



Introduction

About Al Gurg Fosroc

Al Gurg Fosroc is part of Fosroc International - the global leader in providing advanced technology solutions for the construction industry. This revised edition of our popular manual for repairs to new construction features the latest development - *Dimensional Stability Technology* - which is further explained in the following section.

Al Gurg Fosroc was established in the Gulf more than 20 years ago; which places the company in a position to provide unique and unmatched, problem solving experience to a wide variety of on-site situations.

Important note

The method statements contained herein are submitted as proposals only, and should be supplemented by confirmation from the local Fosroc office that the method selected is appropriate to the repair being undertaken. Final approval of any repairs undertaken are the responsibility of the Supervising Officer.

It is the responsibility of the product user to ensure that all the latest information is available and that product instructions for use, safety procedures etc., are understood and followed exactly.

About this manual

Whilst the repairs highlighted in this manual are intended to include those most commonly encountered on site, each one should be viewed in the context of its own requirements.

It is therefore recommended that, before any major repair work is undertaken, the local Fosroc office (see below) is contacted in order to assess the situation and provide the most appropriate solution.

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from Fosroc at the following locations:***

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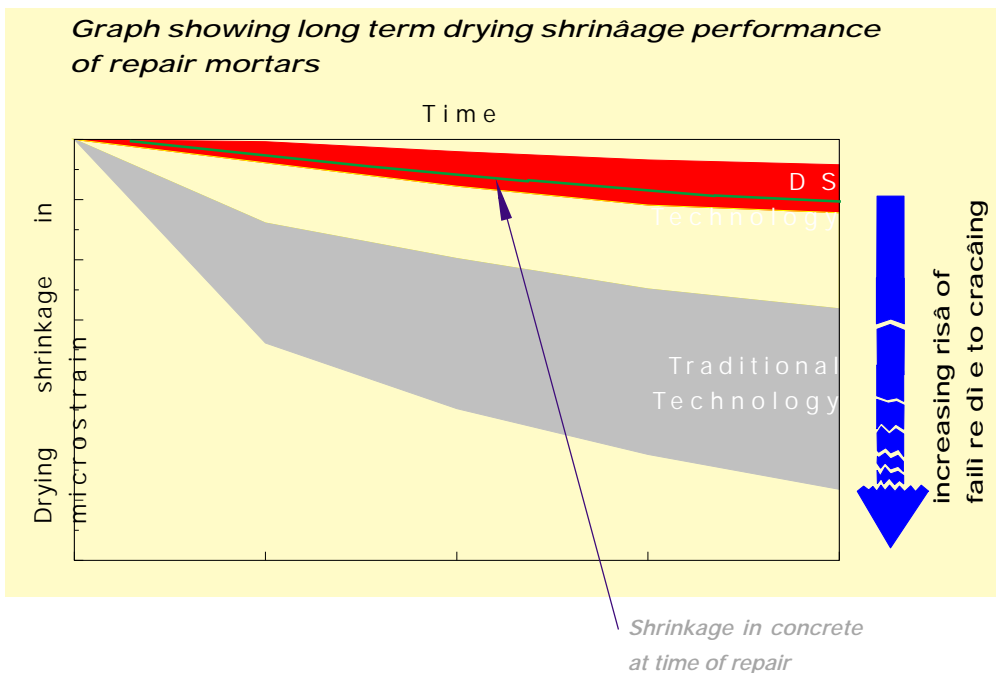
Dimensional Stability Technology

Drying shrinkage

Control of drying shrinkage is fundamental to preventing failure of the repair at a later date, since high drying shrinkage equates to high crack potential in the cured repair - see graph below. The appearance of cracks in the repair can be expressed mathematically as follows :

$$\frac{\text{Tensile stress due to drying shrinkage}}{\text{Tensile strength of the repair material}} > 1.0 = \text{cracks}$$

Dimensional Stability Technology reduces tensile stress so that not only is the ultimate value of drying shrinkage minimised; but also the rate of shrinkage (slope of the graph) is dramatically reduced, which is an equally important control mechanism.



Compatibility

At the time a repair is applied to new construction, approximately 50% of concrete shrinkage has already occurred in the substrate. At this time the shrinkage graph for the host concrete is already levelling out.

Dimensional Stability Technology products are designed to have a very flat shrinkage curve which is identical to that of the host concrete. This feature creates a greater compatibility between the host concrete and the repair area which will ensure it is carried through the life of the structure.



Technical support

Al Gurg Fosroc provides a full technical support package for consultants, contractors and end users, including specification assistance and AutoCAD layouts, on-site assistance and training in the application of its products at the company's specially developed Training Centre in Dubai.

Approved applicators

Al Gurg Fosroc operates a policy to encourage the use, where possible, of approved or licensed applicators. This ensures that repairs are completed satisfactorily so that the long term performance of the materials, as per their formulated properties, is assured.



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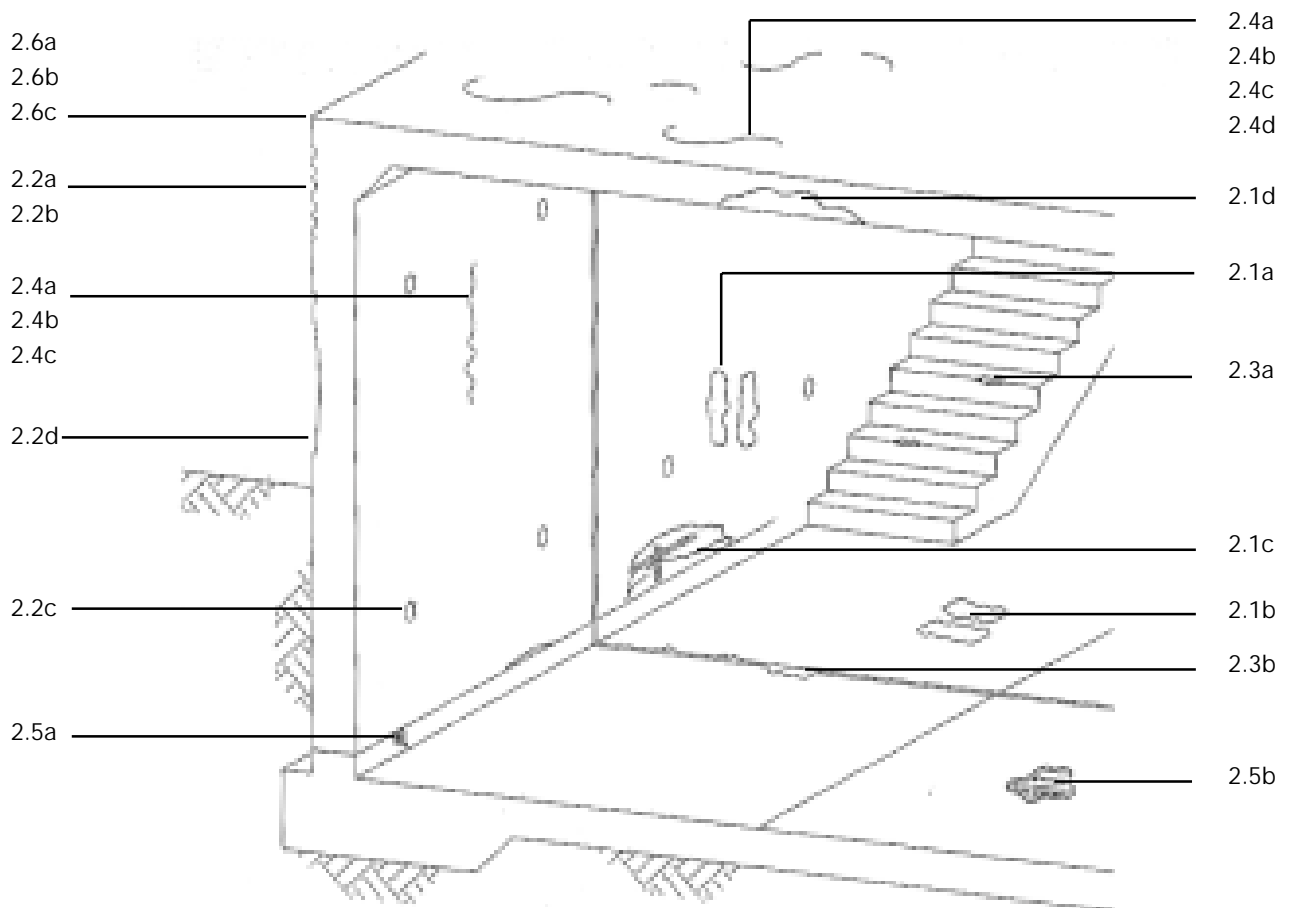
- 1** *Typical problems and recommendations*
- 2** *Method statements*
- 3** *Product data sheets*

Typical problems and recommendations

- 1.1 *Typical problems*
- 1.2 *Recommendations*
- 1.3 *High temperature working*

1.1 Typical problems

- numbers shown below refer to the Method Statements listed in Section 2



Key

2.1 - Honeycombing

- | | |
|---|------------------------|
| <i>a</i> - Shallow : vertical or overhead | <i>Renderoc TGXtra</i> |
| <i>b</i> - Shallow : horizontal | <i>Renderoc SXtra</i> |
| <i>c</i> - Deep : all orientations | <i>Renderoc LAXtra</i> |
| <i>d</i> - Large area : all orientations | <i>Renderoc SPXtra</i> |

2.2 - Surface imperfections

- | | |
|--|--------------------------------|
| <i>a</i> - Pinholes : 0 - 3 mm deep | <i>Rend FC/N'mortar FC</i> |
| <i>b</i> - Blowholes : 3 - 10 mm deep | <i>Rend BF2/N'mortar FC(B)</i> |
| <i>c</i> - Tie-bolt holes (up to 100 mm dia) | <i>Conbextra GP</i> |
| <i>d</i> - General reprofiling | <i>Various</i> |

2.3 - Corner repairs

- | | |
|-------------------------------------|-------------------------------|
| <i>a</i> - Stair treads and nosings | <i>Nitomortar S</i> |
| <i>b</i> - Joint arrises | <i>Nitomortar S + sealant</i> |

2.4 - Cracks

- | | |
|--|--------------------------------|
| <i>a</i> - Moving : 0.25 - 3 mm | <i>Nitofill UR63</i> |
| <i>b</i> - Non moving : < 0.25 mm | <i>Rend TGXtra/N'mortar FC</i> |
| <i>c</i> - Non moving : 0.25 - 3 mm (general) | <i>Nitofill EPLV</i> |
| <i>d</i> - Non moving : 0.25 - 3 mm (horizontal) | <i>Nitofill EPLV</i> |

2.5 - Leaks

- | | |
|-----------------------------|--|
| <i>a</i> - Leaking cracks | <i>Nitofill WS60 + Nitofill UR63</i> |
| <i>b</i> - Leaking concrete | <i>Renderoc Plug, then Nitofill WS60 + Nitofill UR63, then general reprofiling</i> |

2.6 - Enhancing concrete cover

- | | |
|--|-----------------------|
| <i>a</i> - Uniform cementitious finish | <i>Brushbond</i> |
| <i>b</i> - Decorative and protective coating | <i>Dekguard S</i> |
| <i>c</i> - Decorative and crack-bridging coating | <i>Dekguard E2000</i> |

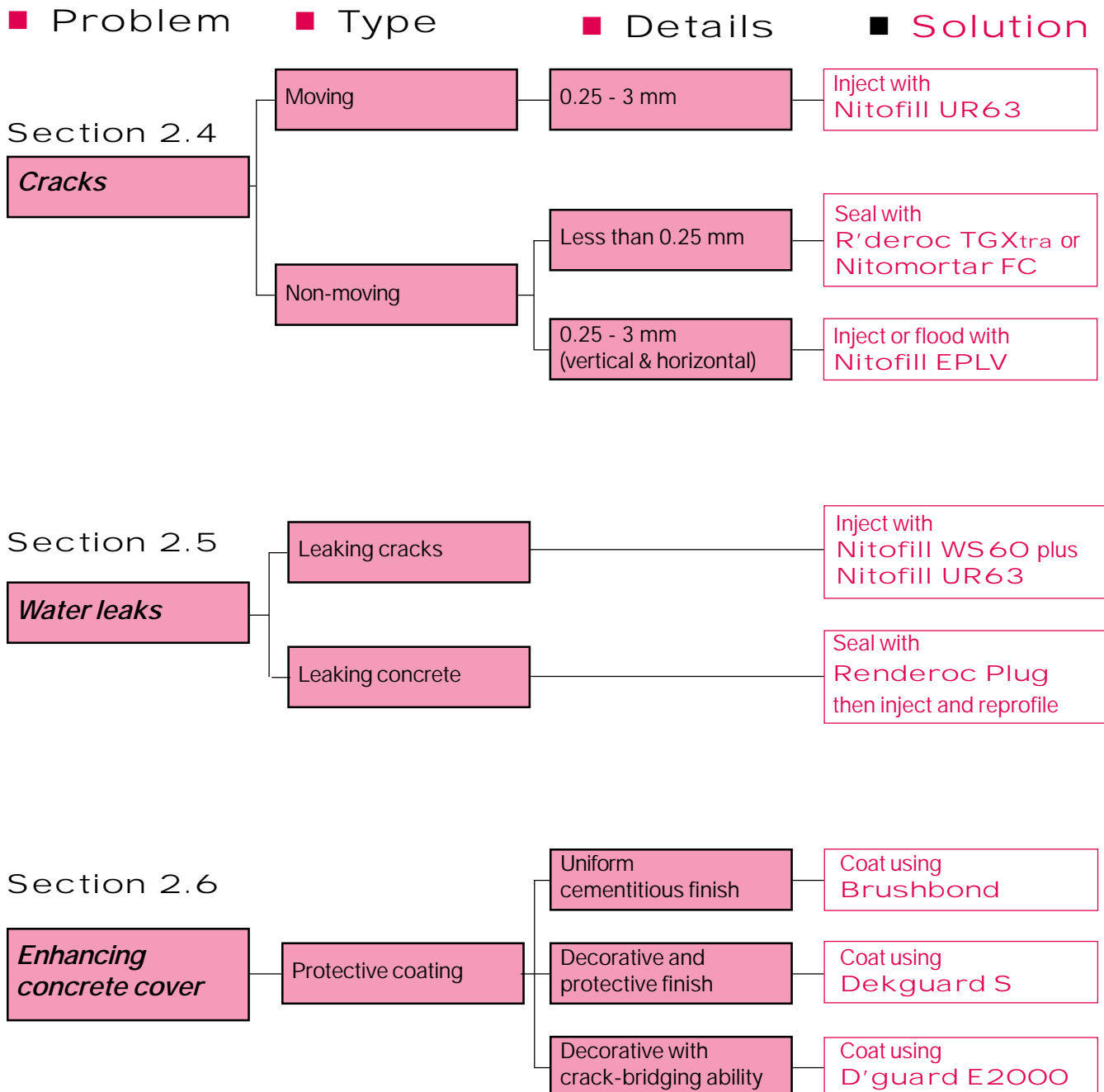
1.2 Recommendations at a glance

- for more detailed instructions, refer to the appropriate Method Statement in Section 2

Problem	Type	Details	Solution
Section 2.1 Honeycombing	Shallow - vertical and overhead	10 - 25 mm overhead 10 - 50 mm vertical	Patch using Renderoc TGX _{tra}
	Shallow - horizontal	10 - 50 mm in a single application	Patch using Renderoc SX _{tra}
	Deep - all orientations	Min 25 mm deep	Recast using Renderoc LAX _{tra}
	Large areas - all orientations	Min 10 mm deep	Spray with Renderoc SPX _{tra}
Section 2.2 Surface imperfections	Pinholes	0 - 3 mm deep	Fill with Renderoc FC or Nitomortar FC
	Blowholes	3 - 10 mm deep	Fill with Renderoc BF2 or Nitomortar FC(B)
	Tie-bolt holes	Max. 100 mm diameter	Fill with Conbextra GP
	General reprofiling		Various according to depth required
Section 2.3 Corner repairs	Stair treads & nosings		Reprofile with Nitomortar S
	Joint arrises		Reprofile with Nitomortar S then apply sealant

1.2 Recommendations at a glance

- for more detailed instructions, refer to the appropriate Method Statement in Section 2



■ 1.3 High temperature Working

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practice:

- (i) Store unmixed materials in a cool preferably airconditioned environment, avoiding exposure to direct sunlight.
- (ii) Keep equipment cool, arranging shade protection if necessary. It is especially important to keep cool those surfaces of the equipment which will come into direct contact with the material itself.
- (iii) Try to avoid application during the hottest times of the day. If necessary provide a shade over the area where application will take place.
- (iv) Make sufficient material, plant and labour available to ensure that application is a continuous process.
- (v) If water is to be added to the prebagged materials, ensure the use of cool potable water - may need to arrange for ice to be available to maintain water temperature at, or below 20°C.

Repair method statements

- 2.1 *Honeycombing*
- 2.2 *Surface imperfections*
- 2.3 *Corner repairs*
- 2.4 *Cracks*
- 2.5 *Leakage*
- 2.6 *Enhancing concrete cover*

Repair method statements

■ 2.1 *Honeycombing*

- a* Shallow : vertical or overhead
- b* Shallow : horizontal
- c* Deep : all orientations
- d* Large area : all orientations

Repair method statement - number 2.1a

■ Proposal

Repairs to the substrate where
honeycombing is apparent on vertical
or overhead surfaces.

Fosroc products

Concrete repair system

- Nitoprime Zincrich
- epoxy zinc primer
- Nitobond AR
- acrylic bonding agent
- Renderoc TGXtra
- shrinkage controlled, repair mortar
- Rendercure
- curing membrane



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Material properties and specification - at a glance

■ Nitoprime Zincrich - epoxy zinc primer

Specification

The steel reinforcement primer shall be Nitoprime Zincrich, by Fosroc, supplied and packed as a ready to use single component, zinc-rich liquid. An unbroken coating of 40 microns shall provide 'active' galvanic protection within the repair zone. Its viscosity shall enable the coating to penetrate imperfections and pits within the surface of corrosion-damaged steel bars.

