Expocrete® EC

(Formerly known as Nitocrete EC)

constructive solutions

High strength epoxy concrete

Uses

For the fast and permanent reinstatement of concrete, particularly where high strength, abrasion, impact and chemical resistance are required. The product is designed for horizontal applications. It is ideally suited for reinstatement of defective concrete surface in bridges, dams, foundations, slabs, joints in highways, concrete runways and for use as a bedding material.

Advantages

- Solvent free
- Dimensionally stable hardening
- High compressive and abrasion strengths
- Curing unaffected by humidity
- Suitable for both damp and dry surfaces
- Rapid hardening at low temperatures
- Impact resistant

Description

Expocrete EC is a solvent free, epoxy based repair concrete, which is supplied as three component system and the coarse aggregate in the ratio recommended to be added at site.

Technical support

The company provides a technical advisory service supported by a team of specialists in the field.

Mix proportions

Form

Base (B)	: Liquid
Hardener (H)	: Liquid
Fine filler (FF)	: Graded sand
Coarse aggregate (C.A)	: 10mm down graded granite aggregates (to be added at site)
Mixing ratio (by wt) :	B : H : FF : C.A 4.537 : 2.145 : 20.818 : 30

Properties

Density of epoxy concrete	: 2.20 - 2.40 kg/litre
Pot life	: 30 min. at 35^{0}C
Compressive strength @ 7days	: > 90 N/mm^2
Flexural strength @ 7 days	: 20 N/mm^2
Bond strength to concrete	: 3 N/mm^2
Recommended thickness per layer	: Min. 20 mm

Application instructions

Preparation

The surface shall be cleaned free from any dust, unsound material, plaster, oil, paint, grease, corrosion deposits or algae. The surface shall be roughened and any laitance shall be removed by light scabbling or grit blasting.

Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser.

Substrate priming

The substrate should be primed using Nitoprime 25. The primer should be mixed in the proportions supplied, adding the entire contents of the 'hardener' tin to the 'base'tin. The two components should be thoroughly mixed together, for 3 minutes.

The mixed primer should be scrubbed well into the prepared substrate, taking care that all imperfections in the surface are properly coated and avoiding 'puddling' in depressions. If the primer is absorbed into the substrate, a second coat should be applied before continuing. Expocrete EC can be applied as soon as the primer has started to gel but still has surface 'tack'. This is normally between 30 minutes and 4 hours dependent on the ambient and substrate temperatures. The usable life of the mixed primer is approximately 30 minutes at 35^{0}C.

Mixing

Care should be taken to ensure that Expocrete EC is thoroughly mixed to produce a fully homogenous, trowellable concrete.

The 'hardener' and 'base' components should be stirred thoroughly in order to disperse any settlement before mixing them together. The entire contents of the base and hardener are emptied into a suitable container and mixed for about 30 minutes. Slowly fine and coarse aggregate shall be added during mixing, using a forced action mixer / slow speed heavy duty drill fitted with a paddle until a homogenous material is obtained.

Expocrete® EC

Application

Whilst the primer is still tacky, the mixed concrete shall be spread and then trowelled firmly into place.

Finishing

Expocrete EC is levelled and finished with a steel trowel. The completed surface should not be overworked.

Cleaning

All tools and equipment shall be cleaned immediately after use with Nitoflor Sol, solvent.

Estimating

Packaging & Coverage

Expocrete EC is available in 13.5 L packing.(**without coarse aggregates**)

Storage

Shelf life

All products have a shelf life of 12 months below 35^{0}C if kept in a dry store in the original, unopened packs.

Storage conditions

Store in dry conditions in the original. unopened bags or packs. If stored at high temperatures, the shelf life may be shortened.

Precautions

Health and Safety instructions

Expocrete EC and Nitoflor Sol should not come in contact with skin or eyes, or be swallowed. Adequate ventilation shall be ensured and inhalation of vapours shall be avoided. Some people are sensitive to resins, hardeners and solvents. Suitable protective clothing, gloves and eye protection shall be worn. If working in confined areas, suitable respiratory protective equipment must be used. The use of barrier creams provide additional skin protection. In case of contact with skin, it shall be removed immediately with resin removing cream followed by washing with soap and water. Solvent should not be used. In case of contact with eyes, it shall be rinsed immediately with plenty of clean water and medical advice shall be sought immediately. If swallowed, medical attention shall be sought immediately - Vomiting should not be induced.

Fire

Expocrete EC is non-flammable.

Nitoflor Sol is flammable. It shall be kept away from sources of ignition. Smoking is prohibited during handling / application of the product. In the event of fire, it shall be extinguished with fire extinguishers like carbon-dioxide or foam. Use of water jet is not suggested.

Important note :

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INDIA/0438/B

Expocrete® EUW

constructive solutions

High strength underwater flexible epoxy concrete

Uses

For the fast and permanent reinstatement of concrete, particularly where high strength, abrasion, impact and chemical resistance are required. The product is designed for underwater applications. It is ideally suited for reinstatement of defective concrete surface in bridges, dams, foundations, slabs, joints in highways, concrete runways and for use as a bedding material.

Advantages

- Most suited for underwater applications
- Solvent free
- Dimensionally stable hardening
- High compressive and abrasion strengths
- Curing unaffected by humidity
- Suitable for both damp and dry surfaces
- Rapid hardening at low temperatures
- Impact resistant

Description

Expocrete EUW is a solvent free, epoxy based underwater repair concrete, which is supplied as three component system.

Technical support

The company provides a technical advisory service supported by a team of specialists in the field.

Mix proportions

	Form
Base (B)	: Liquid
Hardener (H)	: Liquid
filler (F)	: Graded sand with aggregate
Mixing ratio (by wt) :	B : H : FF 3.7 kg : 1.85 kg : 22.2kg

Properties

Fresh Density of epoxy concrete	: 2.02 kg/litre
Pot life	: 30 - 40min. at 27^{0}C
Flow as per BS Cone	: 18 - 19 cm

@ 27^{0}C	Air curing @ 7 days	Underwater application @ 7 days
Compressive Stregth (BS 6319 Pt.2)	100 N/mm^2	80 N/mm^2
Tensile Strength (BS 6319 Pt.7)	12 N/mm^2	3.0 N/mm^2
Flexural Strength (BS 6319 Pt.3)	27 N/mm^2	7.0 N/mm^2

Application instructions

Preparation

The surface shall be cleaned free from any dust, unsound material, plaster, oil, paint, grease, corrosion deposits or algae. The surface shall be roughened and any laitance shall be removed by light scabbling or grit blasting.

Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser.

Substrate priming

Normal concrete and other similar substrates do not require priming. Priming is not required even for underwater conditions. Expocrete EUW can be applied after thorough surface preparation.

