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FOSROC

Solutions for the Repair and Protection of Reinforced Concrete

Introduction

Fosroc has over 70 years experience of supplying specialist chemicals to the construction industry.

In Australia in 1985, Expandite-Rawplug merged with Fosroc Australia. The decision to combine the two companies created Australia's largest supplier of construction chemicals.

Some of the most instantly recognisable brands in the construction business have been introduced by Fosroc including: Nitoseal, Conbextra, Renderoc and Thioflex.

Parchem have been manufacturing and distributing Fosroc products under license since 1996 (formerly under the Parbury Technologies name) and have continued to introduce innovative new products to the Australian market utilising the latest technological developments from Fosroc complimented with local product innovation to suit the Australian market and needs of Australian customers.

The range of concrete repair and protection products now available is further complimented with innovative galvanic and impressed current anodes supplied by Vector Corrosion Technologies.

All of this provides an unrivalled range of products with extensive track record of performance and close to 30 years of experience in the protection of reinforced concrete assets.

CONCRETE INSTITUTE of AUSTRALIA

AUSTRALASIAN CORROSION ASSOCIATION INC.

acra Australian Concrete Repair Association

Parchem Construction Supplies is proud to be active members of the following industry associations.

Innovative Solutions for Reinforced Corrosion

Parchem Construction Supplies have been providing innovative corrosion solutions to the Australian Construction market since 2001. It started with the Galvashield XP anode and has since grown to over 10 different product options including galvanic corrosion protection systems, impressed current cathodic protection systems and electrochemical protection systems.

This wide product range on offer gives asset owners and engineers an unrivalled choice of proven technologies when considering a particular corrosion mitigation strategy.

Complemented with an extensive selection of Fosroc concrete repair mortars and protective coatings, Parchem delivers the complete concrete rehabilitation package. This package can be tailored to the specific requirements of the structure considering all technical, environmental and commercial factors.

Parchem Construction Supplies in conjunction with Vector Corrosion Technologies can provide the service and support that is needed to provide detailed specification assistance through to on site support for your project. With a product range that has been tested and monitored in Australia's harsh marine environment and shown to provide long term protection to numerous structures throughout the country, Parchem and Vector have the product range and experience to provide the most cost effective solution.

What is corrosion?

Corrosion can be described as the deterioration of a material, usually a metal, by a chemical or electrochemical reaction within its environment. In this case we are looking at corrosion of steel reinforcement in concrete. When steel is embedded in concrete, a passive oxide film forms upon its surface. This film is maintained by the alkaline nature of the concrete (typically in excess of pH 12.6). While this passive film is present, the steel is immune to corrosion and therefore gives stability to a structure. However, when the concrete becomes carbonated the local or global pH of the concrete can fall, causing passivity to be lost and corrosion to occur.

Chloride induced corrosion is also a major problem and can mean the concrete around the steel can still have a high pH, high enough for passivation, but once the chlorides reach the steel they break the passivation layer and corrosion occurs.

What causes corrosion?

A number of everyday contaminants can cause corrosion:

- Airborne chlorides
- Seawater
- Carbon dioxide in the atmosphere
- Sea-dredged aggregates
- Chloride containing admixtures

What happens when corrosion occurs?

During the corrosion process, a by-product is formed (rust), which occupies a volume seven times greater than that of the native metal. This volume change causes cracking and eventual spalling of the concrete surface.

Corrosion in the marine environment

The majority of Australia's infrastructure can be classed as being in a marine environment. This environment is extremely aggressive in nature due to the abundance of both chloride and moisture.

Areas of vulnerability

Areas prone to corrosion on a marine structure can be categorised into three areas:

- Atmospheric zone. This is reinforced concrete located in the vicinity of the marine environment, but not in direct contact with water; i.e. bridge decks, soffits and beams. These elements often display moderate corrosion rates due to the presence of airborne moisture and chloride.
- Splash and tidal zone. This is the area located on and around the water line and is often classed as semi-submerged; i.e. concrete piles and piers. These elements generally experience the most severe corrosion due to the high moisture, oxygen availability and wet/dry cycling.