Properties

S.G.	: 2.5
Application thickness :	
dry -	40 microns
wet -	135 microns

■ Nitobond AR - acrylic bonding agent

Specification

The bonding agent for use in the Renderoc repair mortar system shall be Nitobond AR, by Fosroc, supplied as a modified, single-component acrylic emulsion which must be resistant to hydrolysis.

■ Renderoc TGXtra - cementitious, repair mortar

Specification

The repair mortar shall be Renderoc TGXtra, by Fosroc, incorporating Dimensional Stability Technology. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	40 N/mm ²
DIN perm. :	< 10 mm
Water abs. :	< 2 %
Drying shrinkage	
7 days :	< 300 microstrain
28 days :	< 500 microstrain

■ Rendercure - Renderoc curing membrane

Specification

The curing compound for repairs shall be Rendercure, by Fosroc, supplied as a low viscosity, single component, white liquid which dries to form a clear film. It shall exhibit performance characteristics as listed opposite.

Properties

Curing efficiency :	90%
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Proposal

Repairs to the substrate where honeycombing is apparent on vertical or overhead surfaces.

1 Preparation

- 1.1 Using a marker pen, draw a line around the perimeter of the defective area.
- 1.2 Break out the marked area to a minimum depth of 10mm and remove all segregated concrete. Continue breaking out until a sound homogeneous substrate has been reached.
- 1.3 Saw cut to a depth of 10 mm around the perimeter of the repair to avoid feather edges.
- 1.4 Wash the substrate with clean water to remove all dust deposits.

2 Reinforcement Priming

- 2.1 Any exposed reinforcement shall be prepared by mechanical wire brushing to remove any corrosion deposits.
- 2.2 Apply one full, unbroken coat of Nitoprime Zincrich to fully exposed steel reinforcement and allow to dry. If unsure about the continuity of the coating, apply a second coat and allow to dry.

3 Priming

- 3.1 Thoroughly soak the substrate with clean water approximately one hour prior to applying the repair.
- 3.2 Remove all surface water leaving the substrate saturated surface dry.
- 3.3 Apply Nitobond AR to the concrete substrate by brush, ensuring the complete surface is wetted out.
- 3.4 Apply the repair material whilst Nitobond AR is still tacky. If Nitobond AR dries, the substrate can be re-primed.

4 Mixing

- 4.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 4.2 Measure out 3.6 litres of clean, cool water into a suitably sized mixing vessel that has been pre-dampened. Ensure any excess water is removed.

- 4.3 Slowly add one full 20 kg bag of Renderoc TGXtra to the water and mix using a slow speed drill fitted with a Fosroc mixing paddle. Continue mixing for a minimum period of 3-5 minutes until homogeneous.

For mixing more than one bag, use a forced action, proprietary mixer (free fall mixers not to be used).

5 Application

- 5.1 Compact Renderoc TGXtra into the primed substrate by float or gloved hand.
- 5.2 Renderoc TGXtra can be applied at a minimum thickness of 10 mm to a maximum thickness of 50 mm in vertical or overhead sections.
- 5.3 Where greater thicknesses are required, Renderoc TGXtra should be applied in a series of layers with each layer 'scratch-keyed' and cured with wet hessian. Further layer of fresh Renderoc TGXtra may be applied once the intermediate layer has reached its initial set.
- 5.4 Finish Renderoc TGXtra by striking off with a straight edge and close the surface using a steel or plastic float.

6 Curing

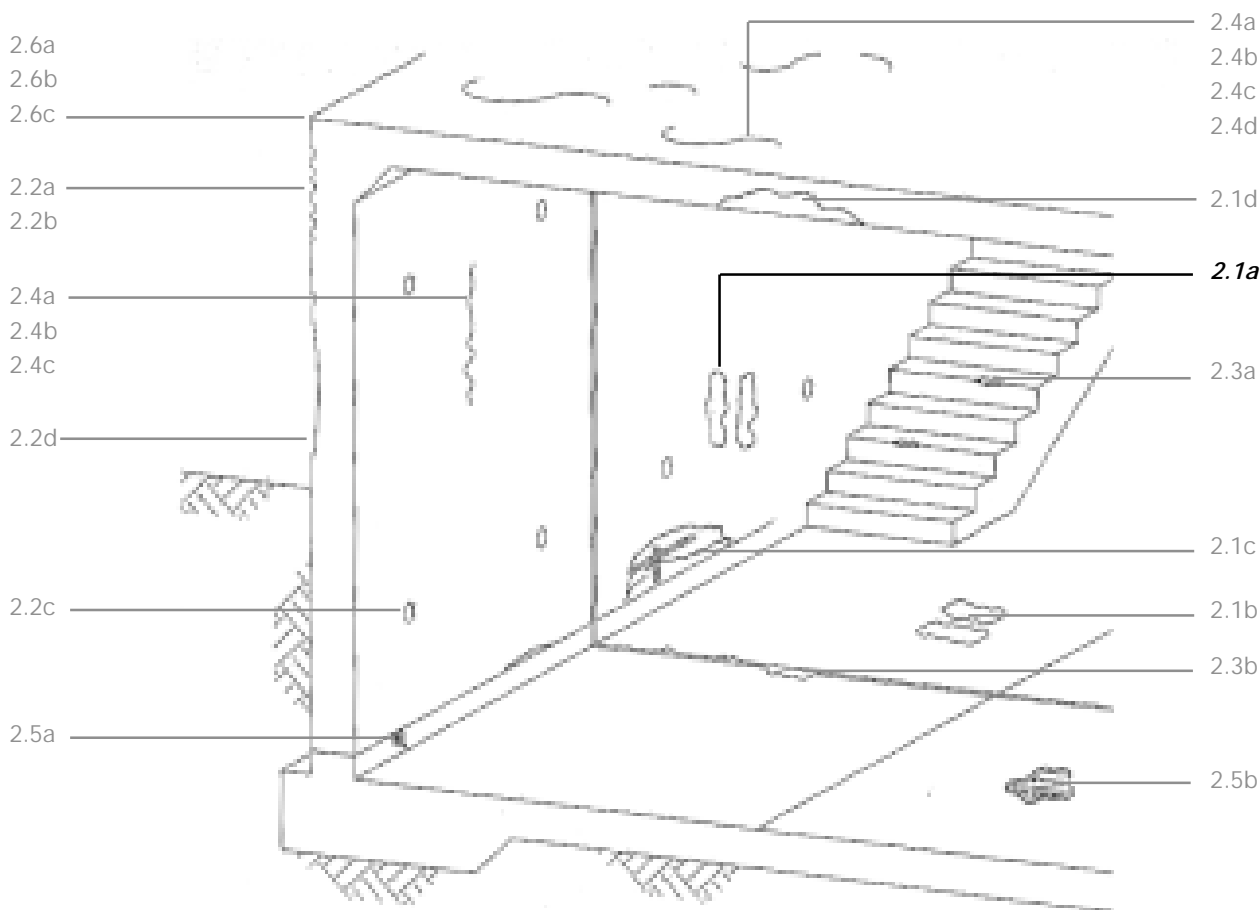
- 6.1 Immediately on completion of repair, cure Renderoc TGXtra by spray applying Rendercure.

In adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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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 the technical information on this data sheet is correct at the time of printing, it is the customer's responsibility to satisfy himself, by checking with the company that this information is still current at the time of use, that the product is suitable for the intended application, and that the actual conditions of use are in accordance with those recommended. Because Fosroc has no control over the conditions of use of its products, all recommendations or suggestions regarding the use of these products are made without guarantee.

Repair method statement - number 2.1b

■ Proposal

Repairs to the substrate where honeycombing is apparent on horizontal surfaces.

Fosroc products

Concrete repair system

- *Nitoprime Zincrich*
- epoxy zinc primer
- *Nitobond AR*
- acrylic bonding agent
- *Renderoc SXtra*
- shrinkage controlled, repair mortar
- *Rendercure*
- curing membrane



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Material properties and specification - at a glance

■ Nitoprime Zincrich - epoxy zinc primer

Specification

The steel reinforcement primer shall be Nitoprime Zincrich, by Fosroc, supplied and packed as a ready to use single component, zinc-rich liquid. An unbroken coating of 40 microns shall provide 'active' galvanic protection within the repair zone. Its viscosity shall enable the coating to penetrate imperfections and pits within the surface of corrosion-damaged steel bars.

Properties

S.G.	: 2.5
Application thickness :	
dry -	40 microns
wet -	135 microns

■ Nitobond AR - acrylic bonding agent

Specification

The bonding agent for use in the Renderoc repair mortar system shall be Nitobond AR, by Fosroc, supplied as a modified, single-component acrylic emulsion which must be resistant to hydrolysis.

■ Renderoc SXtra - cementitious, repair mortar

Specification

The repair mortar shall be Renderoc SXtra, by Fosroc, incorporating Dimensional Stability Technology. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	55 N/mm ²
DIN perm. :	< 10 mm
Water abs. :	< 2 %
Drying shrinkage	
7 days :	< 300 microstrain
28 days :	< 500 microstrain

■ Rendercure - Renderoc curing membrane

Specification

The curing compound for repairs shall be Rendercure, by Fosroc, supplied as a low viscosity, single component, white liquid which dries to form a clear film. It shall exhibit performance characteristics as listed opposite.

Properties

Curing efficiency :	90%
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Proposal

Repairs to the substrate where honeycombing is apparent on vertical or overhead surfaces.

1 Preparation

- 1.1 Using a marker pen, draw a line around the perimeter of the defective area.
- 1.2 Break out the marked area to a minimum depth of 5 mm and remove all segregated concrete. Continue breaking out until a sound homogeneous substrate has been reached.
- 1.3 Saw cut to a depth of 5 mm around the perimeter of the repair to avoid feather edges.
- 1.4 Wash the substrate with clean water to remove all dust deposits.

2 Reinforcement Priming

- 2.1 Any exposed reinforcement shall be prepared by mechanical wire brushing to remove any corrosion deposits.
- 2.2 Apply one full, unbroken coat of Nitoprime Zincrich to fully exposed steel reinforcement and allow to dry. If unsure about the continuity of the coating, apply a second coat and allow to dry.

3 Priming

- 3.1 Thoroughly soak the substrate with clean water approximately one hour prior to application of repair.
- 3.2 Remove all surface water leaving the substrate saturated surface dry.
- 3.3 Apply Nitobond AR to the concrete substrate by brush, ensuring the complete surface is wetted out.
- 3.4 Apply the repair material whilst Nitobond AR is still tacky. If Nitobond AR dries, the substrate can be re-primed.

4 Mixing

- 4.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 4.2 Measure out 3.0 litres of clean, cool water into a suitably sized mixing vessel that has been pre-dampened. Ensure any excess water is removed.

- 4.3 Slowly add one full 20 kg bag of Renderoc SXtra to the water and mix using a slow speed drill fitted with a Fosroc mixing paddle. Continue mixing for a minimum period of 3-5 minutes until homogeneous.

For mixing more than one bag, use a forced action, proprietary mixer (free fall mixers not to be used).

5 Application

- 5.1 Compact Renderoc SXtra into the primed substrate by float or gloved hand.
- 5.2 Renderoc SXtra can be applied at a minimum thickness of 5 mm to a maximum thickness of 100 mm in small pockets or horizontal surfaces.
- 5.3 Where greater thicknesses are required, Renderoc SXtra should be applied in a series of layers with each layer 'scratch-keyed' and cured with wet hessian. Further applications of fresh Renderoc SXtra may be applied once the intermediate layer has reached its initial set.
- 5.4 Finish Renderoc SXtra by striking off with a straight edge and close the surface using a steel or plastic float.

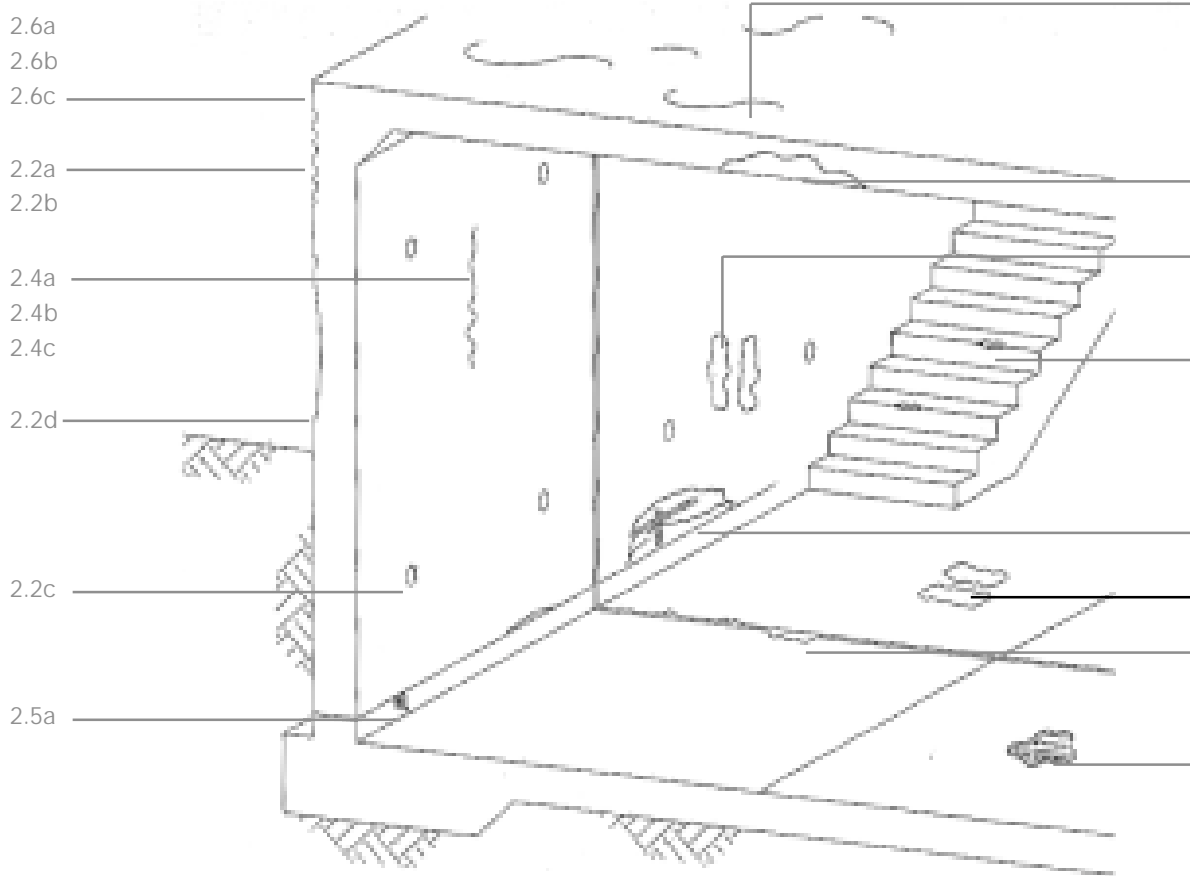
6 Curing

- 6.1 Immediately on completion of repair, cure Renderoc SXtra by spray applying Rendercure. In adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement - number 2.1c

■ Proposal

Repairs to the substrate where deep honeycombing is apparent on any orientation.

Fosroc products

Concrete repair system

- Nitoprime Zincrich
- epoxy zinc primer
- Nitobond EP
- epoxy resin, bonding agent
- Renderoc LAX_{tra}
- shrinkage controlled, repair mortar
- Rendercure
- curing membrane



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Material properties and specification - at a glance

■ Nitoprime Zincrich - epoxy zinc primer

Specification

The steel reinforcement primer shall be Nitoprime Zincrich, by Fosroc, supplied and packed as a ready to use single component, zinc-rich liquid. An unbroken coating of 40 microns shall provide 'active' galvanic protection within the repair zone. Its viscosity shall enable the coating to penetrate imperfections and pits within the surface of corrosion-damaged steel bars.

Properties

S.G.	: 2.5
Application thickness :	
dry -	40 microns
wet -	135 microns

■ Nitobond EP - epoxy resin, bonding agent

Specification

The bonding agent for use in the Renderoc repair mortar system shall be Nitobond EP, by Fosroc, supplied as a modified, two-component solvent-free epoxy resin. The two components shall be differentially pigmented in order to ensure visually that the correct mixing has taken place prior to the application. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Ten. str. :	36 N/mm ²
Slant shear:	38 N/mm ²
Water abs. :	0.05%
viscosity :	64 Poise

■ Renderoc LAXtra - cementitious, repair mortar

Specification

The repair mortar shall be Renderoc LAXtra, by Fosroc, incorporating Dimensional Stability Technology. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	60 N/mm ²
DIN perm. :	< 10 mm
Water abs. :	< 2 %
Drying shrinkage	
7 days :	< 300 microstrain
28 days:	< 500 microstrain

■ Rendercure - Renderoc curing membrane

Specification

The curing compound for repairs shall be Rendercure, by Fosroc, supplied as a low viscosity, single component, white liquid which dries to form a clear film. It shall exhibit performance characteristics as listed opposite.

Properties

Curing efficiency :	90%
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Proposal

Repairs to the substrate where deep honeycombing is apparent on any orientation.

1 Preparation

- 1.1 Using a marker pen, draw a line around the perimeter of the defective area.
- 1.2 Break out the marked area to remove all segregated concrete and to a minimum depth of 10 mm behind the exposed reinforcement. Continue breaking out until a sound homogeneous substrate has been reached.
- 1.3 Saw cut to a depth of 10 mm around the perimeter of the repair to avoid feather edges.
- 1.4 Wash the substrate with clean water to remove all dust deposits

2 Reinforcement Priming

- 2.1 Any exposed reinforcement shall be prepared by mechanical wire brushing to remove any corrosion deposits.
- 2.2 Apply one full, unbroken coat of Nitoprime Zincrich to fully exposed steel reinforcement and allow to dry. If unsure about the continuity of the coating, apply a second coat and allow to dry.