However non-porous substrates such as steel should be primed.The primer consists of Expocrete EUW hardener and base mixed in the proportion 1:2 by weight. Expocrete EUW can be applied when the surface is tacky, typically 15 to 20 minutes after priming.

Mixing

Care should be taken to ensure that Expocrete EUW is thoroughly mixed to produce a fully homogenous, flowable concrete.

The 'hardener' and 'base' components should be stirred thoroughly in order to disperse any settlement before mixing them together. The entire contents of the base and hardener are emptied into a suitable container and mixed for about 3 minutes using a forced action mixer / slow speed heavy duty drill fitted with a paddle. Filler shall be added slowly during mixing and mixed until a homogenous material is obtained.

Expocrete® EUW

Application

On dry surfaces, whilst the primer is still tacky, the mixed concrete shall be spread and then trowelled firmly into place and can be applied at a thickness of 30-40mm. Minimum application thickness shall be 20mm

In underwater application, place the material ensuring minimum wash out.

Finishing

Expocrete EUW is levelled and finished with a steel trowel. The completed surface should not be overworked.

Cleaning

All tools and equipment shall be cleaned immediately after use with Nitoflor Sol, solvent.

Estimating

Packaging & Coverage

Expocrete EUW	13.5 L (27.75 kg.) packing.
Nitoflor Sol	5 L

Storage

Shelf life

All products have a shelf life of 12 months below 35^{0}C if kept in a dry store in the original, unopened packs.

Storage conditions

Store in dry conditions in the original. unopened bags or packs. If stored at high temperatures, the shelf life may be reduced.

Precautions

Health and Safety instructions

Expocrete EUW and Nitoflor Sol should not come in contact with skin or eyes, or be swallowed. Adequate ventilation shall be ensured and inhalation of vapours shall be avoided. Some people are sensitive to resins, hardeners and solvents. Suitable protective clothing, gloves and eye protection shall be worn. If working in confined areas, suitable respiratory protective equipment must be used. The use of barrier creams provide additional skin protection. In case of contact with skin, it shall be removed immediately with resin removing cream followed by washing with soap and water. Solvent should not be used. In case of contact with eyes, it shall be rinsed immediately with plenty of clean water and medical advice shall be sought immediately. If swallowed, medical attention shall be sought immediately - Vomiting should not be induced.

Fire

Expocrete EUW is non-flammable.

Nitoflor Sol is flammable. It shall be kept away from sources of ignition. Smoking is prohibited during handling / application of the product. In the event of fire, it shall be extinguished with fire extinguishers like carbon-dioxide or foam. Use of water jet is not suggested.

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Exposeal® UW

(Formerly known as Nitoseal UW)

constructive solutions

Epoxy resin based putty for underwater repairs

Uses

For filling of blow holes, sealing of cracks underwater grouting, eliminating minor irregularities on concrete surfaces in damp and underwater conditions.

Advantages

- Easy mixing of base and hardener in 1:1 by weight
- Easy to apply and finish
- Non-slump, can be applied to vertical surfaces
- Chemical resistant
- Good adhesion to damp concrete
- Cures in submerged conditions without shrinkage

Description

Exposeal UW is a thixotropic, solvent free, two component compound based on water insensitive epoxy resins, inert fillers and thixotropic agents designed for applying in damp and submerged conditions. It is applied directly to concrete for filling cracks, blow holes etc., which cures to form a strong seal.

Technical Support

Fosroc provides a technical advisory service supported by a team of specialists in the field.

Properties

Specific gravity	1.6 -1.65 (mixed material)
Volume solids	100%
Minimum application temperature	10^0C
Compressive strength	45 N/mm^2 on full cure
Pot life	30 min. at 30^0C
Drying time	16 hrs at 30^0C
Full cure	7 days at 30^0C
Pressure resistance	More than 0.5 N/mm^2 after 7 days

Application instructions

Surface preparation

Concrete surfaces should be clean and free from moss, algae, fungai etc. Wire brushing or abrading may be necessary to achieve suitable surface for application.

Mixing

Transfer the base and hardener component at 1:1 ratio into a suitable container. Using a heavy duty, slow speed drill fitted with a suitable mixing paddle, mix the two components to achieve a uniform consistency. It is important that both the components are intermixed thoroughly.

Application

Due to its easy workability the product can be applied by using a scraper, filling knife or by manual means. After complete mixing, the material can be used directly from the Can or subdivided on to the spot boards for individual applications.

Tool cleaning

The tools should be cleaned after use before the material cures. Nitoflor Sol shall be used for cleaning the tools. Cured material can only be removed mechanically.

Limitations

Exposeal UW is not suitable for application below 10^0C and above 40^0C.

Cured Exposeal UW is not suitable for subzero temperatures.

Estimating

Packaging

Exposeal UW	2.4and 24 litre packs
Nitoflor Sol	5 litre & 20 litre cans

Coverage

Exposeal UW will be consumed at a rate of 1m^2 at 1mm thickness/Litre. Depending on the substrate conditions the coverage may vary.

Storage

Shelf Life

12 months in unopened containers when stored under normal warehouse conditions.

Exposeal® UW

Precautions

Health & Safety instructions

Contact with the skin and eye should be avoided. Gloves, goggles and masks should be worn during application.

If the product comes in contact with the skin, it should be washed thoroughly with a suitable industrial cleaner with luke warm water and soap. In case of eye contact, should be washed with clean water and medical advice should be sought immediately.

The material should not be exposed to naked flame. Smoking is prohibited during handling /application of the product.

Fire

Flash point : 40^0C

Additional information

The Fosroc range of associated products includes high strength cementitious grouts, epoxy injection systems and grouts, polyester resin based mortar for rapid presetting of steel shims to level or for direct bedding of small base plates; resin anchoring systems for same day anchoring of bolts in drilled holes in concrete or rock. Also available a range of products for use in construction viz. admixtures, curing compounds, mould release agents, flooring systems and repair mortars.

Separate datasheets are available on these products.

Important note :

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products whether or not in accordance with any advice, specification, recommendation or information given by it.

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Galvashield® CC

constructive solutions

Embedded Sacrificial Anodes for Corrosion Control in Reinforced Concrete

Description

Galvashield CC galvanic anodes are used to control on-going corrosion and to prevent the initiation of new corrosion activity in reinforced concrete structures. Galvashield CC consists of a sacrificial zinc core activated within a specially formulated cementitious mortar. The cylindrical unit, available in a variety of standard sizes, is quickly and easily installed into concrete that is mechanically sound but has existing or potential corrosion activity. Once installed the zinc core corrodes preferentially to the surrounding steel providing active protection.