Telltale signs of corrosion in these two zones are cracking, spalling and red rust staining.

- Submerged zone. This is reinforced concrete permanently located underwater, i.e marine piles. These areas can experience lower levels of corrosion due to reduced oxygen levels. However, while corrosion here is less aggressive, submerged areas are at risk from another problem known as black rust and low water corrosion.

Selecting a Corrosion Protection Strategy for Concrete Structures

Selecting the appropriate level of corrosion protection is based on many factors such as the level of chloride contamination and carbonation, amount of concrete damage, location of corrosion activity (localized or widespread), the cost and design life of the corrosion protection system, and the expected service life of the structure. The following levels of protection can be used as a guide to decide the most effective strategy.

Corrosion Prevention

Corrosion prevention is used to prevent corrosion activity from initiating in contaminated concrete.

To mitigate new corrosion activity from occurring around concrete repairs or at other interfaces between new and old concrete such as bridge widening, joint repairs and slab replacements, a simple localized corrosion prevention strategy utilizing with Galvashield® XPT or Galvashield® XP2 embedded galvanic anodes, can extend the life of concrete repairs.

Corrosion Control

The use of corrosion control systems will either stop on-going corrosion activity or provide a significant reduction in the corrosion rate and an increased service life of the rehabilitated structure.

Galvashield® XP2 and XP4 anodes can be used in corrosion control or corrosion prevention applications. Galvashield® CC anodes are used to provide targeted galvanic corrosion control to columns, beams, decks, post-tensioned anchorages and other structures where on-going corrosion activity threatens the service life of the structure. Galvanode® DAS anodes can also be used in concrete overlays, concrete jacketing and other concrete repair applications to provide long lasting galvanic protection.

Cathodic Protection

Cathodic protection provides the highest level of protection and is intended to stop on-going corrosion activity.

Impressed current systems such as those that use Ebonex® discrete anodes and Vectorode® catalyzed titanium anodes utilize an outside power source. For long-term performance, these systems should be monitored and maintained. Ebonex anodes are ideal to protect heavily reinforced concrete, thick structural sections such as columns or beams, or steel framed masonry buildings while Vectrode anodes are placed into slots cut into the concrete surface or underneath a concrete overlay.

Galvanic systems are typically designed to provide corrosion control or cathodic protection. The systems are self-powered and require less monitoring and maintenance than ICCP. Galvashield® Jackets are used to protect marine pilings and other structures. Galvanode® DAS and Galvanode® DAS Marine anodes can also be used in concrete overlays, concrete jacketing and other concrete repair applications to provide long lasting galvanic protection.

Corrosion Passivation

Corrosion Passivation is provided by electrochemical treatments which are aimed at directly addressing the cause of the corrosion activity. Norcure® Chloride Extraction is used to address chloride contaminated structures such as bridges and parking garages. Norcure® Re-alkalisation is commonly used on carbonated building facades. These systems are installed onto the structure, operated for a short duration, then dismantled and removed leaving the structure in a passive condition. Electrochemical treatments provide many of the long-term corrosion mitigation benefits of cathodic protection systems but without the need for maintenance and monitoring.

Corrosion Investigation

Cost-effective solutions are predicated on identifying the cause of the problem, not just the symptom; therefore, a thorough evaluation of why the deterioration has occurred is recommended.

Investigating the extent and magnitude of corrosion provides useful information when designing a repair plan.