3 Priming

Refer to Renderoc LAXtra data sheet and Fosroc application guide for information on substrate priming with water.

- 3.1 The 'hardener' and 'base' components of Nitobond EP shall be stirred separately before mixing them together, to disperse any settlement.
- 3.2 The entire contents of the 'hardener' tin shall be poured into the 'base' tin, mixing for 2 minutes with a slow speed drill fitted with a Fosroc mixing paddle, until a fully uniform colour is obtained. Scrape the sides of the tin and mix for a further 2 minutes.
- 3.3 Apply Nitobond EP immediately after the mixing process, to the concrete substrate by brush, ensuring the complete surface is covered.

- 3.4 Placement of Renderoc LAXtra must be completed within the open time of Nitobond EP (refer to data sheet).

4 Shutter

- 4.1 Erect a grout-tight shutter. Care should be taken when designing the shutter to allow for the air to escape during application of the repair concrete.

Provision shall be made for suitable access points to receive the repair concrete.

- 4.2 The internal faces of the shutter shall be treated with Reebol release agent, to ensure that water is not absorbed from the repair material by the shutter.

5 Mixing

- 5.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 5.2 Measure out 2.7 litres of clean, cool water into a suitably sized mixing vessel that has been pre-dampened. Ensure any excess water is removed.
- 5.3 Slowly add one full 20 kg bag of Renderoc LAXtra to the water and mix using a slow speed drill fitted with a Fosroc mixing paddle, or a forced-action mixer. Continue mixing for a minimum period of 3-5 minutes until a smooth, even consistency is obtained.

6 Placing

- 6.1 To gain full benefits of fluidity and expansion the material should be placed within 30 minutes of mixing.

Placement should be a continuous process, to avoid formation of a 'cold joint'.

- 6.2 Pour Renderoc LAXtra into the shutter until it is completely filled.



7 Curing

- 7.1 Keep the shutter in place for a minimum period of 24 hours. Where the repair is overhead, the shutter should remain in place for a minimum of 48 hours.
- 7.2 Immediately after the shutter has been removed, all exposed faces of the repair should be thoroughly soaked with clean water to remove residual traces of the shutter release agent. The repair should then be cured by spray applying Rendercure.

In adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.

2.1c Repair method statement



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Repair method statement - number 2.1d

■ Proposal

Repairs to the substrate where honeycombing is apparent over a large area, in any orientation.

Fosroc products

Concrete repair system

- Nitoprime Zincrich
- epoxy zinc primer
- Renderoc SPXtra
- shrinkage controlled, repair mortar
- Rendercure
- curing membrane



Customer service numbers

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Material properties and specification - at a glance

■ Nitoprime Zincrich - epoxy zinc primer

Specification

The steel reinforcement primer shall be Nitoprime Zincrich, by Fosroc, supplied and packed as a ready to use single component, zinc-rich liquid. An unbroken coating of 40 microns shall provide 'active' galvanic protection within the repair zone. Its viscosity shall enable the coating to penetrate imperfections and pits within the surface of corrosion-damaged steel bars.

Properties

S.G.	:	2.5
Application thickness :		
dry -		40 microns
wet -		135 microns

■ Renderoc SPXtra - cementitious, repair mortar

Specification

The repair mortar shall be Renderoc SPXtra, by Fosroc, incorporating Dimensional Stability Technology. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :		> 60 N/mm ²
DIN perm. :		< 10 mm
Water abs. :		< 2 %
Drying shrinkage		
7 days :		< 300 microstrain
28 days :		< 500 microstrain

■ Rendercure - Renderoc curing membrane

Specification

The curing compound for repairs shall be Rendercure, by Fosroc, supplied as a low viscosity, single component, white liquid which dries to form a clear film. It shall exhibit performance characteristics as listed opposite.

Properties

Curing efficiency :		90%
---------------------	--	-----

Proposal

Repairs to the substrate where honeycombing is apparent over a large area, in any orientation.

1 Preparation

- 1.1 Using a marker pen, draw a line around the perimeter of the defective area.
- 1.2 Break out the marked area to a minimum depth of 10 mm and remove all segregated concrete. Continue breaking out until a sound homogeneous substrate has been reached.
- 1.3 Saw cut to a depth of 10 mm around the perimeter of the repair to avoid feather edges.
- 1.4 Wash the substrate with clean water to remove all dust deposits.

2 Reinforcement Priming

- 2.1 Any exposed reinforcement shall be prepared by mechanical wire brushing to remove any corrosion deposits.
- 2.2 Apply one full, unbroken coat of Nitoprime Zincrich to fully exposed steel reinforcement and allow to dry. If unsure about the continuity of the coating, apply a second coat and allow to dry.

3 Priming

- 3.1 Priming is only required in case of wet spraying.
- 3.2 Thoroughly soak the substrate with clean water.
- 3.3 Remove all surface water immediately prior to spraying.

4 Mixing

- 4.1 Renderoc SPXtra can be applied by either wet or dry spray application
- 4.2 For either technique, water addition shall not exceed 3.6 litres per 20 kg bag.

5 Application

- 5.1 For general guidelines on spraying, refer to Fosroc's Spray Application Guide.
- 5.2 Renderoc SPXtra can be applied at a minimum thickness of 10 mm to a maximum thickness of 200 mm in overhead or vertical sections.
- 5.3 Finish Renderoc SPXtra by striking off with a straight edge and close the surface using a steel or plastic float.

6 Curing

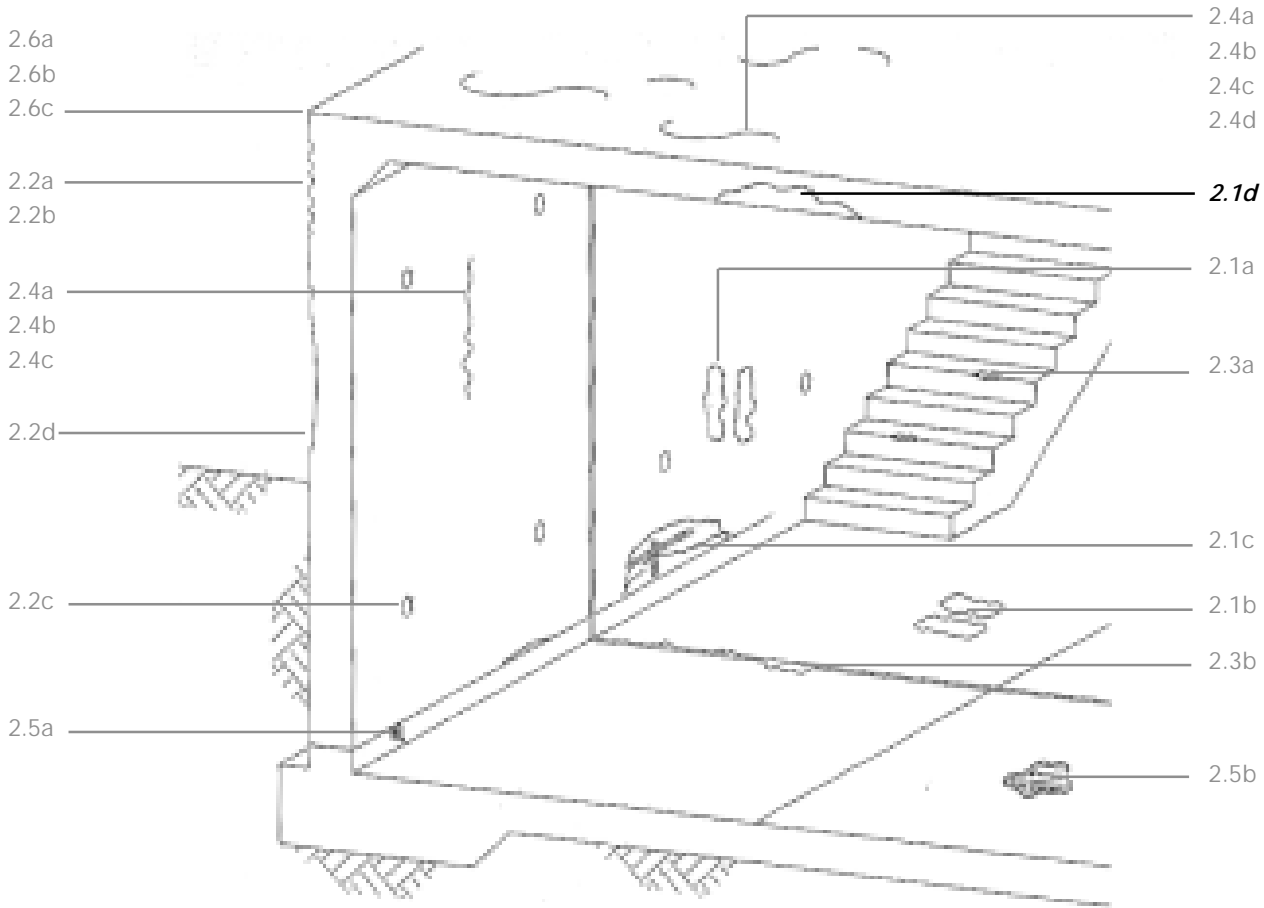
- 6.1 Immediately on completion of repair, cure Renderoc SPXtra by spray applying Rendercure.

In adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statements

■ 2.2 *Surface imperfections*

- a* Pinholes : 0 - 3 mm deep
- b* Blowholes : 3 - 10 mm deep
- c* Tie-bolt holes : (up to 100 mm dia.)
- d* General reprofiling

Repair method statement - number 2.2a

■ Proposal

Repairs to pinholes and minor
surface imperfections.

Fosroc products

Concrete repair system

Method A - cementitious repair

- *Renderoc FC*
- cementitious fairing coat

Method B - epoxy repair

- *Nitomortar FC*
- epoxy resin fairing coat



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Material properties and specification - at a glance

■ Renderoc FC - cementitious fairing coat

Specification

The filler for minor surface imperfections (up to 3mm depth) shall be Renderoc FC, a single component, polymer modified, cementitious mortar supplied by Fosroc. The material shall be capable of use without independent priming and curing systems and shall comply with the British Board of Agreement approval 98/3461. It shall be compatible with the Dekguard range of protective coatings.

Properties

Fresh wet density	: 2000 kg/m ³
Drying time	: 45 mins @20°C 20 mins @35°C
Setting time	: 60 mins @20°C 45 mins @35°C

■ Nitomortar FC - epoxy resin fairing coat

Specification

The filler for minor surface imperfections (up to 3mm depth) shall be Nitomortar FC, a two component, thixotropic, solvent free epoxy resin mortar supplied by Fosroc. The base component and hardener shall be in two different colours to ease identification of uniform mixing. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str.	: 70 N/mm ²
Vol. solids	: 100%
Drying time	: 10 hours @25°C 4 hours @35°C

Proposal

Repairs to pinholes and minor surface imperfections using cementitious or epoxy resin fairing coat.

Method A - cementitious repair

1 Preparation

- 1.1 Clean the surface and remove any dust, loose particles, unsound material and general curing compounds.
- 1.2 All surface contamination and surface laitance must be removed by light scabbling, grit-blasting or mechanical wire brushing.
- 1.3 Broken out areas shall be blown clean with an oil-free compressed air before continuing.

2 Priming

- 2.1 Thoroughly soak the substrate with clean water approximately one hour prior to applying the repair.
- 2.2 Remove all surface water leaving the substrate saturated surface dry.

3 Mixing

- 3.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 3.2 Measure out the correct amount of clean, cool water (3.0 litres dependent on application requirements) into a mixer that has been pre-dampened. Ensure any excess water is removed.
- 3.3 With the machine in operation slowly add one full 20kg bag of Renderoc FC to the water and mix continuously, for a minimum period of 3-5 minutes until fully homogeneous.

Small quantities up to 5 kgs, can be mixed by hand, Renderoc FC should be volume-batched. Add 3 volumes of the powder to 1 volume of water and mix vigorously until fully homogeneous.

4 Application

- 4.1 Apply the mixed Renderoc FC to the prepared surface using a steel float.
- 4.2 Renderoc FC should be allowed to partly set before final trowelling to a smooth surface. If a high quality finish is required, a small amount of water should be flicked on to the surface of Renderoc FC prior to final trowelling.

5 Curing

- 5.1 The cementitious fairing coat generally does not require curing. However, in adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing with Rendercure or Nitobond AR should be considered.

Method B - epoxy repair

1 Preparation

- 1.1 See preparation notes on 'Method A'.

2 Mixing

- 2.1 Stir the 'hardener' and the 'base' components in order to disperse any settlement.
- 2.2 Pour the entire contents of the 'hardener' into the 'base' container and mix until a uniform grey colour and consistency is obtained. Do not part mix.

3 Application

- 3.1 Apply Nitomortar FC using a scraper, filling knife or steel float. Finish flush with surrounding concrete.

Prior to over coating with any epoxy coatings, the surface of the fully cured Nitomortar FC shall be lightly abraded to assist adhesion and then cleaned to a dust-free finish.

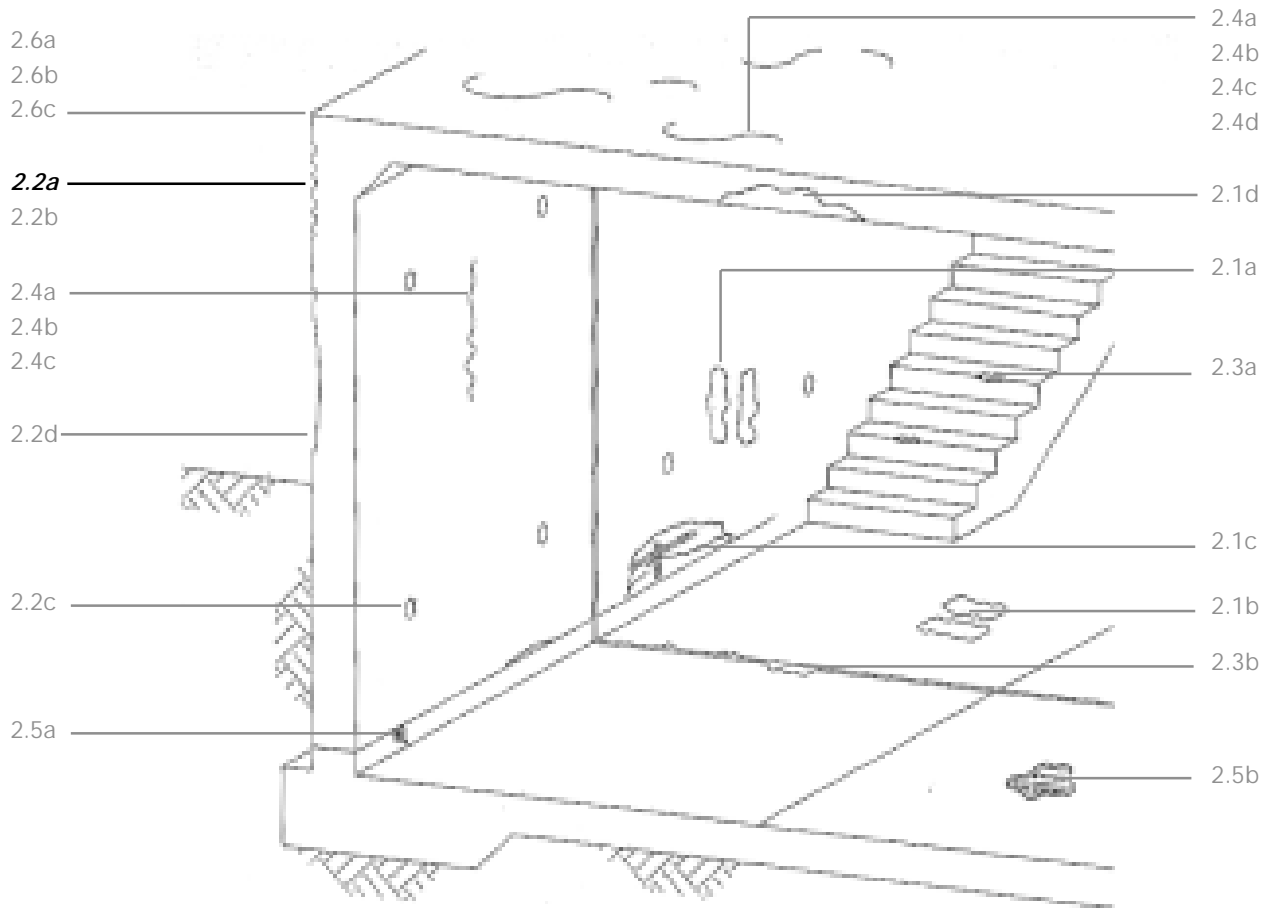
4 Curing

- 4.1 With the epoxy resin fairing coat curing is not required.

Note:

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Refer to Section 1.3 for high temperature working.



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Repair method statement

- number 2.2b

■ Proposal

Repairs to blow holes and minor surface imperfections.

Fosroc products

Concrete repair system

Method A - cementitious repair

- *Renderoc BF2*
- cementitious blow hole filler

Method B - epoxy repair

- *Nitomortar FC(B)*
- epoxy resin blow hole filler



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Material properties and specification - at a glance

■ Renderoc BF2 - cementitious blow hole filler

Specification

The cementitious blow hole filler shall be Renderoc BF2, by Fosroc, supplied as a ready to use blend of dry powders which require only the site addition of the liquid component. The mixed mortar shall exhibit excellent thermal compatibility with concrete and be fully compatible with other Renderoc mortars and Dekguard range of protective coatings.

Properties

Fresh wet density	: 1750 kg/m ³
Setting time:	60 mins @20°C 45 mins @35°C

■ Nitomortar FC(B) - epoxy resin blow hole filler

Specification

The epoxy based blow hole filler shall be Nitomortar FC(B), by Fosroc, supplied as a two component, thixotropic, solvent free compound. It shall be applied directly to concrete substrates without the use of a primer, and shall cure to a surface ready for overcoating. The base component and hardener shall be in two different colours to ease identification of uniform mixing. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Solids :	100% by weight
Drying time :	10 hours @25°C 4 hours @35°C

Proposal

Repairs to blow holes and minor surface imperfections using cementitious or epoxy resin blow hole filler.