Typical applications

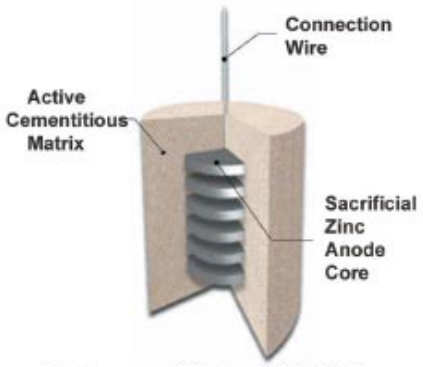
- Bridge Decks
- Carparks
- Columns and Beams
- Prestressed Concrete
- Balconies
- Post tensioning anchors
- Tunnels

Advantages

- **Proven Technology -** Supported by independent test programs. British Board of Agrement and Concrete Innovations Appraisal Service (USA).
- **Zero Maintenance -** Requires no external power source.
- **Measurable -** Anode performance can easily be monitored if required.
- **Focused Protection -** discrete anodes can be installed to provide corrosion control in areas with on-going corrosion activity.
- **Versatile -** Effective in chloride contaminated and carbonated concrete. Can be used for conventionally reinforced and prestressed/post tensioned concrete.
- **Up to 20 years life -** reduces the need for future repairs.

How does it work?

Galvashield anodes work on the principle of sacrificial protection. When two dissimilar metals are placed in an electrolyte (in this case within concrete) the most active metal (zinc) will sacrifice itself in favour of the more noble (less active) reinforcing steel. Galvashield CC anodes are bedded into holes, cored/drilled into reinforced concrete where existing or potential corrosion activity has been identified, but where concrete is still sound (no cracking/spalling). The individual anodes are joined together to form a protective grid over the highlighted area. Once installed they will provide Cathodic Prevention /Corrosion Control/Cathodic Protection to the reinforcing steel, preventing further corrosion causing structural deterioration.



Cut-away of Galvashield CC

Standard compliance/certification

Independently certified performance. British Board of Agrement (BBA) Certificate (No. 04/4140)

Level of Protection	Description	Galvashield CC
Cathodic Prevention	Preventing new corrosion activity from initiating	✓
Corrosion Control	Significantly reduce ongoing corrosion activity	✓
Cathodic Protection	Highest level of protection, intended to stop ongoing corrosion	*

*Dependant upon CC design and structure

Specification clause

The sacrificial anode shall be Galvashield CC, a sacrificial metal surrounded by a highly alkaline cementitious mortar, which has a pore solution pH sufficiently high for corrosion of the anode to occur and for passive film formation on the anode to be avoided as described in patent no WO94/29486PCT.

Anode types

Galvashield CC45 - Short unit for use in concrete of restricted depth.

Galvashield CC65 - Standard unit for use in areas of moderate steel density.

Galvashield CC100 - Larger unit for use in areas of higher steel density and output requirement.

Galvashield CC135 - Slim-fit unit for use in areas of congested reinforcement.

Galvashield® CC

Table 1: Anode dimensions

Type	Unit size diameter x length (mm)	Minimum hole dimensions diameter x length (mm)
CC45	46 x 45	50 x 75
CC65	46 x 62	50 x 90
CC100	46 x 100	50 x 130
CC135	29 x 135	32 x 165

Application instructions

Preparation

A survey of the structure is recommended prior to application. This should be carried out by a competent body and include the position/depth of steel, chloride levels, carbonation depth and half-cell mapping. Check continuity of the steel. Any loss of continuity will require additional electrical connections or restoration by other effective means.

Establish the position of the steel reinforcement and mark out an appropriate grid for anode locations. Take care to avoid locating anodes immediately over the steel reinforcement.

Drill suitably sized holes at the marked locations in accordance with Table 1. Take care to avoid cutting any steel reinforcement.

Drill additional 50mm diameter holes at the end of each anode chain to facilitate electrical connections to the steel reinforcement. A maximum of 10 anodes shall be connected in any one chain.

Link drilled holes by a minimum 4mm wide x 15mm deep saw cut to allow for the recessing of electrical wiring.

Establish electrical connection by drilling a 5-10mm deep hole into the steel reinforcement using the 3.5mm diameter drill bit supplied. Fix the wire in place using the 3.2mm stainless steel rivet provided. Insulate the connection with Galvashield Sealant.

Design tables

Table 2. Galvashield CC45

Steel surface area per m² concrete	Grid dimension (A)	Units per m² of concrete
< 0.4	450mm	5
0.41 - 0.48	400mm	6

Table 3. Galvashield CC65 & CC135

Steel surface area per m² concrete	Grid dimension (A)	Units per m² of concrete
< 0.4	600mm	3
0.41 - 0.54	500mm	4
0.55 - 0.67	450mm	5
0.68 - 0.80	400mm	6
0.81 - 0.94	380mm	7
0.95 - 1.07	355mm	8
1.08 - 1.2	335mm	9

Table 4. Galvashield CC100

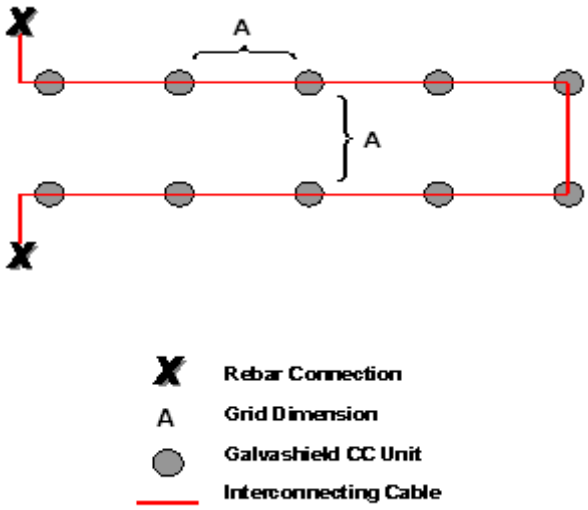
Steel surface area per m² concrete	Grid dimension (A)	Units per m² of concrete
0.55 - 0.94	500mm	4
0.95 - 1.17	450mm	5
1.18 - 1.41	400mm	6
1.42 - 1.64	380mm	7
1.65 - 1.88	335mm	8
1.89 - 2.11	355mm	9

Note: All steel within the zone of influence should be considered when determining anode spacing.
Units per m² are approximate.
For greater steel densities consult Fosroc.

FOSROC

Galvashield® CC

Typical Galvashield CC layout



Installation

Please consult the Galvashield CC Installation Guide for further information before installation.

Pre-soak the required number of Galvashield CC units in clean water for a minimum of 10 and a maximum of 20 minutes. Pre-soak holes and saw cuts with water ensuring pooled water is removed prior to installation. Units should be installed whilst still wet.