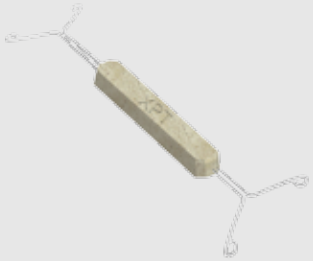
Galvanic Systems

Galvashield® XP

System Description	Disk shaped discrete anode - Alkali-activated zinc - 2G Technology
Applications	Targeted Corrosion prevention for patch repairs and joints
Product Details	Corrosion prevention spacing: 175 - 750mm

Galvashield® XPT

System Description	Bar shaped discrete anode - Alkali-activated zinc - 2G Technology
Applications	Targeted Corrosion prevention around patch repairs and joints. Low concrete cover or congested steel spacing
Product Details	Corrosion prevention spacing: 175 - 750mm

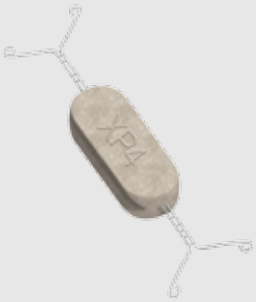


Galvashield® XP2

System Description	Oval shaped discrete anode - Alkali-activated zinc - 2G Technology - BarFit groove for secure anode placement
Applications	Targeted Corrosion prevention or corrosion control for patch repairs and joints
Product Details	Corrosion prevention spacing: 300 - 750mm Corrosion control spacing: 200 - 600mm

Galvashield® XP4

System Description	Oval shaped discrete anode - Alkali-activated zinc - 2G Technology - BarFit groove for secure anode placement
Applications	Targeted Corrosion prevention or corrosion control for patch repairs and joints. High chloride or high steel density structures
Product Details	Corrosion control spacing: 150 - 750mm



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Galvanic Systems

Galvashield® CC

System Description	Cylindrical-shaped discrete anodes - Alkali-activated zinc - 2G Technology
Applications	Corrosion control for concrete
Product Details	Corrosion Control spacing: 325 - 700mm

Galvanode® DAS Marine

System Description	Embedded mortar covered anodes for distributed protection - Alkali-activated zinc
Applications	Galvanic encasements - Jacketing
Product Details	Based on service life and protection requirements

Galvanode® DAS

System Description	Embedded foil covered anodes for distributed protection - Alkali-activated zinc
Applications	Galvanic encasements - Overlays
Product Details	Based on service life and protection requirements

Galvashield® Jacket

System Description	Galvanic anodes with a stay-in-place formwork - Distributed alkali-activated anodes or zinc mesh anodes - Bulk zinc anodes
Applications	Galvanic encasements - Jacketing - Overlays. For marine or non-marine environments
Product Details	Anode selection and spacing based on design requirements

Impressed Current Systems

Ebonex®

System Description	Cylindrical or star-shaped discrete anodes with high current capacity. Built-in ventilation - Crimps or electrical connectors
Applications	Global or targeted protection - Reinforced concrete or masonary structures
Product Details	Anode sizes: 7 to 28mm diameter lengths up to 600mm. Anode spacing based on design requirements

Vectrode® Anodes

System Description	Range of MMO Titanium anodes and related components
Applications	Global or targeted protection - Reinforced concrete, masonary, or buried structures
Product Details	Mesh, Tibbon Mesh, Tubes, Wire

Electrochemical Treatments

Norcure® Chloride Extraction

System Description	Long term corrosion passivation with short term electrical treatment. Reduces chloride and increases pH around reinforcing steel
Applications	Chloride contaminated concrete - Large area treatment
Product Details	4 to 8 week treatment time - Barrier protection recommended if re-exposed to chloride

Norcure® Re-Alkalisation

System Description	Long term corrosion passivation with short term electrical treatment. Potassium or sodium carbonate used as electrolyte
Applications	Carbonated concrete - Large area treatment
Product Details	2 to 8 week treatment time - Will not re-carbonate

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Corrosion Mitigation Comparison Chart