Method A - cementitious repair

1 Preparation

- 1.1 Clean the surface and remove any dust, loose particles, unsound material and general curing compounds.
- 1.2 Roughen the surface and remove any laitance and expose the fine aggregates by light scabbling, grit-blasting or mechanical wire brushing.
- 1.3 Broken out areas shall be blown clean with an oil-free compressed air before continuing.

2 Priming

- 2.1 Thoroughly soak the substrate with clean water approximately one hour prior to applying the repair.
- 2.2 Remove all surface water leaving the substrate saturated surface dry.

3 Mixing

- 3.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 3.2 Place the 3.0 litres of the liquid component into a mixer that has been pre-dampened. Ensure any excess water is removed.
- 3.3 With the machine in operation slowly add one full 10kg bag of Renderoc BF2 to the liquid component and mix continuously, for a minimum period of 3-5 minutes until fully homogeneous.

Smaller quantities can be mixed in a 3:1 ratio by volume of powder to liquid, using a slow speed, heavy duty drill attached with a Fosroc mixing paddle. With the mixing paddle in operation, add 3 volumes of the powder to 1 volume of liquid component and mix for 3-5 minutes until fully homogeneous.

4 Application

- 4.1 Apply the mixed Renderoc BF2 to the blow holes using a steel float.
- 4.2 Renderoc BF2 should be allowed to partly set before final trowelling to a smooth surface. If a high quality finish is required, a small amount of water should be flicked on to the surface of Renderoc BF2 with a paint brush prior to final trowelling.

5 Curing

- 5.1 The cementitious fairing coat generally does not require curing. However, in adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing with Rendercure or Nitobond AR should be considered.

Method B - epoxy repair

1 Preparation

- 1.1 See preparation notes on 'Method A'.

2 Mixing

- 2.1 Stir the 'hardener' and the 'base' components in order to disperse any settlement.
- 2.2 Pour the entire contents of the 'hardener' into the 'base' container and mix until a uniform grey colour and consistency is obtained. Do not part mix.

Smaller quantities can be mixed in a 1:1 ratio by volume. Mix until a uniform consistency is achieved.

3 Application

- 3.1 Apply Nitomortar FC(B) using a scraper, filling knife or steel float. Finish flush with surrounding concrete.

Prior to over coating with any epoxy coatings, the surface of the fully cured Nitomortar FC(B) shall be cleaned to a dust-free finish.

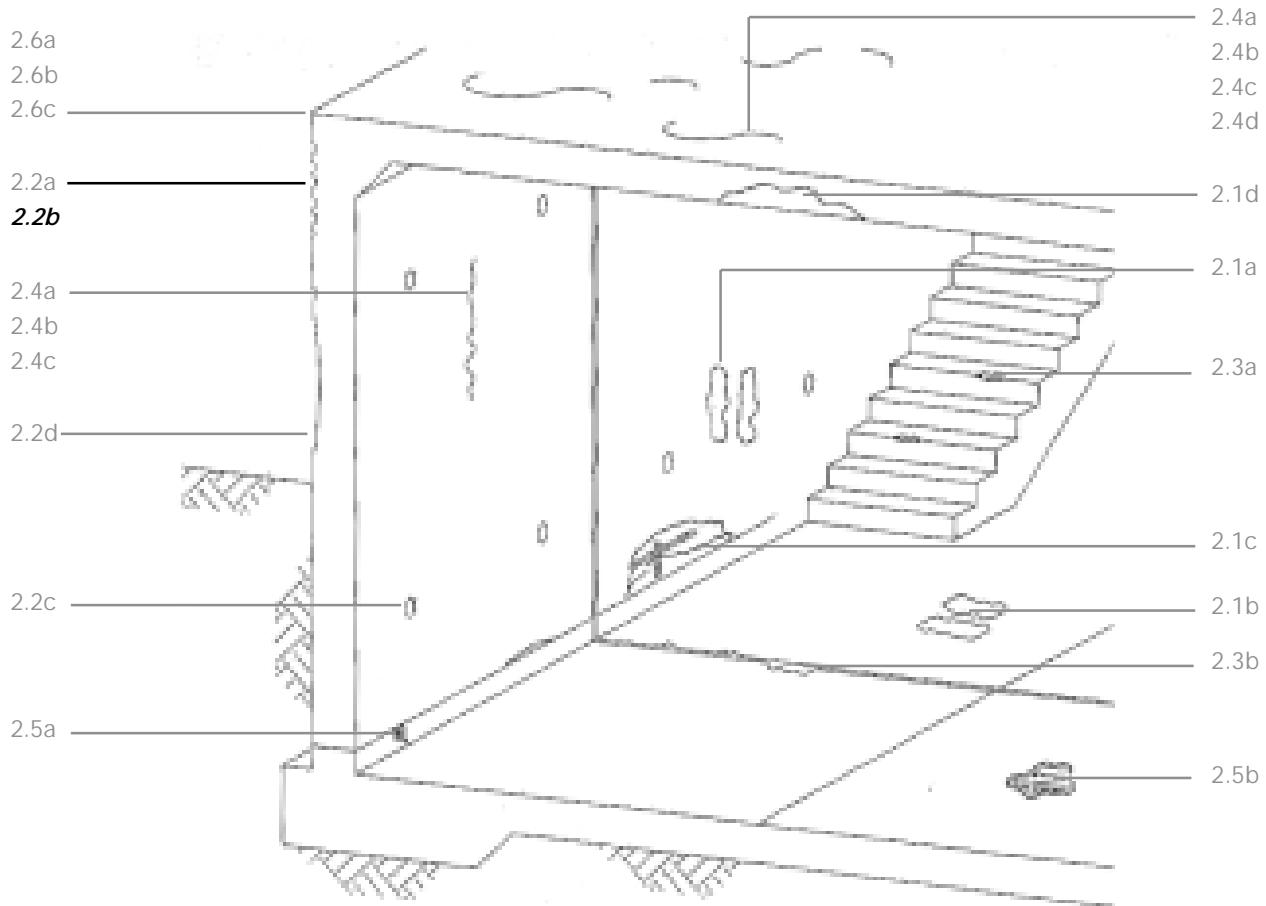
4 Curing

- 4.1 With the epoxy resin fairing coat curing is not required.

Note:

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Refer to Section 1.3 for high temperature working.



2.2b Repair method statement



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Repair method statement - number 2.2c

■ Proposal

To fill tie-bolt holes with
a void filling grout.

Fosroc products

Concrete repair system

- **Conbextra GP**
- general purpose void filling cementitious grout
- **Rendercure**
- curing membrane



Customer service numbers

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Material properties and specification - at a glance

■ Conbextra GP - void filling cementitious grout

Specification

The cementitious grout shall be Conbextra GP by Fosroc, supplied as a ready to use dry powder. With the addition of water it shall produce a non-shrink void filling grout. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	64 N/mm ²
Flex. str. :	11 N/mm ²
Modulus of elasticity :	> 28000 MPa

■ Rendercure - Renderoc curing membrane

Specification

The curing compound for repairs shall be Rendercure, by Fosroc, supplied as a low viscosity, single component, white liquid which dries to form a clear film. It shall exhibit performance characteristics as listed opposite.

Properties

Curing efficiency :	90%
---------------------	-----

Proposal

To fill tie-bolt holes with a void filling grout.

1 Preparation

- 1.1 Ensure tie-bolt hole is free from oil, grease or any loosely adherent material.
- 1.2 Use an oil-free compressed airline to blow the bolt holes clean of any dirt or debris.
- 1.3 Pre-soak the bolt holes with clean water approximately one hour prior to placement of the grout.
- 1.4 Immediately prior to placement of the grout any free water should be removed.

2 Mixing

- 2.1 Dampen all surfaces of mixing equipment, removing any excess water.
- 2.2 Measure out 2.7-2.9 litres of clean, cool water into a suitably sized mixing vessel that has been pre-dampened. Ensure any excess water is removed.
- 2.3 Slowly add one full 20 kg bag of Conbextra GP to the water and mix using a slow speed drill fitted with a proprietary mixing paddle.
- 2.4 Mix continuously for 5 minutes, to achieve a smooth even trowellable consistency.

3 Application

- 3.1 To gain full benefit of the expansion process, place the mortar in the tie-bolt holes within 15 minutes (@ 25°C) of mixing. To speed the application subdivide onto spot boards for individual applicators.
- 3.2 Compact the grout into the tie-bolt holes by float or a gloved hand and finish with a steel or plastic float.

4 Curing

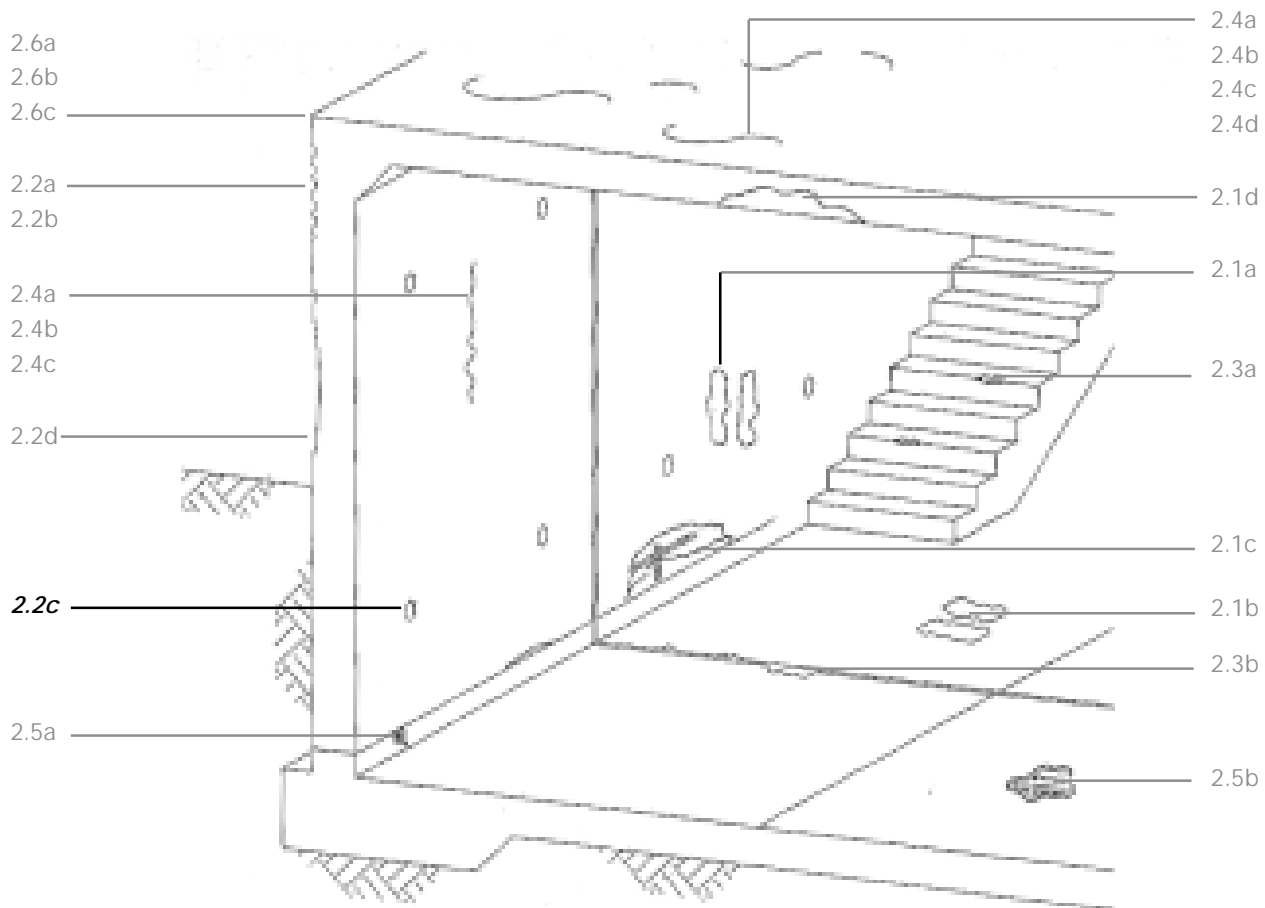
- 4.1 Thoroughly cure the exposed surfaces with Rendercure curing membrane or use clean water and seal with polythene.

In adverse conditions (e.g. windy conditions or ambient temperatures above 30°C) supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

Note:

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Refer to Section 1.3 for high temperature working.



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Repair method statement - number 2.2d

■ Proposal

Reprofiling of the concrete substrate
to regulate the finished surface.

Fosroc products

Concrete repair system

■ *Various*

- according to required depths and extent of repair



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Material properties and specification - at a glance

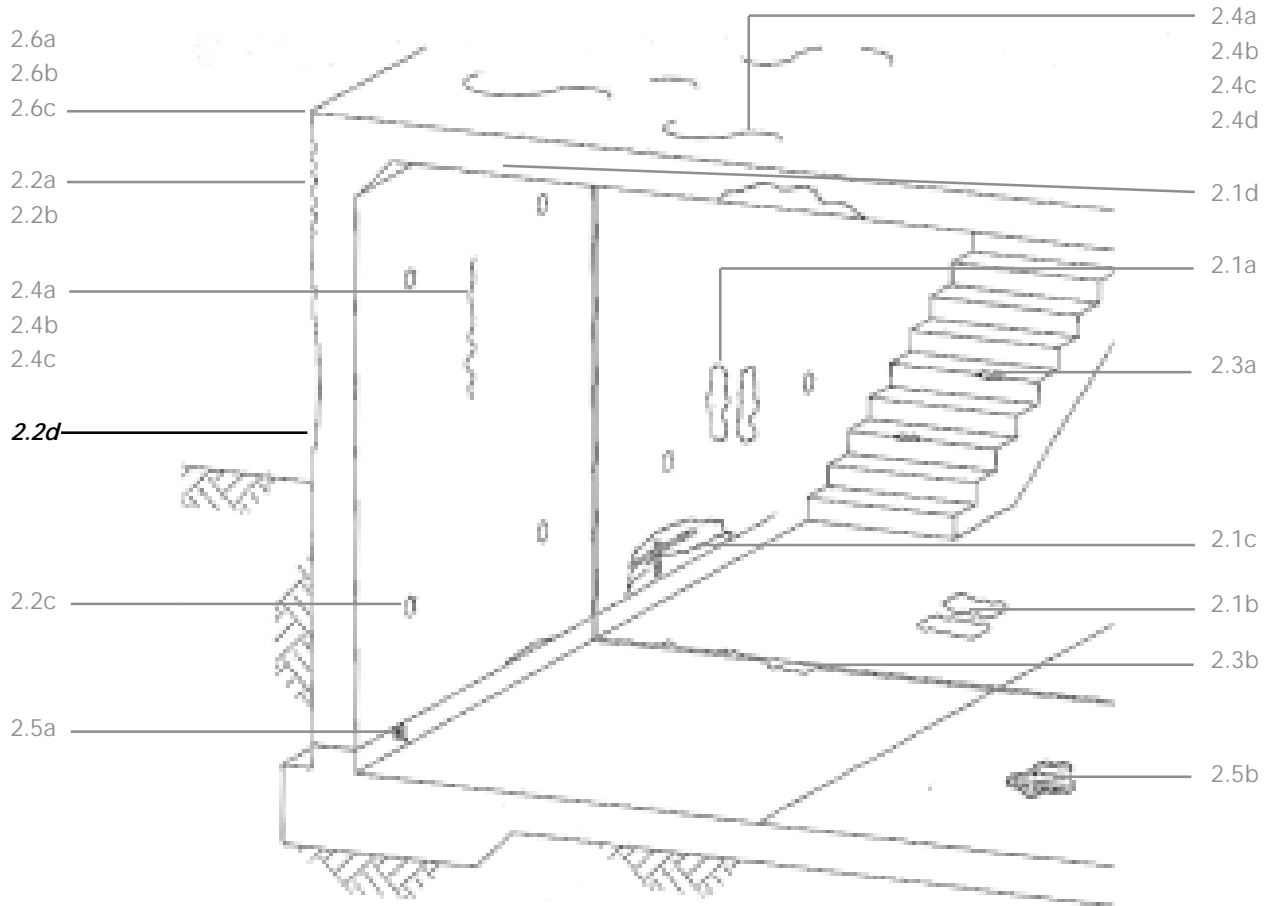
- Refer to related method statement



Proposal

Reprofiling of the concrete substrate to regulate the finished surface.

Depth	Products	Reference
0-3 mm	Renderoc FC/Nitomortar FC	Refer to method statement 2.2a
3-10 mm	Renderoc BF(2) / Nitomortar FC(B)	Refer to method statement 2.2b
10 mm & above	Various	Refer to Section 2.1



2.2d Repair method statement



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Repair method statements

■ 2.3 *Corner repairs*

a Stair treads and nosings

b Joint arrises

Repair method statement - number 2.3a

■ Proposal

Repair and levelling of stair treads
and nosings.

Fosroc products

Concrete repair system

- **Nitoprime 28**
- epoxy primer for vertical surfaces
- **Nitoprime 25**
- epoxy primer for horizontal surfaces
- **Nitomortar S**
- high strength, epoxy reinstatement mortar



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Material properties and specification - at a glance

- Nitomortar S - high strength epoxy reinstatement mortar

Specification

The high strength repair mortar shall be Nitomortar S, by Fosroc, supplied as a solvent free, three-component epoxy resin. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Flex. str. :	20 N/mm ²
Ten. str. :	10 N/mm ²
Water abs. :	0.2 %

Proposal

Repair and levelling of stair treads and nosings.