Galvashield CC Bedding Mortar should be mixed using a Fosroc Mixing Paddle on a slow speed (400/500 rpm) drill. Add between 0.8 - 0.9 litres of drinking quality water to the mixing drum. Add the complete 5kg pack of Galvashield CC Bedding Mortar whilst mixing. Continue mixing for 3 minutes until a smooth, even consistency is obtained. Part bags shall not be used.

Connect individual pre-soaked Galvashield CC units to the electrical wiring using the connectors supplied. Check the continuity of each individual Galvashield CC unit with the steel reinforcement during installation. A value between 0.1 - 1 Ohm shall be achieved in each case.

The Galvashield CC units shall be embedded into the pre-drilled holes using Galvashield CC Bedding Mortar. A maximum of 10 anodes shall be connected in any one chain. Cover to the embedded Galvashield CC units shall be a minimum of 25mm.

Recess all interconnecting wiring into the saw cuts. The saw cuts and drilled holes shall be made good with Galvashield CC Bedding Mortar.

Repair materials

The Galvashield CC system should be used in conjunction with Fosroc's extensive range of compatible cementitious repair mortars and acrylic bonding/curing agents.

Galvanic protection within patch repairs can be established by the use of Galvashield XP, a sacrificial anode system attached directly to the steel reinforcement via cast in tie wires (please refer to the Galvashield XP data sheet).

Limitations

Galvashield CC is not suitable for use with epoxy or polyester repair mortars and primers, as these materials are non-conductive.

Supply

Galvashield CC is supplied in boxes of 20 units, complete with an accessory pack. This includes:

- 20m of interconnecting wire
- 25 wire connectors
- 5 x 3.2mm stainless steel rivets
- 2 x 3.5mm drill bits
- 1 x 60ml cartridge of Galvashield Sealant

Galvashield CC Bedding Mortar is supplied in 5kg bags.

1 bag is typically sufficient for between 10-20 units, dependent on unit size.

Galvashield® CC

Storage

Galvashield CC

Store in cool/dry conditions in the original unopened box. Shelf life 12 months - see package instructions for details.

Galvashield CC Bedding Mortar

Shelf life 12 months if stored in unopened bags in cool dry internal conditions. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced to less than 6 months.

Disposal

All wastewater used to pre-soak Galvashield CC units must be mixed with a cementitious material before disposal. Once cured dispose in accordance with local regulations.

Health and safety

Galvashield CC should be handled using protective gloves and other personal protective equipment, as per regulations for handling cementitious materials.

† See separate data sheet
® Denotes the trademark of Fosroc International Limited

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Galvashield® LJ

constructive solutions

Galvanic Cathodic Protection for Reinforced Concrete and Steel Piles in Seawater

Description

Galvashield LJ is designed to provide a cost effective, reliable method of reinstating and Cathodically Protecting severely exposed reinforced concrete / structural steel elements. Galvashield LJ is composed of a prefabricated fibreglass jacket lined with expanded zinc mesh conforming to ASTM B69-01a for A190 alloy. The zinc mesh is connected to the steel reinforcement to provide the required protective current to the steel. Once in place the jackets are filled with a Fosroc Approved grout, thus effect necessary concrete repair fixing the jacket in place.

The system is 'self-powered' and regulates its current output according to its operating environment. Galvashield LJ is able to provide sufficient performance to satisfy the 100mV potential shift requirement for effective 'Cathodic Protection' as specified under NACE (National Association of Corrosion Engineers) Standard RP 0290-90.

Galvashield LJ can be supplied in rectangular, circular, square, flat or custom formats to suit most substrate profiles, providing felxibility throughout.

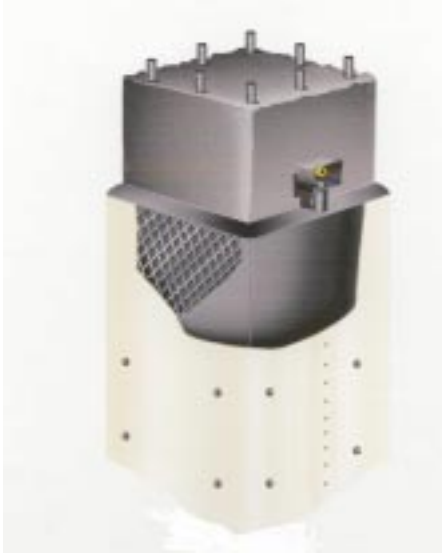
Advantages

- **Cost effective** - The concrete repair and protection carried out at the same time
- **Zero maintenance** - No post installation maintenance required
- **Proven technology** - with measured performance in aggressive environments
- **Self powered and self regulating** - no damaging over-protection
- **Long lasting** - 10 - 35 years service life*
- **Measurable** - Performance can easily be monitored if required.
- **User friendly** - Quick, easy and low cost installation
- **Structure specific design** - Each system is tailored to the environment and service life expectations
- **Versatile** - Can be used to protect conventionally reinforced or prestressed concrete

* Varying mesh gauges and bulk anodes can be used to provide various design lives, depending upon the job requirement. For more information contact Fosroc.

Standards compliance

Galvashield LJ will, when installed and connected in accordance with approved instructions, comfortably exceed the minimum 15-year life criteria laid down by the Federal Highways Authority (USA) specifications.

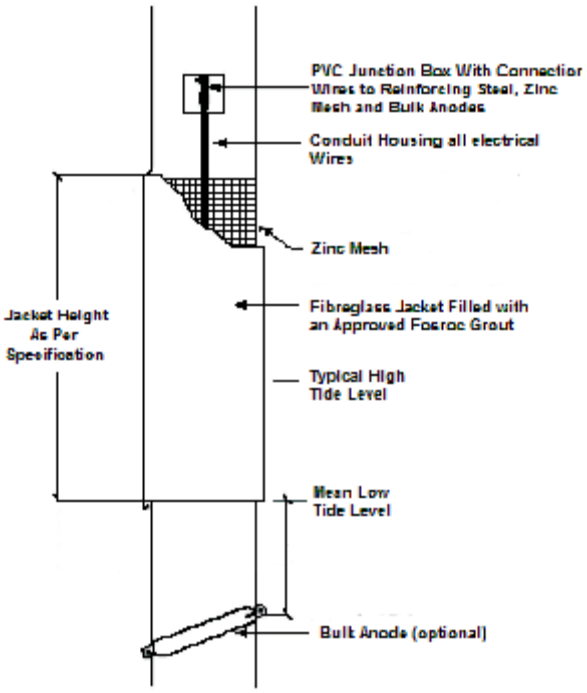


Level of Protection	Description	Galvashield LJ
Cathodic Prevention	Preventing new corrosion activity from initiating	✓
Corrosion Control	Significantly reduce ongoing corrosion activity	✓
Cathodic Protection	Highest level of protection, intended to stop ongoing corrosion	✓

Galvashield® LJ

How does it work?