	Product	Level of Protection	Service Life	Anode Size
GALVANIC TREATMENTS	Galvashield XP	Pr	10 - 20 Years	65 x 30mm (2.5" x 1.2") 60 grams of zinc
	Galvashield XPT	Pr	10 - 20 Years	25 x 125 x 25mm (1" x 5" x 1") 60 grams of zinc
	Galvashield XP2	Pr CC	10 - 20 Years	65 x 80 x 30mm (2.5" x 3.1 x 1") 100 grams of zinc
	Galvashield XP4	Pr CC	10 - 20 Years	65 x 120 x 30mm (2.5" x 4.7" x 1") 160 grams of zinc
	Galvashield N	Pr	10 - 20 Years	25 x 125 x 25mm (1" x 5" x 1") 60 grams of zinc
	Galvashield CC	Pr CC	10 - 20 Years	CC65, CC100,
	Galvanode DAS	Pr CC CP	10 - 40 Years	Zinc mass:0.25, 0.6, 1.2, 2.0 lb./ft. (0.37, 0.89, 1.8, 3.0 kg/m)
	Galvanode Jacket	Pr CC CP	10 - 40 Years	Distributed alkali-activated or zinc mesh, bulk zinc anode
ICCP	Ebonex	CP	25 + Years	7 - 28mm diameter, lengths up to 600mm
TREATMENTS	Norecure Chloride Extraction	Pa	20 + Years	Varies
	Norecure Re-Alkalisation	Pa	Indefinite	Varies

Levels of Protection

Pr - Corrosion Prevention

Used to prevent corrosion activity from initiating in contaminated concrete. If concrete repair projects are completed in accordance with industry guidelines, the replacement of damaged concrete will address the areas with the highest level of corrosion activity. But after the repairs are complete, new corrosion sites are likely to form in the remaining contaminated concrete which was passive before the repairs. Research in the area of corrosion prevention indicates that a low applied current density (in the order of 0.4 mA/m² of steel surface area) is effective at preventing the initiation of corrosion in concrete. The required current will decrease over time as chemical reactions increase the alkalinity and decrease the concentration of chloride ions around the reinforcing steel.

CC - Corrosion Control

Utilized when active corrosion exists. The use of corrosion control systems will provide a reduction in the corrosion rate and increases the service life of the rehabilitated structure. In many cases, this level of protection can be provided with low incremental cost as the protection can be targeted at specific areas of contamination or corrosion activity. The current requirements for corrosion control are higher than for corrosion prevention, generally in the range of 1 to 7 mA/m² and can decrease over time as the beneficial effects of chemical reactions build up the alkalinity and decrease chloride concentrations around the reinforcing steel.

CP - Cathodic Protection

Provides active long term protection. Cathodic protection should be selected when the highest level of protection is necessary and the cost is economically justified. Current industry standards for cathodic protection are based upon a 100 mV depolarization acceptance criteria. This level of protection generally requires an initial operating current between 5 and 20 mA/m². Current may be provided by galvanic anodes or by an impressed current power supply. Impressed current systems should be monitored and maintained over time.

Anode Type	Applications	Special Features	Mitigation Strategy
Discrete Embedded	Patch and joint repair, interfaces between new and old concrete	2G Technology	L
Discrete Embedded	Same as Galvashield XP, low concrete cover, tight spaces	2G Technology	L
Discrete Embedded	Wider spacing than Galvashield XP, higher current density for corrosion control	2G Technology, BarFit groove	L
Discrete Embedded	Wider spacing than Galvashield XP2, higher chloride corrosion control	2G Technology, BarFit groove	L
Discrete Embedded	New construction, large areas or target high risk areas, e.g control joints	2G Technology, Extra long lead wires	L, G
Discrete Embedded	Protection of areas with active corrosion, embedded into drilled holes	2G Technology, quick rebar and anode connection devices	L, G
Distributed Embedded	Galvanic encasements of reinforced concrete, pile jacketing, overlays, large area repairs	Custom sizes avaliable	L, G
Distributed Embedded	Marine or non-marine piles and columns	Stay-in-place formwork	G
Discrete Embedded	High current capacity, reinforced concrete beams and columns, steel frame masonary buildings	Vented, special connectors, acid resistant grout	L, G
Distributed, Temporary Surface Applied	Chloride contaminated beams, archs, columns and other large areas, historic structures	Does not significantly change structure appearance	G
Distributed, Temporary Surface Applied	Widespread carbonation, historic structures	Does not significantly change structure appearance	G