1 Preparation

- 1.1 Using a marker pen, draw a line around the perimeter of the defective area.
- 1.2 Break out the marked area to a minimum depth of 5mm and remove all segregated concrete. Continue breaking out until a sound homogeneous substrate has been reached.
- 1.3 Saw cut to a depth of 5 mm around the perimeter of the repair to avoid feather edges.
- 1.4 broken out areas should be blown clean with oil-free compressed air before the application of the repair mortar.

2 Priming

- 2.1 On horizontal surfaces apply Nitoprime 25 primer and use Nitocote Primer Sealer for vertical substrates.
- 2.2 The 'hardener' and 'base' components of the primer shall be stirred separately, before mixing them together, to disperse any settlement.
- 2.3 The entire contents of the 'hardener' tin shall be poured into the 'base' tin, mixing for 3 minutes.
- 2.4 The mixed primer shall be scrubbed well into the prepared substrate. Ensure all surface imperfections are coated and avoid 'ponding' in depressions.

If primer is absorbed within 30 minutes, a second coat must be applied before continuing.
- 2.5 Nitomortar S shall be placed as soon as the primer has started to gel but still has surface tack.

If the primer has cured hard, a second application must be made before the application of Nitomortar S.

3 Mixing

- 3.1 Nitomortar S must be mixed mechanically using a forced action mixer.
- 3.2 The 'hardener' and 'base' components of Nitomortar S shall be stirred separately before mixing them together, to disperse any settlement.
- 3.3 The entire contents of the 'hardener' tin shall be poured into the 'base' tin, mixing for 3 minutes until a uniform consistency has been obtained. Pour into the mixing vessel.
- 3.4 With the mixer in operation, slowly add the entire volume of aggregate and mix for 2-3 minutes. Continue mixing until a uniform consistency has been obtained.

4 Application

- 4.1 Apply the material immediately after mixing. Using a wooden float, press the mortar firmly on to the primed substrate, ensuring intimate contact with the primed surface is made.
- 4.2 For vertical surfaces, the mortar can be applied up to 12mm deep in a single application without the use of formwork. For horizontal applications, the material can be applied up to 50mm deep.
- 4.3 When finishing Nitomortar S, apply a small amount of Fosroc Solvent 102 to a steel trowel. This will produce a dense surface.

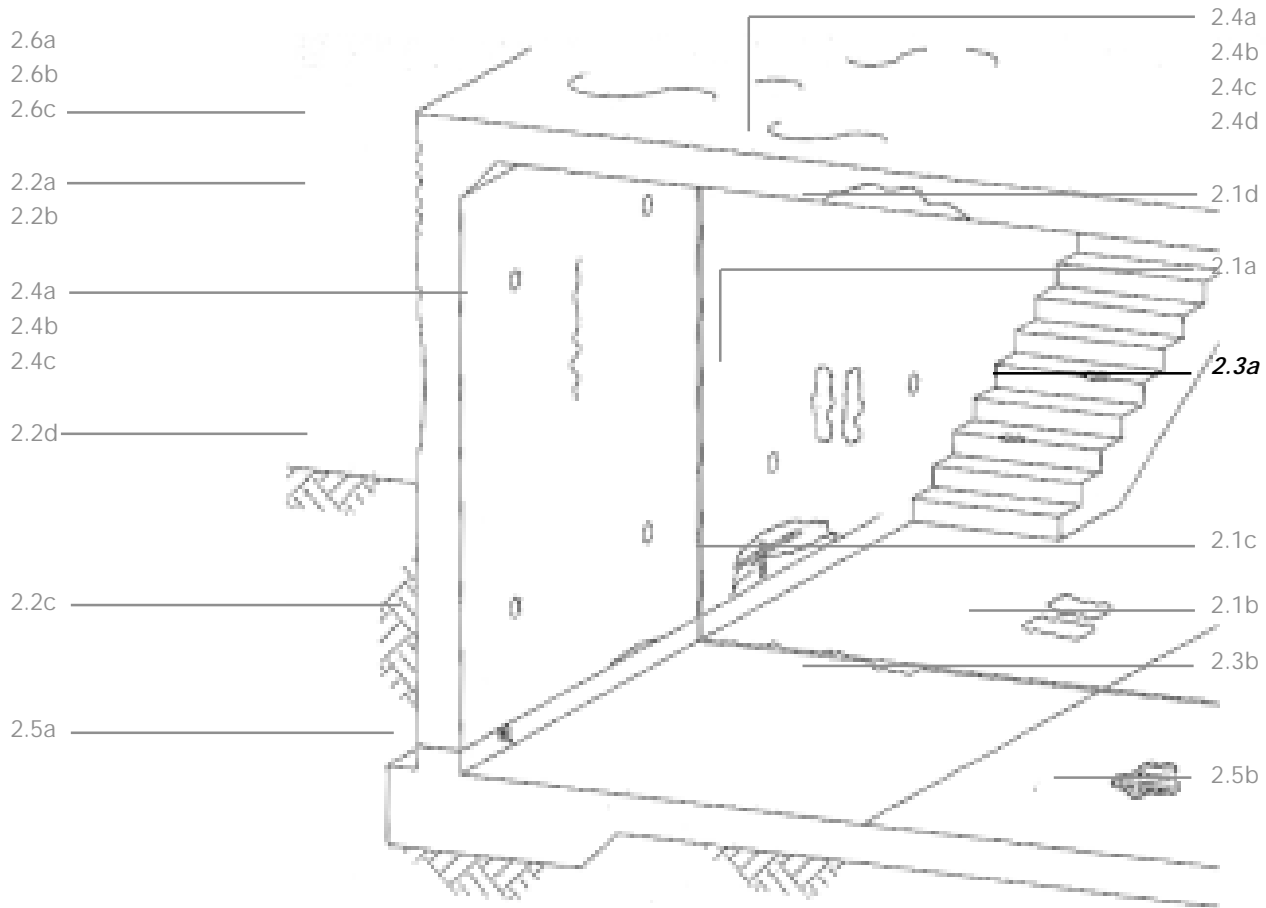
5 Curing

- 5.1 Nitomortar S does not require the application of a curing membrane.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant data sheets.

Refer to Section 1.3 for High temperature working.



2.3a Repair method statement



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Repair method statement

- number 2.3b

■ Proposal

Repairs of joint arrises in floor and wall joints - *internal use only*.

Fosroc products

Concrete repair system

- **Nitoprime 28**
- epoxy primer for vertical surfaces
- **Nitoprime 25**
- epoxy primer for horizontal surfaces
- **Nitomortar S**
- high strength, epoxy reinstatement mortar

Joint sealant

- **Thioflex 600 + primer**
- two part polysulphide sealant (walls)
- **Colpor 200PF + primer**
- cold applied, pitch free sealant (floors)



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Material properties and specification - at a glance

- Nitomortar S - high strength epoxy reinstatement mortar

Specification

The high strength repair mortar shall be Nitomortar S, by Fosroc, supplied as a solvent free, three-component epoxy resin. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Flex. str. :	20 N/mm ²
Ten. str. :	10 N/mm ²
Water abs. :	0.2 %

- Thioflex 600 - Two part polysulphide sealant

Specification

The wall joint sealant shall be Thioflex 600, by Fosroc, supplied as a 100% solids content, two-part polysulphide material available in gun and pouring grade. The mixed components shall have a pot life not less than 1 hour @ 35°C and a setting time not greater than 12 hours at 35°C. It shall be capable of application between 5°C and 50°C.

Properties

Movement Acc. Factor	
Butt Joints :	25%
Lap Joints :	50%
Standard :	BS 6093

- Colpor 200PF - cold applied pitch free sealant

Specification

The floor joint sealant shall be Colpor 200, by Fosroc, supplied as a cold applied, pitch free, two-part elastomeric material. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Movement Acc. Factor	
Butt Joints :	25%
Mixed Den.:	1.35 kg/ltr

Proposal

Repairs of joint arrises in floor and wall joints due to differential settlement between adjacent slabs - internal use only.

1 Preparation

- 1.1 Using a chalk line, define a line parallel to the joint 50 mm either side of the defective area.
- 1.2 Make a saw cut 10 mm deep along the length of each chalk line. Break out the area between the saw cuts. The depth of the broken out area should be 15 mm at the face of the joint tapering to 10 mm at the saw cut.
- 1.3 Remove all surface debris, broken out areas should be blown clean with oil-free compressed air ensuring the substrate is sound and dust free.
- 1.4 Insert filler board into the joint, leaving enough gap for the sealant to ensure correct width to depth ratio.
- 1.5 Fix nails into the filler board, using a string line, locate the centre of the joint.

2 Priming

Repair are to be restricted to 1.2 -1.3m long strips.

- 2.1 On horizontal surfaces apply Nitoprime 25 primer and use Nitocote Primer Sealer for vertical substrates.
- 2.2 The 'hardener' and 'base' components of the primer shall be stirred separately, before mixing them together, to disperse any settlement.
- 2.3 The entire contents of the 'hardener' tin shall be poured into the 'base' tin, mixing for 3 minutes.
- 2.4 The mixed primer shall be scrubbed well into the prepared substrate. Ensure surface imperfections are coated and avoid 'ponding' in depressions.

If primer is absorbed within 30 minutes, a second coat must be applied before continuing.
- 2.5 Nitomortar S shall be placed as soon as the primer has started to gel but still has surface tack.

If the primer has cured hard, a second application must be made before the application of Nitomortar S.

3 Mixing

- 3.1 Nitomortar S must be mixed mechanically using a forced action mixer.
- 3.2 The 'hardener' and 'base' components of Nitomortar S shall be stirred separately before mixing them together, to disperse any settlement.
- 3.3 The entire contents of the 'hardener' tin shall be poured into the 'base' tin, mixing for 3 minutes until a uniform consistency has been obtained. Pour into the mixing vessel.
- 3.4 With the mixer in operation, slowly add the entire volume of aggregate and mix for 2-3 minutes. Continue mixing until a uniform consistency has been obtained.

4 Application

- 4.1 Apply the material immediately after mixing. Using a wooden float, press the mortar firmly on to the primed substrate, ensuring intimate contact with the primed surface is made.
- 4.2 Totally fill the area broken out to a level surface. Care should be taken not to alter the sting line. Allow 24 hours for the material to cure.

5 Reprofiling the joint

- 5.1 Using the string line for reference, mark the joint parameter and saw cut to the depth of the filler board.
- 5.2 Totally remove all repair material from the joint.

6 Sealing the joint

- 6.1 Apply a foam backing rod where required into the joint to the depth as required by the proposed joint sealant.
- 6.2 Prime the joint with the appropriate primer.
- 6.3 Mix joint sealant and apply in accordance with details on the relevant technical data sheet.

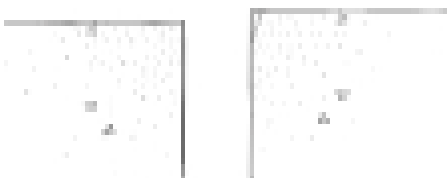
Note:

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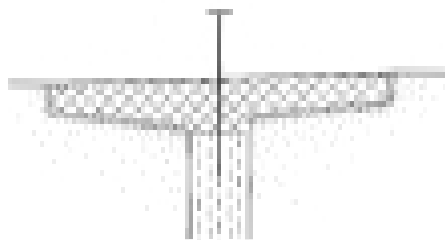
Refer to Section 1.3 for high temperature working.

For repairs to joint arrises located externally, refer to Fosroc local office for recommendations.

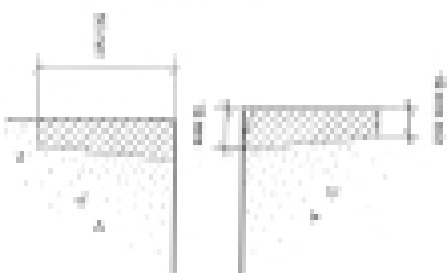
1 Typical failures at joints



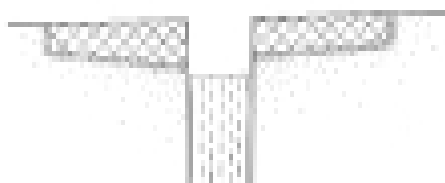
2 Fill formwork and area with M30 concrete (2)



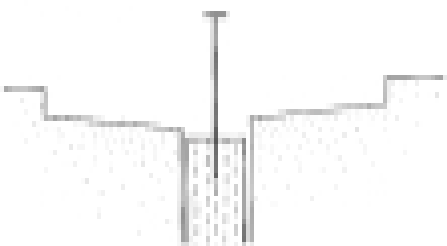
3 Breakout area as shown



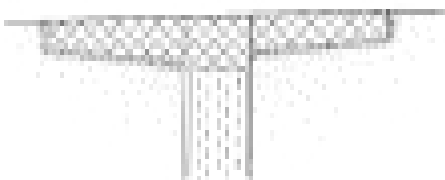
4 Saw out to the depth of the final board and remove repair material from joint



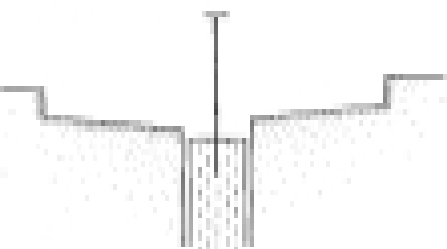
5 Insert joint filler, fix and to include centre of joint



7 Prime with appropriate primer and seal with joint sealant



6 Finish with Polycrete (2) or M30crete (2) on central joint



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Repair method statements

■ 2.4 *Cracês*

a Moving : 0.25 - 3 mm

b Non moving : less than 0.25 mm

c Non moving : 0.25 - 3 mm (general)

d Non moving : 0.25 - 3 mm (horizontal)

Repair method statement - number 2.4a

■ Proposal

Injection of moving cracks, 0.25 - 3 mm wide, with a two part, low viscosity, polyurethane resin.

Fosroc products

Crack injection system

- **Nitofill UR63**
- flexible polyurethane crack injection resin
- **Nitomortar FC**
- epoxy resin



Customer service numbers

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<i>Oman</i>	<i>771 5080</i>	<i>771 7554</i>
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Material properties and specification - at a glance

■ Nitofill UR63 - flexible crack injection resin

Specification

The flexible crack injection resin system shall be Nitofill UR63, by Fosroc, supplied as a two part solvent-free low viscosity liquid polyurethane with a 3.0 poise at 20°C and be capable of penetrating crack widths of minimum 0.2 mm. The specific gravity shall not exceed 1.0. It shall be fully compatible with the Nitofill WS60 system.

Properties

S. G.	: 1.00
Viscosity	: 3.0 poise @ 20°C

■ Nitomortar FC - epoxy resin

Specification

The fixing resin shall be Nitomortar FC, a two component, thixotropic, solvent free mortar supplied by Fosroc. The base component and hardener shall be in two different colours to ease identification of uniform mixing. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str.	: 70 N/mm ²
Vol. solids	: 100%
Drying time:	10 hours @25°C
	4 hours @35°C

Proposal

Injection of moving cracks, 0.25 - 3 mm wide, with a two-part, low viscosity, polyurethane resin.

The resin injection system featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.

1 Preparation

- 1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.
- 1.2 The prepared area should then be cleaned to remove all loose particles and dust by means of oil free compressed air.
- 1.3 Holes need to be drilled, to receive the injection packers, at a regular spacing along the length of the crack. Such spacing will be largely dependent upon the width and depth of the crack. The spacing should thus be sufficient to ensure that the resin will ultimately penetrate along the crack to the next injection point; this will normally be in the range of 200 to 500 mm.
- 1.4 The holes themselves should be drilled either directly into the crack, or diagonally into it from the adjacent substrate (staggered on alternate sides of the crack), using a drill bit appropriate to the size of the injection packers.
- 1.5 If the substrate is cracked all the way through, hole spacing and positioning should be staggered on both sides, with those at the back placed midway between those at the front.

2 Fixing injection packers

- 2.1 The injection packers shall be inserted into the pre-drilled holes along the length of the crack.
- 2.2 The surface of the cracks between the packers shall be sealed with a band of Nitomortar FC, 30 to 40 mm wide and 2 to 3 mm thick. Both sides of any cracks which go all the way through a wall or slab shall be sealed in this way.