Galvashield LJ works on the principle of Sacrificial Protection. When two dissimilar metals are placed in an electrolyte (in this case within concrete) the most Active metal (zinc) will sacrifice itself to the more Noble (less active) steel. Galvashield LJ's are installed on corroding reinforced concrete or steel piles in the tidal/splash zone. Once installed they will provide Cathodic Prevention /Protection to the reinforcing steel, preventing further corrosion causing structural deterioration



Example of Galvashield LJ in conjunction with a Bulk anode, which is optional depending upon design life

Application instructions

Preparation

Deteriorated concrete shall be broken out from around and behind steel reinforcing in accordance with good concrete repair practice. Saw cut the extremities of the repair area to a minimum depth of 10mm thus 'feather edging' is avoided and a square edge created.

All exposed steel reinforcement must be cleaned to a bright condition paying particular attention to the back of exposed steel bars. Abrasive blasting is recommended for this process.

In order for Galvashield LJ to function correctly, all steel reinforcing must be continuous. Any loss of continuity will require additional electrical connections or restoration of continuity by effective means.

Connections can be made through a single excavation to a sound reinforcing bar in the area requiring protection. This will become the negative connection and must be made in compliance with local specification requirements.

A watertight junction box is used to house all functional wire connections and may serve as an access site for measuring current and voltage outputs.

Installation

The Galvashield LJ system is a supplied as a 'Tongue and Groove' interlocking jacket assembly. It is positioned and held in place via temporary bracing.

Temporary formwork is installed around the jacket to retain the Fosroc approved grout, which is poured into the jacket cavity. This formwork is later removed to allow saltwater migration to wet the anode interface within the jacket.

Wire connection are made and the system becomes immediately operational providing non-interrupted current to the corroded structure.

For more detailed instructions refer to the Fosroc's installation guide.

Specification

The galvanic protection jacket shall be Galvashield LJ by Fosroc Limited, a composite fiberglass jacket lined with an expanded zinc mesh. The jacket cavity shall be filled with a Fosroc grout. Additionally, a replaceable bulk anode can be incorporated to provide extended life.

Galvashield® LJ

Galvashield® LJ

Supply

Each Galvashield LJ assembly is supplied prefabricated and ready to use, in accordance with the specifications

received from the client.

Health and safety

There are no known health and safety hazards associated with Galvashield LJ. Standard precautions should be taken to avoid injury when installing the system, such as use of gloves and safety glasses.

The Galvashield LJ protection system distributed by Fosroc International uses sacrificial zinc anode

Technology developed by Altrista Corporation in USA and licensed to Fosroc.

Important note :

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products whether or not in accordance with any advice, specification, recommendation or information given by it.

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INDIA/0440/A

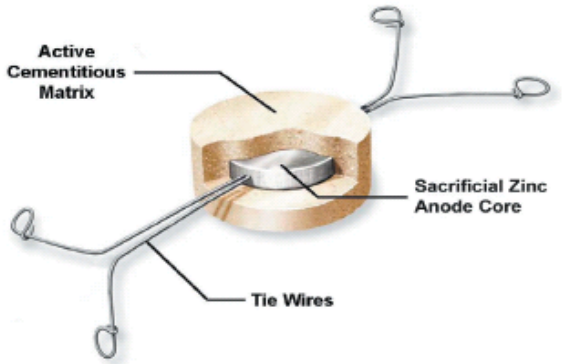
Galvashield® XP

FOSROC constructive solutions

Tied-on Sacrificial Anode units for Corrosion Prevention

Description

Galvashield XP embedded galvanic anodes are used in concrete rehabilitation to prevent the formation of new corrosion sites on adjacent rebar. The anode consists of a sacrificial zinc core activated within a specially formulated cementitious mortar. The XP unit is fixed to the reinforcing steel by means of tie wires, which allow attachment in horizontal, vertical and overhead locations. Once installed, the zinc core corrodes preferentially to the surrounding rebar, providing 'Cathodic Prevention' and therefore preventing 'Incipient Anode' formation.



Cut-away of Galvashield XP

Typical applications

- Patch Repairs
- Joints between new and existing concrete
- Prestressed Concrete
- Post-tensioning anchors

Advantages

- **Proven technology** - supported by independent test programs. British Board of Agrement and Concrete Innovations Appraisal Service (USA)
- **Quick and easy installation -** requiring no special equipment or training.
- **Zero Maintenance** - Requires no external power source or monitoring.
- **Measurable -** Anode performance can easily be monitored if required.
- **Versatile** - Suitable for chloride contaminated, prestressed/ post tensioned and new concrete.
- **Up to 20 years life -** Reduces the need for future repairs.

How does it work?

Galvashield anodes work on the principle of sacrificial protection. When two dissimilar metals are placed in an electrolyte (in this case within concrete) the most active metal (zinc) will sacrifice itself to protect the more noble (less active) reinforcing steel. Galvashield XP anodes are embedded in patch repairs to provide Cathodic Prevention to the reinforcing steel immediately adjacent to the repair area. They will prevent secondary corrosion to the steel, commonly referred to as the 'Incipient Anode' or 'Ring Effect'.

Standard compliance/certification

Independently certified performance.British Board of Agrement Certificate (No. 04/4140)

Level of Protection	Description	Galvashield XP
Cathodic Prevention	Preventing new corrosion activity from initiating	✓
Corrosion Control	Significantly reduce ongoing corrosion activity	*
Cathodic Protection	Highest level of protection, intended to stop ongoing corrosion	✘

*Dependant upon XP design and structure

Specification clause

The sacrificial anode shall be Galvashield XP, a sacrificial metal surrounded by a highly alkaline cementitious mortar, which has a pore solution pH sufficiently high for corrosion of the anode to occur and for passive film formation on the anode to be avoided as described in patent number WO94/29486PCT.

Application instructions

Repair preparation

Break out the concrete from around and behind the steel reinforcement in accordance with good concrete repair practice.

All exposed steel reinforcement should be cleaned to a bright condition paying particular attention to the back of exposed steel bars. Abrasive blasting is recommended for this process.

Prior to installation of the XP units, check the continuity of the steel reinforcement. Any loss of continuity will require additional electrical connections or restoration of continuity by effective means.

Galvashield® XP

Product application

Select a location for the Galvashield XP as close as practical to the edge of the broken out repair zone and excavate a rebate as required. Galvashield XP units should be positioned around/ along the repair boundary.