Pa - Corrosive Passivation

Achieved by changing the environment around the steel to a significantly less corrosive condition. This can be achieved by reducing the amount of chloride or by increasing the pH around the steel by using a temporary electric field. The systems are installed until the objective is achieved then removed so that no further monitoring or maintenance is required.

Special Features

2G Technology - Includes special additive for increased anode current.

BarFit - Grooved design or plastic spacers for secure fit to steel.

L-Local - A local corrosion mitigation strategy is utilized when only targeted areas require protection or if global protection is outside the owner's current budget.

G-Global - A Global corrosion mitigation strategy is utilized when protection is required for an entire structure or large structural elements.

High Performance Concrete Repair Mortars

The number, size and geometry of repair areas will vary from job to job.

Expert diagnosis needs to be carried out to determine the extent of the problem. The most appropriate method of repair should then be selected.

Fosroc offer the world-renowned range of Renderoc mortars. These are pre-bagged, single component products available in various grades.

These repair mortars have been tested to both local and International standards with independent performance certification. This independent performance data is backed up with close to 20 years of proven performance repairing Australian Infrastructure. This long and varied history provides comfort for engineers and asset owners that the products are not only independently verified but have a track record of proven performance.

Non Structural Repair Mortars

Renderoc FC

Polymer Modified Fairing Mortar

- Designed for application in thin layers to produce a fair faced appearance to concrete in readiness to receive a protective coating

Renderoc HB

Polymer modified general purpose patch repair mortar

- Used for large and small vertical and overhead applications
- Lightweight formulation enables high build

Renderoc HB25

High performance lightweight low shrinkage concrete reinstatement mortar

- Used for vertical and overhead builds
- Lightweight formulation enables high build
- Low shrinkage

Structural Repair Mortars

The Fosroc Range of repair mortars are specifically designed for rehabilitation of large civil infrastructure which demands a high level of engineering and durability performance. The following range of repair mortars have been tested to EN1504 and are defined as being suitable for structural repair to this standard. The below table summarises the different products durability characteristics.

All of the below products have independent test certificates available on request and the results are based on product manufactured and supplied in Australia and New Zealand.

Renderoc HB40

High Performance fibre reinforced, medium weight concrete reinstatement mortar

- Low permeability
- Low shrinkage
- Used for vertical and overhead

Renderoc HB70

Structural grade polymer modified high build reinstatement mortar

- High strength
- High abrasion
- Low shinkage
- Low permeability

Renderoc LA55

Super fluid, high strength micro concrete reinstatement mortar

- Ideal for the repair of large structural sections of concrete
- Excellent chloride and carbonation resistance
- Can be pumped or poured
- Self compacting

Guncrete E

Spray applied repair mortar with high build and high strength

- Ideal for bridge piers, tunnels and sewers
- High build and high strength
- Low rebound

The following results were obtained at a water:powder ratio of 0.15 and a temperature of 20°C unless otherwise stated.