- 2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

- 3.1 Mix the two components of Nitofill UR63 together until the liquid becomes clear.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

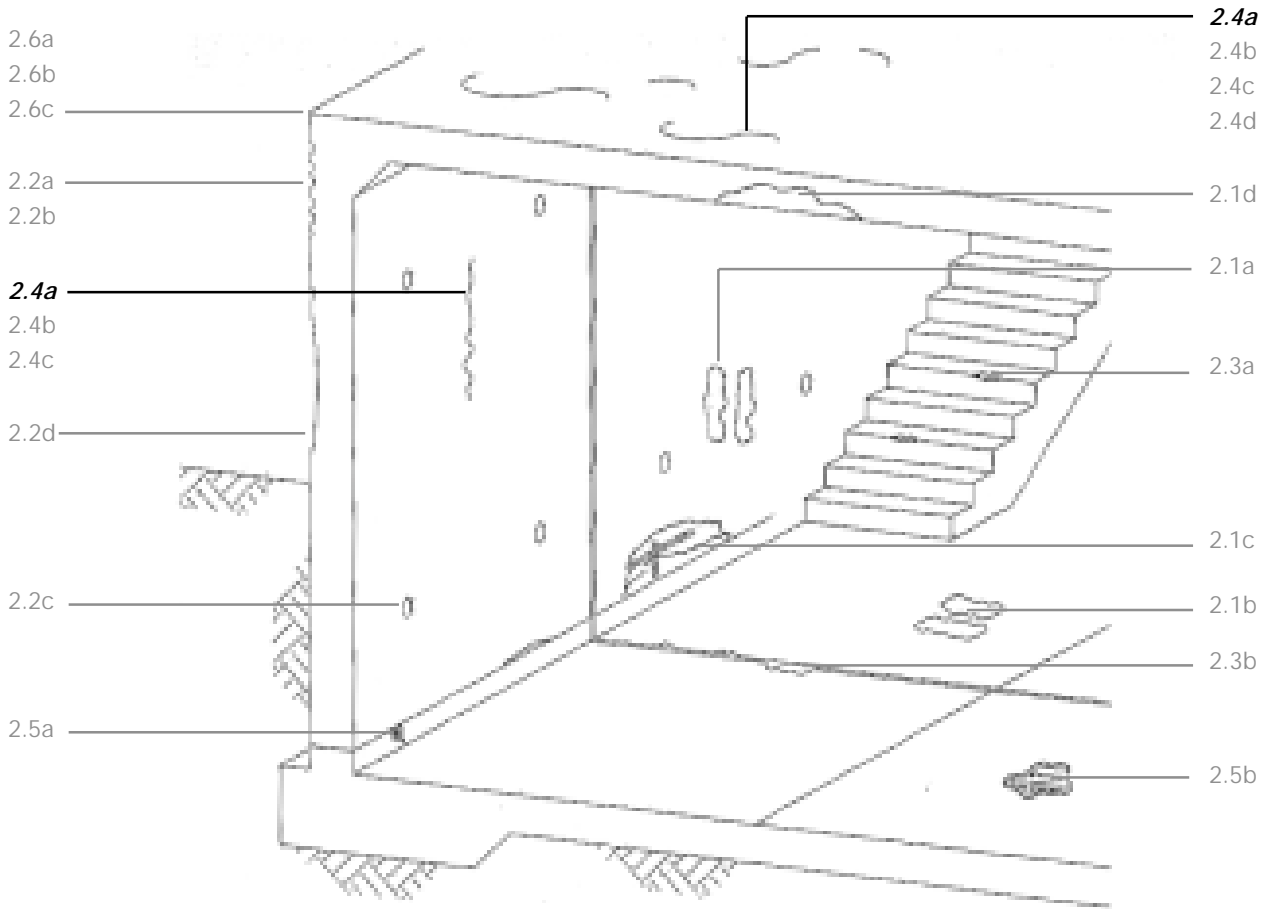
4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.
- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location or until no more resin will enter the crack.
- 4.4 Remove pressure from the injection gun, close valve and crimp injection packer. Move on to the next location.
- 4.5 Continue as above at all injection points until all packer locations have been sealed.
- 4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.
- 4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement

- number 2.4b

■ Proposal

Surface sealing of horizontal non-moving cracks, less than 0.25 mm wide, with either a rigid cementitious or epoxy material.

Fosroc products

Concrete repair system

Method A - cementitious repair

- **Nitobond AR**
- acrylic bonding agent
- **Renderoc TGXtra**
- shrinkage controlled repair mortar

Method B - epoxy repair

- **Nitomortar FC**
- epoxy resin



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Material properties and specification - at a glance

■ Nitobond AR - acrylic bonding agent

Specification

The bonding agent for use in the Renderoc repair mortar system shall be Nitobond AR, by Fosroc, supplied as a modified, single-component acrylic emulsion which must be resistant to hydrolysis.

■ Renderoc TGXtra - cementitious, repair mortar

Specification

The repair mortar shall be Renderoc TGXtra, by Fosroc, incorporating Dimensional Stability Technology. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	40 N/mm ²
DIN perm. :	< 10 mm
Water abs. :	< 2 %
Drying shrinkage	
7 days :	< 300 microstrain
28 days :	< 500 microstrain

■ Nitomortar FC - epoxy resin

Specification

The fixing resin shall be Nitomortar FC, a two component, thixotropic, solvent free mortar supplied by Fosroc. The base component and hardener shall be in two different colours to ease identification of uniform mixing. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Vol. solids :	100%
Drying time:	
	10 hours 25°C
	4 hours @35°C

Proposal

Surface sealing of horizontal non-moving cracks, less than 0.25 mm wide, with either a rigid cementitious or epoxy material.

Method A - cementitious repair

- 1 Preparation
 - 1.1 Using a marker pen, draw a line along the length of the crack to be repaired.
 - 1.2 Make a chase in the concrete 10 mm either side of the crack and 15 mm deep. The chase should be 'V' shaped.
 - 1.3 Wire brush the surface of the chase to remove all loose deposits, debris and other deleterious substances.
- 2 Substrate priming
 - 2.1 Thoroughly soak the chase with clean water. Remove all surface water, leaving the concrete saturated surface dry.
 - 2.2 Apply Nitobond AR acrylic primer to the prepared concrete chase.
- 3 Mixing and application
 - 3.1 Measure out 3.6 litres of cool, potable water, and mix in a full 20 kg bag of Renderoc TGX_{tra}.
 - 3.2 Mix for 3 to 5 minutes until fully homogenous, using a 1 KW, slow speed drill (400/500 rpm) + Fosroc mixing paddle.
 - 3.3 Apply Renderoc TGX_{tra} into the chase, firmly compacting with a steel pointing trowel. Finish flush with surrounding concrete.
- 4 Curing
 - 4.1 Cure Renderoc TGX_{tra} immediately on completion of the repair using Rendercure.
 - 4.2 In adverse conditions (e.g. windy conditions or ambient temperatures greater than 30°C), supplementary curing in the form of polythene sheeting, taped down at the edges, should be used.

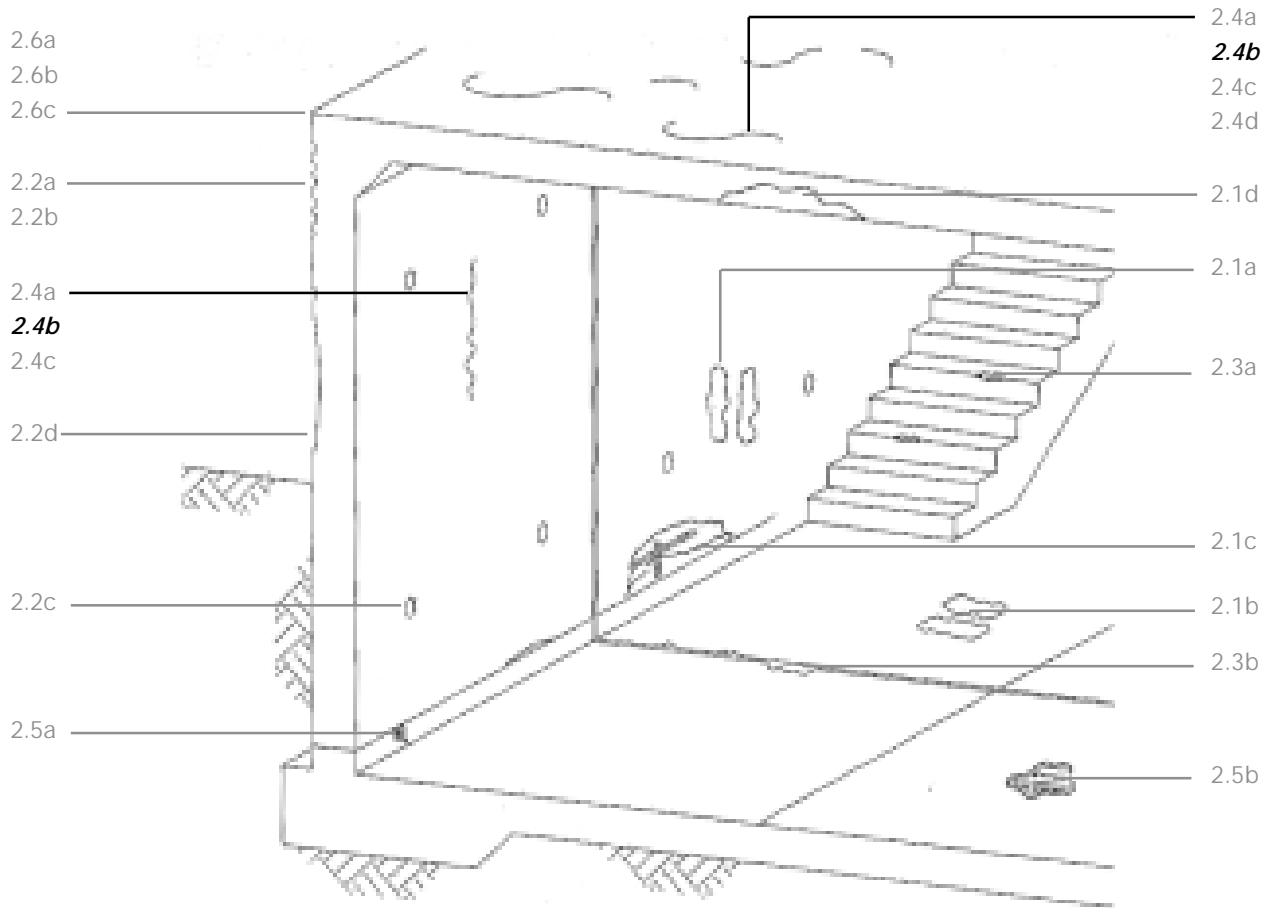
Method B - epoxy repair

- 1 Preparation
 - 1.1 Using a marker pen, draw a line along the length of the crack to be repaired.
 - 1.2 Make a chase in the concrete 5 mm either side of the crack and 5 mm deep. The chase should be 'V' shaped.
 - 1.3 Wire brush the surface of the chase to remove all loose deposits, debris and other deleterious substances.
- 2 Mixing
 - 2.1 Stir the 'hardener' and the 'base' components in order to disperse any settlement.
 - 2.2 Pour the entire contents of the 'hardener' into the 'base' container and mix until a uniform grey colour and consistency is obtained. Do not part mix.
- 3 Application
 - 3.1 Apply Nitomortar FC by firmly pressing the material into the chase with a steel pointing trowel. Finish flush with surrounding concrete.
- 4 Curing
 - 4.1 Nitomortar FC does not require the application of a curing membrane.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement - number 2.4c

■ Proposal

Injection of non-moving cracks,
0.25 mm - 3 mm wide, with a low
viscosity, epoxy grout.

Fosroc products

Cracã injection system

- **Nitofill EPLV**
- epoxy crack injection resin
- **Nitomortar FC**
- epoxy resin



Customer service numbers

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Material properties and specification - at a glance

■ Nitofill EPLV - epoxy crack injection resin

Specification

The crack injection system shall be Nitofill EPLV, a two part, solvent free, low viscosity epoxy, supplied by Fosroc. It shall be capable of penetrating crack widths of min 0.2 mm. When mixed in the proportions supplied and injected into cracks in concrete, the resin shall form a permanent bond and seal in both dry and damp conditions. The cured material shall exhibit the performance characteristics listed opposite.

Properties

Comp. str. :	70 N/mm ² @ 20°C
	93 N/mm ² @ 35°C
Ten. str. :	25 N/mm ²
Flex. str. :	63 N/mm ²
S.G. :	1.04
Viscosity :	1.0 poise @ 35°C

■ Nitomortar FC - epoxy resin

Specification

The fixing resin shall be Nitomortar FC, a two component, thixotropic, solvent free mortar supplied by Fosroc. The base component and hardener shall be in two different colours to ease identification of uniform mixing. The cured material shall exhibit performance characteristics as listed opposite.

Properties

Comp. str. :	70 N/mm ²
Vol. solids :	100%
Drying time:	10 hours @25°C
	4 hours @35°C

Proposal

Injection of non-moving cracks, 0.25 mm - 3 mm wide, with a low viscosity, epoxy grout.

The resin injection system featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.

1 Preparation

- 1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.
- 1.2 The prepared area should then be cleaned to remove all loose particles and dust by means of oil free compressed air.
- 1.3 Holes need to be drilled, to receive the injection packers, at a regular spacing along the length of the crack. Such spacing will be largely dependent upon the width and depth of the crack. The spacing should thus be sufficient to ensure that the resin will ultimately penetrate along the crack to the next injection point; this will normally be in the range of 200 to 500 mm.
- 1.4 The holes themselves should be drilled either directly into the crack, or diagonally into it from the adjacent substrate (staggered on alternate sides of the crack), using a drill bit appropriate to the size of the injection packers.
- 1.5 If the substrate is cracked all the way through, hole spacing and positioning should be staggered on both sides, with those at the back placed midway between those at the front.

2 Fixing injection packers

- 2.1 The injection packers shall be inserted into the pre-drilled holes along the length of the crack.
- 2.2 The surface of the cracks between the packers shall be sealed with a band of Nitomortar FC, 30 to 40 mm wide and 2 to 3 mm thick. Both sides of any cracks which go all the way through a wall or slab shall be sealed in this way.

- 2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

- 3.1 Mix the two components of Nitofill EPLV together until the liquid becomes clear.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

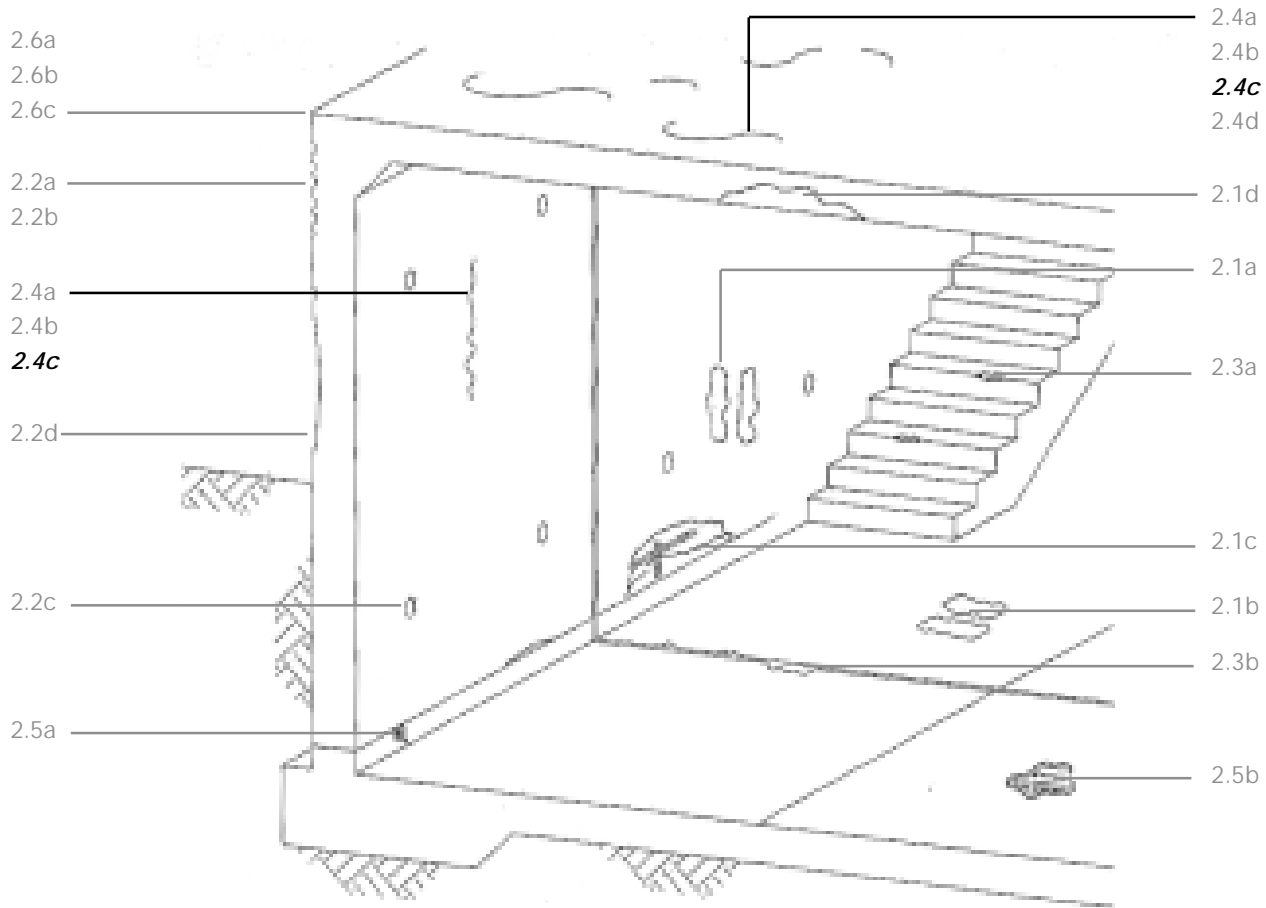
4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.
- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location or until no more resin will enter the crack.
- 4.4 Remove pressure from the injection gun, close valve and crimp injection packer. Move on to the next location.
- 4.5 Continue as above at all injection points until all packer locations have been sealed.
- 4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.
- 4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



2.4c Repair method statement



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Repair method statement - number 2.4d

■ Proposal

The filling and sealing of horizontal non-moving cracks, 0.25 mm - 3 mm wide, with a low viscosity, epoxy grout using the flooding method.

Fosroc products

Cracâ injection system

- *Nitofill EPLV*
- epoxy crack injection resin



Customer service numbers

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Material properties and specification - at a glance

- Nitofill EPLV - epoxy crack injection resin

Specification

The crack injection system shall be Nitofill EPLV, a two part, solvent free, low viscosity epoxy, supplied by Fosroc. It shall be capable of penetrating crack widths of minimum 0.2 mm. When mixed in the proportions supplied and injected into cracks in concrete, the resin shall form a permanent bond and seal in both dry and damp conditions. The cured material shall exhibit the performance characteristics listed opposite.

Properties

Comp. str.	:70 N/mm ² @ 20°C
	93 N/mm ² @ 35°C
Ten. str.	: 25 N/mm ²
Flex. str.	: 63 N/mm ²
S.G.	: 1.04
Viscosity	: 1.0 poise @ 35°C

Proposal

To fill and seal non-moving horizontal cracks, 0.25 - 3 mm wide, with a low viscosity, epoxy grout.

1 Preparation

- 1.1 When it has been determined that the crack is non-moving, chisel it out to form a 'V' shape channel 5 mm deep and 10 mm wide along its entire length.
- 1.2 The prepared area should then be cleaned to remove all loose particles and dust by means of oil free compressed air.