In addition to standard substrate preparation, the Galvashield XP anode(s) shall be thoroughly pre-soaked in clean water for a minimum of 10 and a maximum of 20 minutes, prior to the application of the repair mortar.

Attach the Galvashield XP anodes immediately following preparation and cleaning of the steel reinforcement. The anode spacing shall be in accordance with the repair specification.

Tighten tie wires using Galvashield Fixing Tool so that no free movement is possible, thus ensuring good electrical continuity. To test electrical continuity between tie wires and reinforcement bar a continuity meter should be used. A value between 0.1 - 1 Ohm shall be achieved.

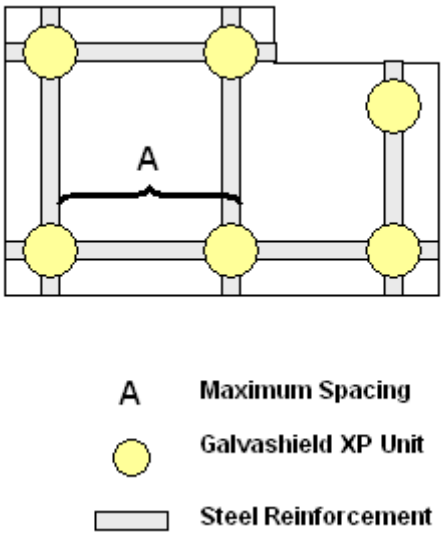
When required the steel reinforcement should be primed immediately following attachment of the Galvashield XP with a 135 micron (wft) continuous coating of Nitoprime Zincrich.

Over painting with the bonding agent or reinforcement primer, onto the surface of the Galvashield XP unit must be avoided.

The Galvashield XP should be positioned to ensure all round contact with the reinstatement material preventing void formation.

Cover to the Galvashield XP should equal the depth of cover to the steel reinforcement to which it is attached. In no case shall it be less than 20mm for horizontal repairs or 10mm for vertical and overhead repairs

Typical layout



Design table - Anode Spacing

Steel Surface Area per m 2 of Concrete	Maximum Spacing Between XP Units (A)
<0.6	610mm
0.61 - 0.9	500mm
0.91 - 1.2	430mm

For greater steel densities contact Fosroc Ltd

Galvashield® XP

Repair materials

The Galvashield XP should be used in conjunction with Fosroc's extensive range of compatible repair mortars and acrylic bonding/curing agents.

Galvashield XP is not suitable for use with epoxy and polyester repair mortars or primers, as these are non conductive

Blanket galvanic protection of sound but contaminated areas of concrete can be established by the use of Galvashield CC sacrificial anodes (refer to Galvashield CC data sheet).

Packaging

Galvashield XP	64mm diameter x 27mm thick 20 units per pack

Storage

Store in dry conditions in the original unopened box. Shelf life 12 months - see package instructions for details.

Nitoprime Zincrich must be stored in accordance with the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972.

Precautions

Disposal

All wastewater used to presoak Galvashield XP units must be mixed with a cementitious material before disposal. Once cured dispose in accordance with local regulations.

Health and safety

Galvashield XP should be handled using protective gloves, and other personal protective equipment, as per standard procedures for handling cementitious materials.

Galvashield® XP

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INDIA/0418/B

Nitocote® Putty

constructive solutions

High quality ready to-use putty

Uses

Nitocote Putty is a white ready-to-use putty for fairing and smoothing plastered and fairface concrete surfaces. In addition to that, it can be used for filling hairline cracks to give a smooth and high quality surface ready for aplication for all kinds of paints.

Advantages

- Smooth surface
- Good Coverage for all types of voids
- Rapid drying
- Easy to apply
- Excellent bonding to moist building surface
- Ability to apply at relatively high thickness.

Description

Ready to use white paste on most building surfaces. It gives high quality, even surface for painting. Nitocote Putty is specifically manufactured for the painter.

Technical Support

Fosroc offers a comprehensive range of high performance, high quality repair, maintenance and construction products. In addition, Fosroc offers a technical support package to specifiers, end-users and contractors, as well as on-site technical assistance in locations all over the world.

Properties

Curing characteristics at 30^{0}C

Color	White
Density	1.70 kg/litre

Instructions for use

Surface preparation

Ensure that dust, dirt and foreign matter is brushed away. Ridges and form oil must also be removed.

Priming

To stabilise a surface which shows signs of dusting or flaking, the use of a separate primer is recommended.

Consult your local Fosroc office for the suitable primer.

Application

Apply Nitocote Putty in a thin even layer, if the area under repair requires a thick coat than apply several thin layers, allowing each layer to dry before adding the next.

Lightly sandpaper over the dry final surface before painting preferably within 24 hours of application.

Cleaning

Nitocote Putty should be removed from tools and equipment with water.

Estimating

Supply

Nitocote Putty	5 and 25 kg. bags

Coverage

Nitocote Putty	1.7 kg/m^2/1mm thickness

Actual coverage rate is approvimate, and will be wholly dependent upon the general substrate condition. It is recommended therefore, that site trials over a typical area are conducted to determine the likely usage / coverage rates for a particular substrate.

Storage

Shelf Life

Nitocote Putty has a shelf life of 12 months; if kept in a dry environment in its original, unopened packing. If stored in conditions of high humidity and / or temperature, the shelf life may be reduced to as little as 6 months.

Precautions

Health and Safety

Nitocote Putty does not fall into the hazard classifications. Suitable protective gloves and goggles should be worn. Splashes on the skin should be removed with water.

Fire

Nitocote Putty is water based and non-flammable.

Nitocote® Putty

Additional Information

Fosroc manufactures a wide range of complementary products which include:

- waterproofing membranes & waterstops
- joint sealants and filler boards
- cementitious and epoxy grouts
- specialised flooring materials

Fosroc additionally offers a comprehensive package of products specially designed for a repair and refurbishment of damaged concrete. Fosroc's Systematic Approach to concrete repair features the following:

- hand-placed repair mortars
- spray grade repair mortars
- fluid micro-concretes
- chemically resistant epoxy mortars
- anti-carbonation / anti-chloride protective coatings
- chemical and abrasion resistant coatings

For further information on any of the above, please consult your local Fosroc office.

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INDIA/0449/A

Nitofill® EPLV

constructive solutions

Low viscous epoxy injection resin grout

Uses

Nitofill EPLV is used for injecting into cracks, honeycombs and cavities in concrete structures. It can also be used for grouting base plates with very narrow gaps (<10mm).

Advantages

- **Low viscosity** - Can be injected into fine cavities and narrow gaps.
- **High mechanical strength** - Performs even under heavy loads and stresses.
- **Excellent adhesive strength** - Good bonding with substrate
- **Two part system** - Easy to mix and handle
- **Non shrink** - Complete filling of voids and cracks
- **Chemical resistant** - Can be used in aggressive environments.

