolidating injections below railway sleepers
- Subsoil stabilization
- Foundation strengthening in offshore applications (e.g. wind farms)



RASCOFLEX US509F

RASCOflex US509F is a foaming injection grout for void filling. The high foam factor and moisture-independent foaming action, i.e. working equally well in both wet and dry environments, combine to deliver substantial savings in material consumption. Unlike the tough, elastic polyurethane foams, the fully cured urea-silicate foam is hard and brittle. This means that the injected zone can be cut, broken or hacked away without damaging any other parts of the structure.

APPLICATIONS

- Void filling in ground
- Pre-injection in bored tunnels
- Temporary anchor seals

- 1 Structural injection with RASCOflex US409
- 2 Structural bonding of old and new fabric with RASCOflex US409
- 3 Foundation soil stabilization with RASCOflex US409
- 4 Stabilizing pre-injection with RASCOflex US509F
- 5/6 Preventive waterproofing to sewer launch pit with RASCOflex US509F

Injection Products RASCOflex Tabular Summary

FEATURES

	AY108	AY408	AY808	US409	US509F
Base	Acrylic	Acrylic	Acrylic	Urea-silicate	Urea-silicate
Application method	2-component	2-component	2-component	2-component	2-component
Standard gel/curing time	2 - 3 min	4 - 5 min	10 min	150 s	40 s
Impact of water	hydrophilic	hydrophilic	hydrophilic	no impact	no impact
Increase in volume/foam factor	approx. 15%	approx. 15%	none	none	30-fold
Compressive strength N/mm ²	not applicable	not applicable	Nnot applicable	> 30	Nnot applicable
Groundwater compatibility	yes	yes	yes	yes	yes
Temporary waterproofing					
Permanent waterproofing					
Injection channels/systems					
Void filling					
Ground consolidation					
Crack/joint injections					
Contaminated crack/joint injections					
Grout curtains					
Excavation pit waterproofing					
Sewer refurbishment					
Ballast bonding					
Structural injections					
Consolidating injections below structures					
Lifting of building elements/carriageways					



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FEATURES

	PU110X	PU309L	PU309N	PU309S	PU309V
Base	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Application method	1-/2-component	1-/2-component	2-component	2-component	2-component
Standard gel/curing time	50 min	60 min	120 s	30 s	40 s
Impact of water	slight foaming	foaming	foaming	foaming	foaming
Foam factor	1.15-fold	10-fold	10-fold	10-fold	10-fold
Compressive strength N/mm ²	not applicable	65	60	60	60
Groundwater compatibility	yes	yes	yes	yes	yes
Temporary waterproofing					
Permanent waterproofing					
Injection channels/systems					
Void filling					
Ground consolidation					
Crack/joint injections					
Contaminated crack/joint injections					
Grout curtains					
Excavation pit waterproofing					
Sewer refurbishment					
Ballast bonding					
Structural injections					
Consolidating injections below structures					
Lifting of building elements/carriageways					



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Injection Products
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Injection Systems

Hydrophilic Systeme

Waterbar Systems

Machines and Accesories

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