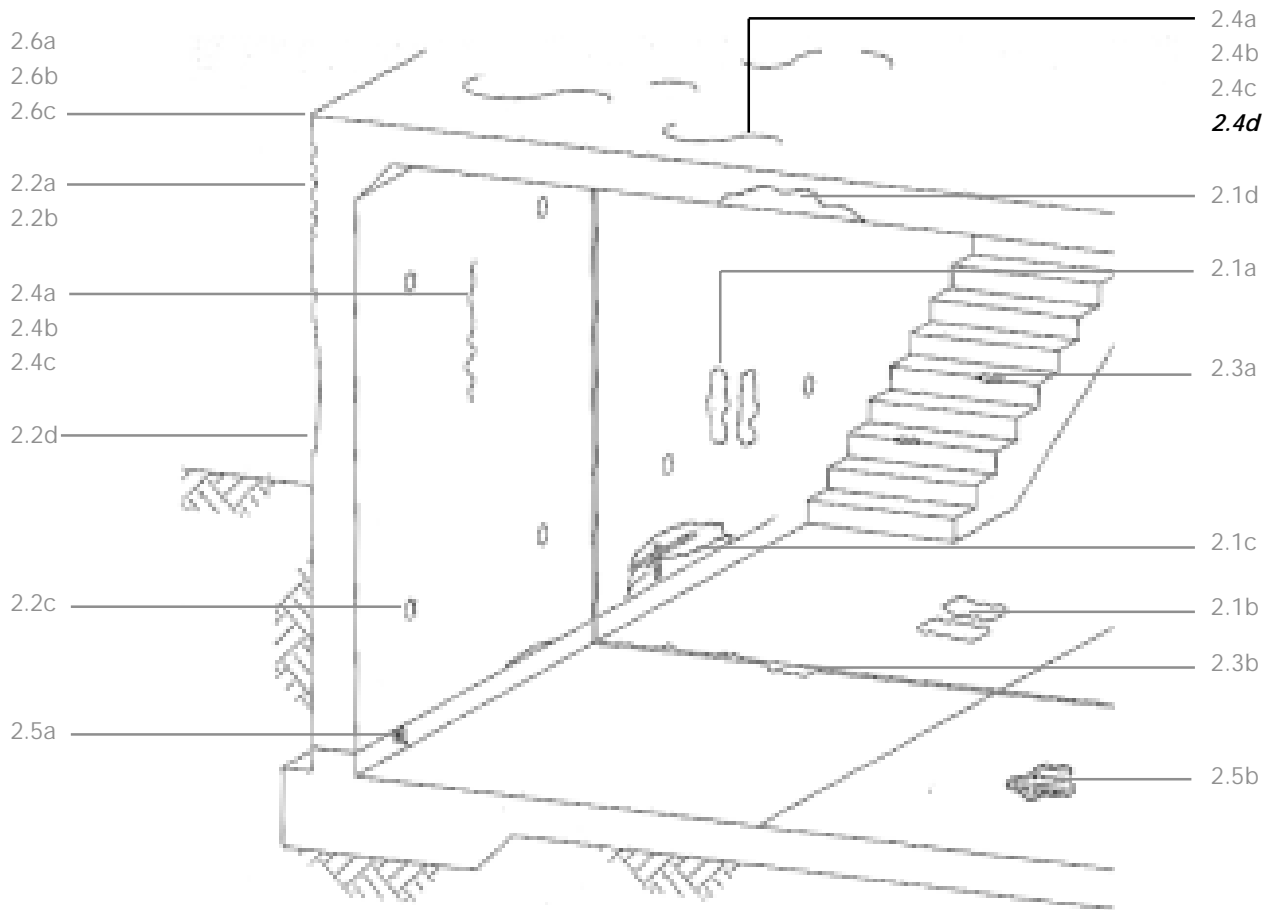
2 Application

- 2.1 Mix the two components of Nitofill EPLV together until the liquid becomes clear.
- 2.2 Pour the mixed Nitofill EPLV into the clean, chiselled-out crack to flood its entire length, topping up with mixed resin as required.
- 2.3 After the Nitofill EPLV has cured, (24 hours @ 20°C) grind flat excess material using an angle grinder.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statements

- 2.5 *Leaês*

- a* Leaking cracks

- b* Leaking concrete

Repair method statement - number 2.5a

■ Proposal

Injection of leaking cracks with a rapid foaming and setting resin to stop the leak, followed by injection of a two-part polyurethane resin to seal the crack.

Fosroc products

Cracâ injection system

- **Part A - Nitofill WS60**
 - foaming and rapid setting polyurethane resin
- **Part B - Nitofill UR63**
 - flexible polyurethane crack injection resin



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Material properties and specification - at a glance

■ Nitofill WS60 - foaming crack injection resin

Specification

The water-stopping crack injection material shall be Nitofill WS60, by Fosroc, supplied as a two part rapid foaming and rapid setting liquid polyurethane resin. It shall be capable of stopping water flowing through crack widths between 0.2 mm and 5 mm in width. It shall have a viscosity of 2.0 - 3.0 poise at 20°C and a density of foam not less than 0.025. It shall be capable of reacting with water in 5 to 30 seconds, and shall be fully compatible with the Nitofill UR63 system.

Properties

S.G.	: 1.14 ± 0.06
Viscosity	: 2.0-3.0 poise @ 20°C

■ Nitofill UR63 - flexible crack injection resin

Specification

The flexible crack injection resin system shall be Nitofill UR63, by Fosroc, supplied as a two part solvent-free low viscosity liquid polyurethane with a 3.0 poise at 20°C and be capable of penetrating crack widths of minimum 0.2 mm. The specific gravity shall not exceed 1.0. It shall be fully compatible with the Nitofill WS60 system.

Properties

S. G.	: 1.00
Viscosity	: 3.0 poise @ 20°C

Proposal

Injection of leaking cracks with a rapid foaming and setting resin to stop the leak, followed by injection of a two-part polyurethane resin to seal the crack.

Solution of this problem is a two stage process, and is appropriate for relatively minor seepage of water. Where a continuous water flow is encountered, please refer to Method Statement 2.5b

Nitofill WS60, used in Part A, provides a temporary seal to halt the seepage of water, but cannot offer long term resistance to water movement - it cannot resist the build up of hydrostatic pressure.

Nitofill UR63, used in Part B, will provide a permanent seal, but cannot be applied to wet surfaces and is hence reliant upon Part A of the process.

Part A - Temporary seal

Injection using Nitofill WS60 rapid foaming and setting resin.

1 Preparation

- 1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.
- 1.2 Holes need to be drilled, to receive the injection packers, at a regular spacing along the length of the crack. Such spacing will be largely dependent upon the width and depth of the crack, as well as the rate of water flow. The spacing should thus be sufficient to ensure that the resin will ultimately penetrate along the crack to the next injection point; this will normally be in the range of 200 to 500 mm.
- 1.3 The holes themselves should be drilled either directly into the crack, or diagonally into it from the adjacent substrate (staggered on alternate sides of the crack), using a drill bit appropriate to the size of the injection packers.

2 Fixing injection packers

- 2.1 Insert the injection packers into the pre-drilled holes.
- 2.2 Where water flow permits, the surface of the crack between the injection packers should be sealed using Nitomortar FC (on both sides if the crack penetrates through). In such cases apply a band 30 to 40 mm wide and 2 to 3 mm thick, along the length of the crack.
- 2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

- 3.1 Mix the two components of Nitofill WS60 rapid foaming polyurethane resin together until homogeneous.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.
- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer, or further up the crack location.
- 4.4 Remove pressure from the injection gun, close valve and crimp. Move on to the next location.
- 4.5 Continue as above at all injection points until water no longer seeps from the crack.
- 4.6 Allow the resin to cure for 6 hours.
- 4.7 Proceed to Part B when the Engineer is satisfied with the temporary seal.

Note:

The resin systems featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.



Proposal

Injection of leaking cracks with a rapid foaming and setting resin to stop the leak, followed by injection of a two-part polyurethane resin to seal the crack.

Part B - permanent seal

Injection using Nitofill UR63 flexible polyurethane resin.

1 Preparation

1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.

1.2 Using a marker pen, locate new drill positions midway between the points used in Part A.

1.3 At marked locations, drill a hole approximately 10 mm deep; either straight in or at an angle, as per the drilling method used in Part A.

2 Fixing injection packers

2.1 The injection packers shall be inserted into the pre-drilled holes along the length of the crack.

2.2 The surface of the cracks between the packers shall be sealed with a band of Nitomortar FC, 30 to 40 mm wide and 2 to 3 mm thick.

2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

3.1 Mix the two components of Nitofill UR63 together until the liquid becomes clear.

3.2 Insert the mixed material into the injection gun and close all seals.

3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.

4.3 Continue applying pressure until resin appears at the next packer location or until no more resin will enter the crack.

4.4 Remove pressure from the injection gun, close valve and crimp. Move on to the next location.

4.5 Continue as above at all injection points until all packer locations have been sealed.

4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.

4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement

- number 2.5b

■ Proposal

Repairing major leaks in concrete, to initially stop the water flow and then make good the substrate.

Fosroc products

Concrete repair system

- **Part A - Renderoc Plug**
 - rapid setting mortar for leak plugging running water
- **Part B - Nitofill WS60**
 - foaming and rapid setting polyurethane crack injection resin to stop water flow
- **Part C - Nitofill UR63**
 - flexible polyurethane crack injection resin
- **Part D - Renderoc**
 - reprofile as per Section 2.2



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Material properties and specification - at a glance

■ Renderoc Plug - rapid setting mortar

Specification

The water-stopping mortar shall be Renderoc Plug, by Fosroc, supplied as a single-component, rapid setting, cement-based blend of powders to which only the site addition of clean water shall be permitted. It shall be chloride-free and shall be formulated to prevent high exotherm and minimise thermal cracking. The cured mortar shall be capable of an initial set time of one minute at 20°C and a compressive strength of 25 N/mm² at 28 days and 20°C.

Properties

Comp. str. :	25 N/mm ²
--------------	----------------------

■ Nitofill WS60 - foaming crack injection resin

Specification

The water-stopping crack injection material shall be Nitofill WS60, by Fosroc, supplied as a two part rapid foaming and rapid setting liquid polyurethane resin. It shall be capable of stopping water flowing through crack widths between 0.2 mm and 5 mm in width. It shall have a viscosity of 2.0 - 3.0 poise at 20°C and a density of foam not less than 0.025. It shall be capable of reacting with water in 5 to 30 seconds, and shall be fully compatible with the Nitofill UR63 system.

Properties

S.G. :	1.14 ± 0.06
Viscosity :	2.0-3.0 poise @ 20°C

■ Nitofill UR63 - flexible crack injection resin

Specification

The flexible crack injection resin system shall be Nitofill UR63, by Fosroc, supplied as a two part solvent-free low viscosity liquid polyurethane with a 3.0 poise at 20°C and be capable of penetrating crack widths of minimum 0.2 mm. The specific gravity shall not exceed 1.0. It shall be fully compatible with the Nitofill WS60 system.

Properties

S. G. :	1.00
Viscosity :	3.0 poise @ 20°C

- Renderoc - select appropriate product to effect reprofiling (see Sectn. 2.2)

Proposal

Repairing major leaks in concrete, to initially stop the water flow and then make good the substrate.

Solution of this problem is a 3 or 4 stage process, and is appropriate for situations where water flow is continuous. For minor leaks or seepage through cracks, please refer to Method Statement 2.5a.

Renderoc Plug, used in Part A, will provide an immediate, temporary plug, at the surface, by stemming the flow of water. This then allows further repair works to be completed in dry conditions.

Nitofill WS60 and Nitofill UR63, used in Parts B and C, are used to complete the sealing operation by filling voids beneath the surface, and thereby effect a permanent repair.

Reprofiling works, as per Part D, may finally be required to coordinate with the adjacent substrate and thus complete the repair.

Part A - Temporary plug

Fill using Renderoc Plug rapid setting repair mortar

1 Preparation

- 1.1 Where water is seeping through a concrete wall, cut back the areas to be repaired to a minimum depth of 15 mm. Where water is seen seeping through a crack, cut a chase 20 mm deep and 20 mm wide along the entire length of the crack.
- 1.2 Remove all surface deposits by mechanical wire brushing to leave the substrate free from any deleterious substances or contaminated water.
- 1.3 Flush area to be repaired with clean water.

2 Mixing

- 2.1 Since Renderoc Plug sets in less than a minute, mix only that quantity of material which can be placed within the setting time.
- 2.2 Take a quantity of Renderoc Plug and place on a suitable mixing board. Create a reservoir in the centre of the material.
- 2.3 Add clean water to the reservoir at a volume ratio of 1:3. Using gloved hands, mix the Renderoc Plug and water together until a ball has been produced.

3 Application

- 3.1 Immediately after the ball has been formed press the material into the prepared location.
- 3.2 Continue applying pressure until the material has hardened (approximately 30 seconds).
- 3.3 Continue with the above process until the concrete or crack has been completely sealed.

Part B - Temporary seal

Injection using Nitofill WS60 rapid foaming and setting resin.

1 Preparation

- 1.1 Wire brush the surface of the substrate immediately adjacent to the perimeter of the initial application of Renderoc Plug. Remove all loose deposits, debris and other deleterious substances.
- 1.2 Holes need to be drilled diagonally into the repair area, from the adjacent substrate, to receive the injection packers.
- 1.3 Mark out drill points at 150 to 200 mm centres around the perimeter of the repair area. Where the repair is being applied to a crack, drill points should be staggered either side of the crack.
- 1.4 Drill into the substrate, being sure to penetrate at least 15 mm beneath the initial application of Renderoc Plug, using a drill bit appropriate to the size of the injection packers.

Note:

The resin systems featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.

Proposal

Repairing major leaks in concrete, to initially stop the water flow and then make good the substrate.

- 2 Fixing injection packers
 - 2.1 Insert the injection packers into the pre-drilled holes.
 - 2.2 The perimeter of the repair area or crack between the injection packers should be sealed using Nitomortar FC. This should be applied as a band 30 to 40 mm wide and 2 to 3 mm thick, either around the perimeter of the repair or along the length of the crack.
 - 2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

- 3.1 Mix the two components of Nitofill WS60 rapid foaming polyurethane resin together until homogeneous.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The repair should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

Where applying around the perimeter of a horizontal repair; attach the hose on opposite sides, then progress around the perimeter in a clockwise direction from both points.

Where applying around the perimeter of a vertical repair; attach the hose to the lowest packer, then progress around the perimeter on alternate sides.

- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location.
- 4.4 Remove pressure from the injection gun, close valve and crimp. Move on to the next location.

- 4.5 Continue as above at all injection points until water no longer seeps from the crack or repair area.
- 4.6 Allow the resin to cure for 6 hours.
- 4.7 When the Engineer is satisfied that water no longer seeps from the repair, proceed to Part C to create a permanent seal to the repair.

Part C - Permanent seal

Injection using Nitofill UR63 flexible polyurethane resin

1 Preparation

- 1.1 Wire brush the surface of the substrate immediately adjacent to the perimeter of the repaired area or crack. Remove all loose deposits, debris and other deleterious substances.
- 1.2 Using a marker pen, locate new drill positions midway between the points used in Part B.
- 1.3 Drill into the substrate, being sure to penetrate at least 15 mm beneath the initial application of Renderoc Plug, using a drill bit appropriate to the size of the injection packers.

2 Fixing injection packers

- 2.1 Insert the injection packers into the pre-drilled holes.
- 2.2 The perimeter of the repair area or crack between the packers shall remain sealed with a band of Nitomortar FC. Re-apply as required to maintain a band 30 to 40 mm wide and 2 to 3 mm thick.
- 2.3 If re-applied, leave the Nitomortar FC to cure properly - 8 hours at 35°C.

Proposal

Repairing major leaks in concrete, to initially stop the water flow and then make good the substrate.

Mixing

- 3.1 Mix the two components of Nitofill UR63 together until the liquid becomes clear.
- 3.2 Insert the mixed material into the injection gun and close all seals.
- 3.3 The repair should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

- 4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

Where applying around the perimeter of a horizontal repair; attach the hose on opposite sides, then progress around the perimeter in a clockwise direction from both points.

Where applying around the perimeter of a vertical repair; attach the hose to the lowest packer, then progress around the perimeter on alternate sides.