Description

Nitofill EPLV is a two part system comprising of liquid base and hardener. It is designed for injecting into narrow gaps, cracks and voids ranging from 0.25mm to 9mm.

Technical support

Fosroc offers a comprehensive range of high performance, high quality concrete repair and construction products. In addition, Fosroc offers technical support service to specifiers, end- users and contractors, as well as on-site technical assistance in locations all over the country.

Properties

The following results are typical for the hardened grout at 30^{0}C.

Density (kg/m^3)		1100	
Compressive strength (N/mm^2)	1D	3D	7D
BS 6319 Part 2	45	60	70
Tensile strength (N/mm^2)			
BS 6319 Part 7 (7 days)		18	
Flexural strength (N/mm^2)			
BS 6319 Part 4 (7 days)		55	
Pot life	60 minutes @ 20^{0}C		
	30 minutes @ 30^{0}C		

Chemical resistance

Nitofill EPLV is resistant to oil, grease, fats, most chemicals, mild acids and alkalis, fresh and sea water. Fosroc shall be contacted when exposure to solvent or concentrated chemicals is anticipated.

Exotherm

All epoxy products will develop a temperature rise on mixing. Its extent will be a function of the volume to surface ratio, the ambient temperature as well as the mass and thermal conductivity of the surrounding materials. Fosroc shall be contacted for specific data.

Specification clauses

Performance specification

All epoxy injection must be carried out with a two component low viscous epoxy resin system. The epoxy resin shall have sufficiently low viscosity (150-300 cps) to ensure easy injection into cracks and voids. The epoxy injection grout shall develop a compressive strength exceeding 60 N/mm^2 @ 7days, tensile strength exceeding 15 N/mm^2 and flexural strength exceeding 50N/mm^2. The mixed epoxy shall have a pot life exceeding 30 minutes @ 30^{0}C.

Supplier specification

All epoxy injection must be carried out using Nitofill EPLV manufactured by Fosroc and used in accordance with the manufacturer's datasheet.
The storage, handling and placement of the grout must be in strict accordance with the manufacturer's instructions.

Application instructions

Surface preparation

The area to be injected shall be cleaned to remove all loose material, laitence, grease and other deposits.

Drilling injection holes

Injection holes of 8 - 10mm dia shall be drilled at fixed intervals along the crack length or in a grid pattern incase of grouting of voids in concrete.

The holes shall be cleaned to remove all dust and loose material by blowing compressed air.

Fixing Nipples

Suitable injection nipples of GI/PVC shall be fixed in these holes using an epoxy sealing putty . The cracks shall also be sealed with this product.

Injection of resin

The two components of Nitofill EPLV injection grout shall be individually stirred and then mixed and injected into the nipples through a suitable injection pump exerting a uniform pressure.

Nitofill® EPLV

Injection shall be carried out till it flows from the adjacent nipple and then stopped. The same operation shall be carried out for the next nipple.

After all the holes are completed, the nipples are removed next day and the holes shall be sealed with a high strength mortar.

Note : For grouting under base plates with very narrow gaps, either injection grouting or normal grouting by pouring, can be resorted to. For details, Fosroc shall be contacted.

Cleaning

All tools and equipment should be cleaned immediately after use with Nitoflor Sol. Spillages should be absorbed with sand or sawdust and disposed in accordance with local regulations.

Estimating

Packaging

Nitofill EPLV : 1 Litre pack

Storage

Shelf life

12 months in unopened container under normal warehouse condition.

Precautions

Health and Safety instructions

Nitofill EPLV contains resins which may cause sensitisationwhen comes in contact with skin. Contact with skin and eyes and inhalation of vapour shall be avoided. Use of suitable protective clothing, gloves and eye/face protection is recommended. Barrier creams provide additional skin protection. Should accidental skin contact occur, it shall be removed immediately with a resin removing cream, followed by soap and water. Solvent should not be used. Incase of contact with eyes, immediate rinsing with plenty of clean water is suggested and medical attention shall be sought immediately - Vomiting should not be induced.

Fire

Nitoflor Sol is flammable. In the event of fire, use of fire extinguishers like Carbon dioxide or foam is suggested.

Flash point : 33°C

Additional information

The Fosroc range of associated products includes high strength cementitious epoxy grout, polyester resin based mortar for rapid presetting of steel shims to level or for direct bedding of small base plates. Resin Anchoring systems for same day anchoring of bolts in drilled holes in concrete or rock. Also available a range of products for use in construction; viz., admixtures, curing compounds, mould release agents, flooring systems and repair mortars. Separate datasheets are available on these products.

Important note :

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products whether or not in accordance with any advice, specification, recommendation or information given by it.

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INDIA/0444/A

Nitofill® UR63

constructive solutions

Solvent free, two part polyurethane resin for sealing cracks

Uses

Can be injected into cracks in concrete or masonry in dry or damp conditions to form an elastic seal. Caution must be exercised with cracks which are live or filled with dust, water or salts.

Use with Nitofill WS60 to seal cracks in wet conditions in basements, subways and tunnels.

Advantages

- **Low viscosity :** Penetrates fine cracks and cavities.
- **Good adhesion:** Adheres strongly to dry or moist concrete
- **Flexible:** Strong but flexible to withstand differential structural movement
- **Tough :** Withstands high hydrostatic pressures
- **Impermeable:** On curing it forms a hard mass impermeable to water
- Suitable for use in high temperature conditions.

Description

Nitofill UR63 is a two part liquid polyurethane. When mixed in the proportion supplied they react to form a tough, slightly flexible resin. Nitofill UR63 has a good adhesion to concrete and masonry and when injected into cracks it allows some movement without loss of bond.

Technical support

The company proves a technical advisory service supported by a team of specialists in the field

Typical properties

Specific gravity	1.0	
Viscosity at 20^{0}C	3 poise	
Cure properties (Tropical grade)		
Temperature	**25^{0}C**	**35^{0}C**
Pot life	35 min	20 min
Reaction time	95 min	55 min

Application instructions

Surface preparation

Care must be taken to provide a clean and sound surface for bonding and injecting.

1. Remove heavy deposits of grease and dirt by scrubbing with detergent solution and washing with plenty of clean water to ensure complete removal of the detergent. Dirt alone may be removed with wire brushes or similar mechanical means.

2. Remove deteriorated concrete, laitence and paint. The best treatment is grit blasting with sand, steel shot or a proprietary abrasive. Where grit blasting is impracticable, use rotary wire brushes.

3. Blow the cracks and treated surfaces with oil free compressed air to ensure complete removal of all dust and loose particles. Ensure that wet surfaces are blown dry.