Test method	Standard	Rendoeroc HB40 Result-R3		Renderoc HB70 Result-R4		Renderoc LA55 Result-R4	Guncrete E Result-R4
Compressive Strength	EN 2190:1999	38 MPa @ 28 days		68 MPa @ 28 days		74.3 MPa	84 MPa
Bond strength by pull off	EN 1542:1999	No primer	1.8 MPa	No primer	2.4 MPa	3.3 MPa	3.2 MPa
		Nitobond HAR	2.5MPa	Nitobond HAR	2.7 MPa	-	-
Capillary Absorption	EN 1307:2002	0.2 kg/(m² x h0.5)		0.1 kg/(m² x h0.5)		0.1 kg/(m² x h0.5)	0.1 kg/(m² x h0.5)
Carbonation Resistance	EN 13295:2005	Conforms		Conforms		Conforms	Conforms
Coefficient of thermal expansion	EN 1770:1990	13.7 x 10^{-6} /°C		11.2 x 10^{-6} /°C		17.2 x 10^{-6} /°C	16.3 x 10^{-6} /°C
Shrinkage and Expansion	EN 12617-4:2002	Shrinkage: 1.7 MPa		Shrinkage: 2.5 MPa		Shrinkage: 3.3 MPa	Shrinkage: 2.7 MPa
		Expansion: 1.7 MPa		Expansion: 2.5 MPa		Expansion: 3.3 MPa	Expansion: 2.8 MPa
Elastic Modulus	EN 13412:2008	18.4 GPa		33.8 GPa		39.3 GPa	52.8 GPa
Chloride Diffusion	Nordtest NT Build 443	4.47 x 10^{-12} m²/sec		1.26 x 10^{-12} m²/sec		0.64 x 10^{-12} m²/sec	-

Specialised Repair Mortars

Patchroc GP/C

Fast setting emergency patching mortar used repairing localised patches

- Rapid strength gain. Will accept foot traffic in just 2 hours
- High strength high abrasion and weather resistance

Paveroc

Reinstatement mortar for large areas of concrete pavements and floors

- Rapid strength gain. Will accept pedestrian traffic after just 12 hours
- High strength and high abrasion resistance

Renderoc Rapid

Extremely fast setting repair mortar

- Used where urgent repairs are required
- Rapid strength gain

Renderoc G

An acid resistant repair mortar for use in highly corrosive environments.

- Based on sustainable technology.
- Has excellent long term resistance to acidic conditions

Epoxy Repairs

Nitomortar 903

Multi purpose epoxy binder for fast repair and filling of voids. Can produce to desired consistency

Nitomortar AP

Used for repairing and re-profiling of precast concrete units, damaged arisses and treads

- Rapid strength - 66MPa after 1 day
- Multipurpose repair mortar and adhesive
- Excellent resistance to abrasion and impact
- Used as an adhesive for Nitofill LV crack injection system

Nitofil LV

Pre-packaged low viscosity or thixotropic epoxy resin injection grout.

- Achieve high strength bond to dry or wet concrete
- Material designed for low creep
- Non shrink - no loss of bond or surface contact
- High compressive, tensile and flexural strengths
- Excellent chemical resistance

Protective Coatings & Impregnations

Although the correct use of Fosroc's range of repair mortars will ensure a successful, long lasting repair, it should be remembered that the rest of the structure will remain exposed to possible future attack from the surrounding environment.

The use of correctly selected coating systems can prevent the damaging gases and salts from entering the concrete pore structure and reaching the steel reinforcement where the damage occurs.

A highly impervious coating however is not the simple answer to the problem. The porous nature of concrete, and the fact that it inevitably contains some mositure, means that the coating must allow the structure to breath.

A further consideration, especially where climatic conditions are severe, is the resistance of the coating to UV attack. This is particularly important in countries such as Australia where high levels of UV are recorded on a daily basis.

Incheon Bridge South Korea
Product: Emer-Stop Creme protective coating

Properties Required of a Protective Coating

The particular characteristics of concrete demand that the protective coating system chosen must meet certain basic performance which are as follows:

- Prevent ingress of chloride ions and carbon dioxide
- Still allow moisture to pass through the coating
- Excellent weathering and UV resistance
- Provide an aesthetic appearance to the concrete surface (if required)

Types of protective treatments

Hydrophobic impregnations

Are generally low viscosity liquids which penetrate into the concrete and line the pores. They are colourless and therefore have little or no effect on the appearance of the structure. These systems are hydrophobic and thus repel water, which otherwise would cause corrosion of the reinforcing steel as chlorides are carried by water.