In the presence of running water, the flow must be stopped by injecting Nitofill WS60 which produces a rapid setting foam. When the flow of water is stopped the cracks are reinjected with Nitofill UR63.

The surface of the crack must be sealed and injection nipples bonded in place before Nitofill UR63 is injected using Nitomorar PE.

Mixing of Nitomortar PE

Add the hardener component to the base components and mix thoroughly until a uniform colour is achieved.

Application of Nitomortar PE

Immediately after mixing, apply the compound to the surface cracks. Overlap the cracks on both sides by 15 - 20mm. In general aim to form a band of material 30 -40mm width and 2 - 3 mm thick. Use the material to bond on injection nipples using locating pins to ensure correct sitting. Depending on the width and depth of the cracks the distance between nipples should be 200 to 500mm.

Fit nipples to both sides of a wall that is cracked all the way through, those at the back should be midway between those in front.

Take care not to block the nipple holes with Nitomortar PE.

Nitofill® UR63

Mixing and application of Nitofill UR63

Application of the injection system may be commenced as soon as the Nitomortar PE has cured (at least 8 hours at 35^{0}C). This will be extended at lower ambient temperatures. Mix the entire contents of the base and hardener components together until the liquid becomes clear.

The product is applied by standard resin injection equipment. The injection pressure should be at least 0.4 N/mm^2 (4 bar).

Making good

Remove the nipples. Make good any holes or voids with more Nitomortar PE and allow to cure. The Nitomortar PE used to seal cracks can then be ground off, or softened with a blow lamp and peeled off. Do not allow to burn.

Storage

Six months shelf life if stored at 30^{0}C

Packaging

Usually available in 2kg packs

Cleaning

Use Nitoflor Sol

Precautions

Health and safety

Some people are sensitive to resins so gloves and a barrier cream should be used when handling all resins. If contact with the resin occurs, it must be removed, before it hardens, with a resin removing cream. Follow by washing with soap and water. Do not use solvent. The use of goggles is recommended but should accidental eye contamination occur, wash thoroughly with plenty of water and seek medical treatment immediately. Ensure good ventilation and do not smoke during use.

Fire

Nitoflor Sol and Nitofill UR63 are flammable

Flash point

Nitoflor Sol	33^{0}C

Additional information

Nitofill UR63 is part of a wide range of adhesive, grouts, repair mortars and sealing compounds specifically designed and manufactured by Fosroc for the construction industry.

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INDIA/0451/A

Nitofill® WS60

constructive solutions

Rapid foaming and setting resin for stopping flow of water

Uses

STOPS the flow of water when injected into cracks in concrete in the presence of moving water. Nitofill WS60 with Nitofill UR63 provides an effective system for crack sealing in wet conditions.

Advantages

- **Seals against water:** Reacts and produces foam resistant to water
- **Rapid acting** : Rapid reaction to produce water stop in presence of flowing water
- **Reinjectable** : Can be reinjected with Nitofill UR63 to produce a permanent seal.

Description

NitofillWS60 is a two part liquid polyurethane when mixed in the proportions supplied it reacts rapidly with water to form a foam barrier.

Technical support

The company proves a technical advisory service supported by a team of specialists in the field

Typical properties

Specific gravity	1.14 ± 0.06
Density of foam	0.025
Viscosity at 20°C	2 - 3 poise
Pot life, in absence of water	
at 20°C	6 - 8 hours
at 30°C	3 - 4 hours
Reaction time with water	5 to 30 seconds dependent upon temperature

Application instructions

If water flow permits then the surfaces should be free from oil, grease and other contaminants. Nitofill WS60 can be applied using either injection plugs or adhesion packers (nipples) bonded to the surface with Nitomortar PE.

Instructions for use of Nitomortar PE

Surface preparation

Nitomortar PE has to retain the injection system under pressure. Care must be taken to provide a clean and sound surface for bonding

1. Remove heavy deposits of grease and dirt by scrubbing with detergent solution and washing with plenty of clean water to ensure complete removal of the detergent. Dirt alone may be removed with wire brushes or similar mechanical means.

2. Remove deteriorated concrete, laitence and paint. The best treatment is grit blasting with sand, steel shot or a proprietory abrasive. Where grit blasting is impracticable, use rotary wire brushes.

3. Blow the cracks and treated surfaces with oil free compressed air to ensure complete removal of all dust and loose particles.

Mixing of Nitomortar PE

Mix only the quantity of Nitomortar PE that can be applied within the usable life. Pour a small quantity of the resin into the mixing bucket provided and slowly add the powdered catalyst from the polythene bag and stir until a smooth putty like consistency is obtained. Mix further quantities as required and retain some material for making good after removing the injection nipples.

Application of Nitomortar PE

Immediately after mixing, apply the compound to the surface cracks. Overlap the cracks on both sides by 15 - 20mm. In general aim to form a band of 30 -40mm width and 2 - 3 mm thick. Use the material to bond on injection nipples using locating pins to ensure correct sitting. Depending on the width and depth of the cracks the distance between nipples should be 200 to 500mm.

Take care not to block the nipple holes with Nitomortar PE.

Seal the surfaces of the cracks, using Nitomortar PE.

Application of the injection system may be commenced as soon as the Nitomortar PE has cured (atleast 2 hours)

Note : At low ambient temperatures the curing time must be extended in order to allow sufficient strength to build up in the sealant.

Nitofill® WS60

Nitofill WS60

Thoroughly mix the accelerator with the base resin. Take care to exclude moisture as much as possible and place in an enclosed container after mixing. There will be a skin on the surface but the liquide underneath will be satisfactory for use.

Nitofill WS60 should be used with standard injection equipment having closed containers.

When flowing water has been stopped, reinject with Nitofill UR63 to give permanent seal. See the datasheet.

Making good

Remove the nipples. Make good any holes or voids with more sealing compound and allow to cure. The Nitokit surface sealant used to seal cracks can then be ground off, or softened with a blow lamp and peeled off. Do not allow to burn.

Cleaning

Use Nitoflor Sol

Storage

Six months shelf life if stored at 20^{0}C

Packaging

Usually available in 2kg packs

Precautions

Health and safety

Some people are sensitive to resins so gloves and a barrier cream should be used when handling Nitofill WS60. If contact with the resin occurs, it must be removed, before it hardens, with a resin removing cream. Follow by washing with soap and water. Do not use solvent. The use of goggles is recommended but should accidental eye contamination occur, wash thoroughly with plenty of water and seek medical treatment immediately. Ensure good ventilation and do not smoke during use.

Fire

Nitomortar PE and Nitoflor Sol are flammable

Flash point

Nitoflor Sol	33^{0}C
Nitomortar PE resin	29^{0}C

Additional information

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