The Emer-stop Creme and Emer-Stop S100N are high performance silane based systems that have a proven track record of performance on civil infrastructure projects.

Coatings

Well formulated combinations of penetrants and coatings, like the Dekguard system , provide engineers and asset owners another high performance option to protect concrete infrastructure.

The Dekguard System consists of a silane-siloxane primer with a pigmented acrylic topcoat. The low viscosity, low volatility primer penetrates the substrate and provides resistance to water soluble chloride salts. The topcoat is an aliphatic acrylic which forms a film over the surface of the concrete, providing excellent resistance to carbonation as well as chloride attack.

The combination of the two provides powerful protection against corrosive and UV attack together with the breathability vital to allow potentially harmful water vapour to escape from the structure.

Silane Impregnations

Today, alkylalkoxysilanes set the standard in terms of highly efficient penetration and excellent resistance to high alkalinity. They are colorless, low-molecular (and thus low-viscosity), highly penetrating liquids that are generally applied to concrete in undiluted form. There, they react with moisture, liberating alcohol, and form extremely stable bonds with the pores and capillary walls of the concrete. After the reaction, the silane juts out into the centre of the capillaries and pores, which is the reason behind hydrophobic impregnation's high effectiveness.

Emer-Stop S100N

Emer-Stop S100N is an iso-butyltriethoxysilane clear liquid water repellent. Emer-Stop S100N is used in undiluted form for the impregnation of reinforced concrete.

Special Features

Emer-Stop S100N is characterised by:

- Excellent penetration
- Being solvent-free and environmentally compatible
- Low volatility
- Optimum resistance to alkalis

The treated concrete has the following lasting properties:

- Drastic reduction in chloride and water absorption
- Retention of breathability
- High protection against freeze/thaw

After application to the concrete, Emer-Stop S100N reacts initially with atmospheric moisture or the building material's pore water. In the zone where the impregnating agent has penetrated, the active agent formed greatly reduces the concrete's absorption, but without blocking the concrete's pores and capillaries. The impregnated building material retains its very high water-vapor permeability.

Emer-Stop creme and Emer-Stop S100N complies with the highest requirements of EN 1504-2 for hydrophobic Impregnation (penetration depth class II & resistance to freeze and thaw salt stresses). These are summarised in the table below.

Test Method	Standard	Result
Freeze thaw stress test	EN 13581	Complies (weight loss at 20 cycles later than untreated samples)
Depth of Penetration	EN 14630	Class 2 > 10mm
Absorption rate	EN 13580	< 7.5% (compared with untreated sample)
Absorption rate after exposure to alkali	EN 13580	< 10%
Drying rate coefficient	EN 13579	Class 1 > 30%

Emer-Stop Creme

Emer-Stop Creme is an aqueous, solvent-free, water-repellent cream based on silane. It's a high-quality specialty product for the hydrophobic impregnation of concrete and reinforced concrete.

The Formula for Deep-Pore Protection Emer-Stop Creme is characterized by:

- Excellent penetration
- Being solvent-free, aqueous and environmentally compatible
- Low volatility
- Optimum resistance to alkalis
- The treated concrete exhibits the following lasting properties:
- Drastic reduction in chloride and water absorption
- Retention of breathability by the substrate
- High protection against freeze/thaw

Emer-Stop Creme's thixotropic consistency is unique among water repellents and its properties are excellent for the hydrophobic impregnation of high-quality concrete and reinforced concrete. Unlike conventional liquid products, Emer-Stop Creme can be applied to the required extent in just one or sometimes two steps. Depending on porosity and thus concrete quality, the silane active ingredient penetrates into the substrate within a short period of time (30 minutes to a couple of hours) and there it reacts, liberating alcohol with the silicate matrix of the capillaries and pores of the concrete.

Emer-Stop Creme also allows the pores and capillaries of the substrate to remain open, leaving the substrate breathable. Emer-Stop Creme is designed so that the active ingredient penetrates as deeply into the concrete as possible and thus optimally protects against the absorption of water and aggressive substances, as well as against damage from freeze/thaw.

Nitocote SN502

Economical, general purpose penetrating hydrophobic silane-siloxane, clear treatment for masonry and concrete

- Reduces water and chloride intrusion
- Penetrates into porous substrates
- Non-staining
- Suitable for applications where windy conditions or high temperatures are likely
- Minimises efflorescence
- Allows water vapour to escape from the structure

Dekguard Range of Coatings Systems

Dekguard Elastic

High Performance crack accommodating elastomeric acrylic protective and decorative coating.

- Can accommodate substrate cracking up to 6mm and cyclic movement up to 1mm
- Excellent barrier to carbon dioxide, chloride ions, oxygen and water
- Special acrylic polymer minmisis dirt retention
- Allows water vapour to escpae from the structure
- UV-resistant with high resistance to long term weathering
- Water based

Dekguard E2000

High Performance crack accommodating elastomeric acrylic protective and decorative coating.

Provides all of the benefits of the Dekguard Elastic but due to a thinner film build has reduced movement capacity

- Can accommodate substrate cracking up to 2 mm and cyclic movement up to 0.3 mm

Endeavour Bridge NSW
Product: Dekguard S protective coating

Dekguard S

High Performance aliphatic acrylic protective and decorative coating.

- Excellent barrier to carbon dioxide, chloride ions, sulphates, oxygen and water
- Allows water to escape from the structure
- Highly UV-resistance apliphatic acrylic gives exceptional resistance to the effects of long term weathering
- Highly durable in all climatic conditions

Dekguard O

High performance, aliphatic acrylic, translucent protective coating for concrete and masonry.

Provides all the benefits and performance of the Dekguard S system but is a translucent coating so ideal if the asset owner wants to retain the appearance of the existing surface but provide extra protection.

- Also reduces different appearances between concrete sections and / or repaired patches

The below table is a summary of performance data for the Dekguard range of protective coatings. These are tested to the standard AS/NZS 4548.5-1999- guide to long life for coatings and masonry which has been prepared as a guide for information on the properties that could be expected from long-life exterior coatings applied to concrete and masonry surfaces.

All of the performance data have had independent third party test certificates which can be provided on request.

Table Summary of Dekguard Performance Data tested to AS/NZS 4548.5-1999

	Elogation at break (ASTM D412)	CO_2 diffusion resistance			Vapour Diffusion Coefficient cm²/sec	Chloride ion diffusion coefficient
		Equivalent thickness of air (R), metres	Equivalent thickness of 30 MPa concrete cover (Sc) :	CO_2 Diffusion Coefficient, cm² / sec:		
Dekguard Elastic	>400%	> 150	> 380 mm	$3.8x10^{-07}$	$1.3x10^{-04}$	5.5 x 1014m²/sec
Dekguard E2000	>300%	> 96	> 240 mm	3.7×10^{-07}	$1.1x10^{-04}$	2.3 x 10-14m²/sec
Dekguard S	N/A	>200	>940 mm	7.1×10^{-08}	$2.7x10^{-05}$	1.0 x 10-14m²/sec
Dekguard O	N/A	> 350	> 850 mm	$1.3x10^{-04}$	$1.3x10^{-04}$	0.1x10-12 m²/ sec

Sea Cliff Bridge NSW
Product: Dekguard S protective coating

www.parchem.com.au

FOSROC

Superior Service Throughout Australia
With trade stores and warehouses throughout Australia, Parchem is able to offer a superior level of service to customers in all regions of the country.

Single Source Supplier
Parchem range of products gives you the security of dealing with a single supplier for a complete range of compatible solutions to meet the total needs of your project.

ISO 9001 Quality Assurance
With its manufacturing facilities fully accredited to ISO 9001, Parchem offers its customers the assurance of independently audited quality systems.

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