- 4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.
- 4.3 Continue applying pressure until resin appears at the next packer location.
- 4.4 Remove pressure from the injection gun, close valve and crimp injection packer. Move on to the next location.
- 4.5 Continue as above at all injection points until all packer locations have been sealed.
- 4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.
- 4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Part D - Reprofiling

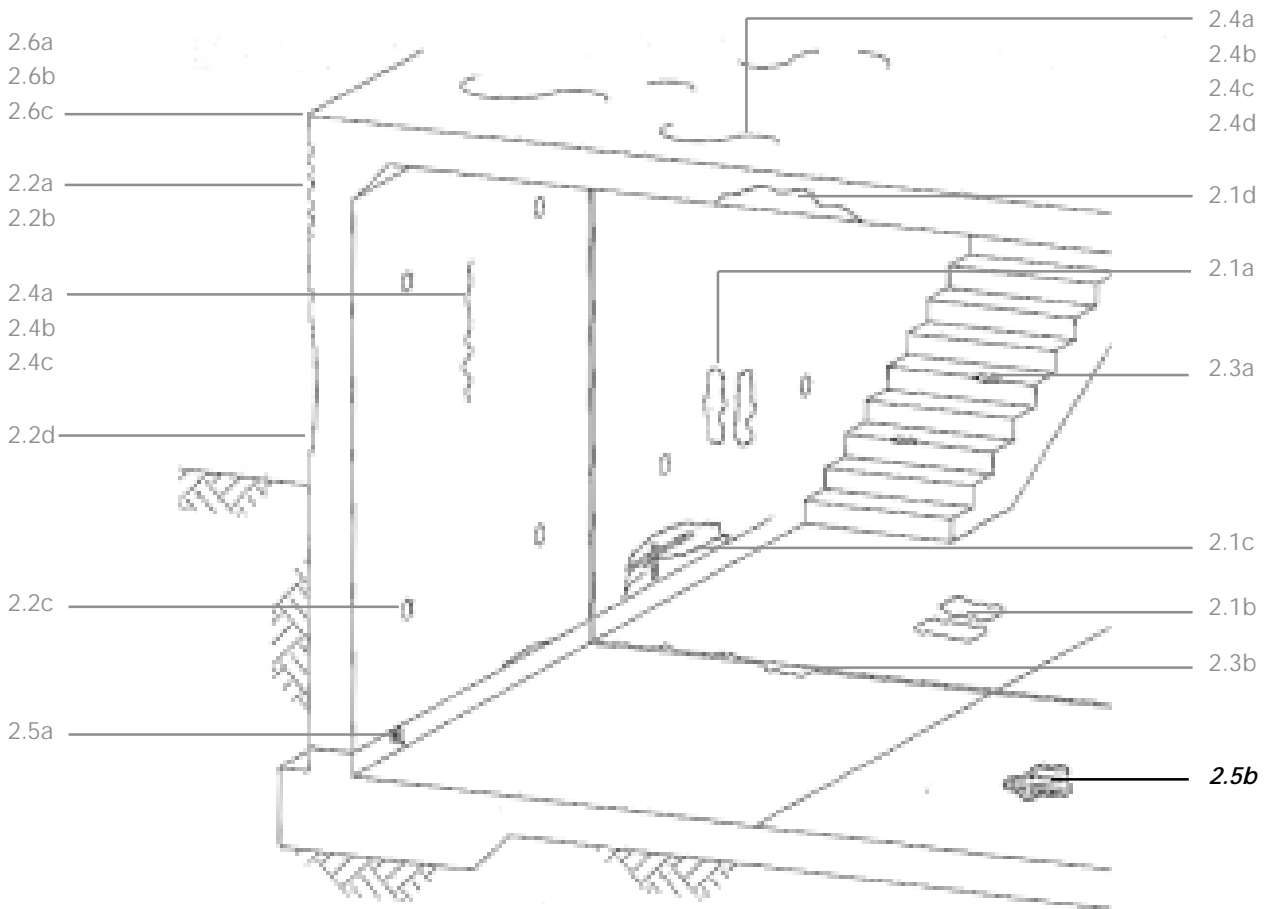
Where repairs have been effected over a large area, it may be necessary to reprofile the repaired area in order to coincide with the adjacent substrate.

Refer to Method Statements contained in Section 2.2 for the most appropriate method, this will be dependent upon the required configuration and depth of the repair.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



2.5b Repair method statement



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Repair method statements

- **2.6** *Enhancing concrete cover*
 - a Uniform cementitious finish
 - b Decorative and protective coating
 - c Decorative and crack-bridging coating

Repair method statement - number 2.6a

■ Proposal

Refacing concrete surfaces to provide
a uniform cementitious finish.

Fosroc products

Concrete protection

- *Brushbond*
- protective cementitious coating



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Material properties and specification - at a glance

■ Brushbond - protective cementitious coating

Specification

The cementitious coating shall be Brushbond, by Fosroc, supplied as a two-component, acrylic-modified protective coating. The mixed product shall be capable of application by stiff brush, roller, spray or trowel.

Properties

<i>Bond str.</i>	<i>: 3.5 N/mm²</i>
<i>Flex. str.</i>	<i>: 11 N/mm²</i>
<i>Ten. str.</i>	<i>: 3.75 N/mm²</i>

Proposal

Refacing concrete surfaces to provide a uniform cementitious finish.

1 Preparation

- 1.1 Using medium pressure water blasting, or by mechanically abrading the concrete surface, fully clean concrete surface. Remove any surface laitance, all traces of mould release oils and curing compounds and expose fully all blowholes or other surface imperfections.
- 1.2 Ensure that all surrounding concrete is free from dust and other deleterious substances.
- 1.3 For best results surfaces should be left damp, but without standing water.

Note: Following instructions relate to hand application only. For spray application, refer to the local Fosroc office.

2 Mixing

- 2.1 Pour the liquid component into the metal drum provided, and stir using a slow speed drill fitted with a Fosroc Mixing Paddle (MR3).
- 2.2 Whilst mixing, add the powder to the liquid slowly, to avoid lump formation. Continue mixing for 2 to 4 minutes, until a uniform consistency is achieved.
- 2.3 The fully mixed material should be used immediately after mixing has been completed.
- 2.4 Mixed material quantities should be restricted to only that which can be used within the pot life of the material.
- 2.5 Brushbond should be continually agitated during hand application.

3 Application

- 3.1 Apply the mixed Brushbond using a stiff-bristle brush. Apply like paint using two coats to suit service conditions.
- 3.2 For general resurfacing, each coat should be 1 mm thick, to give a finished thickness of 2 mm. Areas subjected to moderate or heavy traffic should receive 2 coats of 2 mm each, to give a finished thickness of 4 mm.
- 3.3 Where surface temperatures are in excess of 40°C, a primer coat of Brushbond mixed with additional water may be required. Please refer to the relevant technical data sheet for further details.

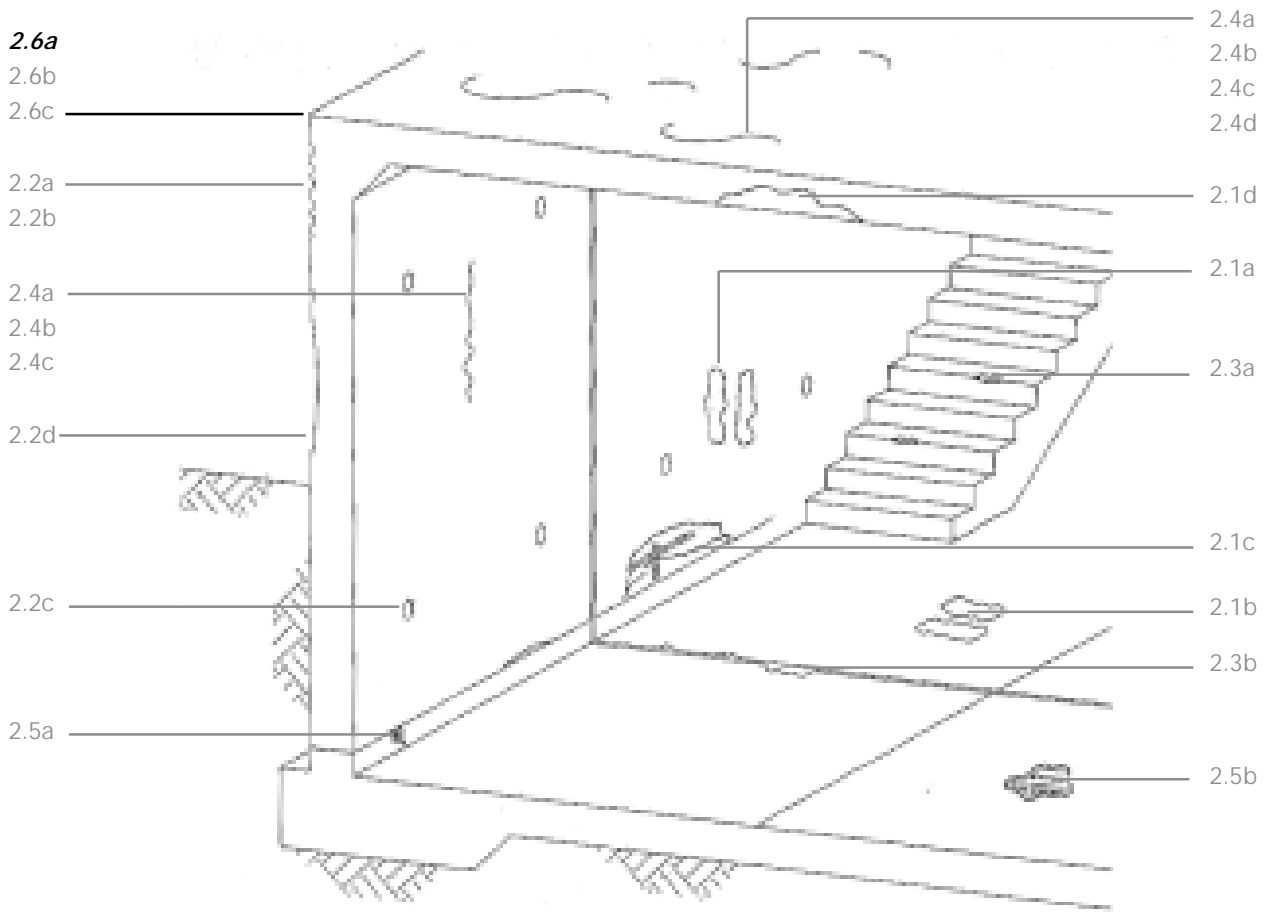
4 Curing

- 4.1 Brushbond does not require the application of a curing membrane.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement

- number 2.6b

■ Proposal

Provision of a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided.

Fosroc products

Concrete repair system

- *Refer to Section 2.2*

Concrete protection system

- *Dekguard Primer or Dekguard Primer DG*
- penetrating priming system
- *Dekguard S*
- high performance protective/decorative coating
- *Dekguard Filler*
- intercoat, acrylic, pinhole filler



Customer service numbers

UAE Freephone: 800 - 4456

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Dubai	285 8787	285 2023
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Oman	771 5080	771 7554
Qatar	441 3628	444 0812

Material properties and specification - at a glance

■ Dekguard S - high performance coating

Specification

The protective coating shall comprise a penetrating silane-siloxane primer & Dekguard S, a single-component, aliphatic acrylic coating, supplied by Fosroc. The total dry film thickness of the coating shall not be less than 150 microns and shall be capable of providing carbon dioxide diffusion resistance equivalent to not less than 500 mm of 30 N grade concrete cover or 250 m of air cover (by the Taywood method). It shall produce zero chloride ion diffusion after 1500 days continuous testing (by the Taywood method) at a nominal dry film thickness of 150 microns. It must exhibit a water vapour transmission resistance (S_p) of not more than 1.90 metres (by the Taywood method) at a nominal dry film thickness of 150 microns. When tested to BS476, Pt 7:1987, it must exhibit a Class 1 spread of flame and achieve a Class 0 Building Regulations rating.

Properties

CO ₂ diffn. :	R > 250 m
	S_c > 500 mm
Chl. diffn. :	Zero after 1500 days testing
H ₂ O trans. :	S_p = 1.90 m
Flame spd. :	Class 1 (to BS476, Pt.7)
Fire rating :	Class 0 (to Building Regs.)

■ Dekguard Filler - intercoat, acrylic pinhole filler

Specification

The intercoat pinhole filler shall be Dekguard Filler, by Fosroc, supplied as a one part acrylic paste. It shall be completely compatible with the Dekguard S protective coating system.

Properties

Bulk density :	1500 kg/m ³
----------------	------------------------

Proposal

To provide a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided.

1 Substrate preparation

- 1.1 All surfaces should be dry and free from contamination such as oil, grease, loose particles, decayed matter, moss, algal growth, laitance, and all traces of mould release oils and curing compounds. This is best achieved by lightly grit-blasting the surface. Where moss, algae or similar growths have occurred, treatment with a proprietary biocide should be carried out after the grit-blasting process.
- 1.2 It is essential to produce an unbroken coating of Dekguard S. To ensure this is achieved, surface irregularities should be filled using the appropriate Renderoc product (see Section 2.2). Materials used should be allowed to cure properly before application of Dekguard S.

2 Substrate priming

Note:

A primer coat is required to penetrate and 'stabilise' the substrate. The depth of penetration of the primer, and thus its coverage rate, are determined by substrate profile, porosity and general condition.

Hence for low permeability concretes, primer penetration will be low and area covered per litre will be high - permeability may be affected by cement replacements (e.g. microsilica). It is thus recommended that a general coverage rate of 4m²/litre be observed (see Table 1, below), noting that this may change according to substrate condition.

- 2.1 In order to obtain the protective properties of the Dekguard S system, it is important that the correct rates of application and overcoating times are observed.
- 2.2 The primer should be applied in one or more coats until the required rate of application has been achieved. This is best accomplished by using portable spray equipment of the knapsack-type.
- 2.3 A uniform surface appearance (sheen) should be apparent when the required rate of application has been achieved. If any matt, porous patches remain, then a further application of the primer should be made.
- 2.4 Whilst Dekguard Primer is normally used, porous substrates may require the use of Dekguard Primer DG. Use of Dekguard Primer DG is identical, and should once more be applied in one or more coats until the required rate of application has been achieved.
- 2.5 If in any doubt about the condition of the substrate, or priming required for a particular substrate, then contact the local Fosroc office.

3 Coating application

- 3.1 The primer should be allowed to dry for a minimum of two hours at 20°C (or 1 hour at 35°C) before application of Dekguard S. Under no circumstances should the primer be overcoated until the surface is properly dry.

Table 1

	<i>Dekguard Primer or Nitoprime DG</i>	<i>DekguardS</i>
<i>Number of coats</i>	: Flood coat	2
<i>Theoretical application rate per coat</i>	: 0.25 litres/m ²	0.175 litres/m ²
<i>Theoretical wet film thickness per coat</i>	: N/A	175 microns
<i>Overcoating time -</i>		
<i>@ 20°C</i>	2 hours	6 hours
<i>@ 35°C</i>	1 hour	4 hours

Proposal

To provide a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided.

- 3.2 Dekguard S may be applied by the use of suitable brushes, rollers or airless spray equipment. Queries relating to spray application should be referred to the local Fosroc office prior to the commencement of work.
- 3.3 All primed substrates should be treated with two coats of Dekguard S. The material should be stirred thoroughly before use.
- 3.4 The first coat should be applied to all areas to achieve a uniform coating with a wet film thickness not less than 175 microns. This coat should be allowed to dry before continuing.
- 3.5 Prior to application of the second coat, a close visual inspection of the surface should be made to check for any pinholes or surface irregularities. Any such irregularities should be filled using Dekguard Filler, and allowed to dry before proceeding.
- 3.6 To ensure a final full unbroken coating to the substrate the second coat of Dekguard S, should be applied at 90° to the first coat. Again exactly as detailed above and achieving a wet film thickness not less than 175 microns.

Note:

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section 1.3 for high temperature working.



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Repair method statement

- number 2.6c

■ Proposal

Provision of a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided and crack opening or movement is expected.

Fosroc products

Concrete repair system

- *Refer to Section 2.2*

Concrete protection system

- *Dekguard Primer DG*
- penetrating priming system
- *Dekguard E2000*
- high performance elastomeric coating
- *Dekguard Filler*
- intercoat, acrylic, pinhole filler



Customer service numbers

UAE Freephone: 800 - 4456

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Dubai	285 8787	285 2023
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Material properties and specification - at a glance

■ Dekguard E2000 - elastomeric coating

Specification

The protective coating shall comprise Nitoprime DG, a penetrating silane-siloxane primer and Dekguard E2000, a single-component, aliphatic acrylic coating, with crack bridging ability - both by Fosroc. The total dry film thickness of the coating shall not be less than 200 microns and shall be capable of providing carbon dioxide diffusion resistance equivalent to not less than 125 mm of 30 N grade concrete cover or 50m of air cover (by the Taywood method). It shall produce zero chloride ion diffusion after 900 days (by the Taywood method) at a nominal dry film thickness of 200 microns. It must exhibit a water vapour transmission resistance (S_p) of not more than 0.32 metres (by the Taywood method) at a nominal dry film thickness of 200 microns. It shall provide static crack bridging ability of not less than 2 mm (BRE Test method).

Properties

CO ₂ diffn. :	R > 175 m
	S_c > 500 mm
Chl. diffn. :	Zero after 60 days testing
H ₂ O trans. :	S_p = 1.0 m
Crack span:	2 mm

■ Dekguard Filler - intercoat, acrylic pinhole filler

Specification

The intercoat pinhole filler shall be Dekguard Filler, by Fosroc, supplied as a one part acrylic paste. It shall be completely compatible with the Dekguard E2000 protective coating system.

Properties

Bulk density :	1500 kg/m ³
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Proposal

To provide a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided, and crack opening or movement is expected.

1 Substrate preparation

- 1.1 All surfaces should be dry and free from contamination such as oil, grease, loose particles, decayed matter, moss, algal growth, laitance, and all traces of mould release oils and curing compounds. This is best achieved by lightly grit-blasting the surface. Where moss, algae or similar growths have occurred, treatment with a proprietary biocide should be carried out after the grit-blasting process.
- 1.2 It is essential to produce an unbroken coating of Dekguard E2000. To ensure this is achieved, surface irregularities should be filled using the appropriate Renderoc product (see Section 2.2). Materials used should be allowed to cure properly before application of Dekguard E2000.

2 Substrate priming

Note:

A primer coat is required to penetrate and 'stabilise' the substrate. The depth of penetration of the primer, and thus its coverage rate, are determined by substrate profile, porosity and general condition.

Hence for low permeability concretes, primer penetration will be low and area covered per litre will be high - permeability may be affected by cement replacements (e.g. microsilica). It is thus recommended that a general coverage rate of 4m²/litre be observed (see Table 1, below), noting that this may change according to substrate condition.

- 2.1 In order to obtain the protective properties of the Dekguard E2000 system, it is important that the correct rates of application and overcoating times are observed.

- 2.2 The primer should be applied in one or more coats until the required rate of application has been achieved. This is best accomplished by using portable spray equipment of the knapsack-type.
- 2.3 A uniform surface appearance (sheen) should be apparent when the required rate of application has been achieved. If any matt, porous patches remain, then a further application of the primer should be made.
- 2.4 If in any doubt about the condition of the substrate, or priming required for a particular substrate, then contact the local Fosroc office.

3 Coating application

- 3.1 The primer should be allowed to dry for a minimum of two hours at 20°C (or 1 hour at 35°C) before application of Dekguard E2000. Under no circumstances should the primer be overcoated until the surface is properly dry.
- 3.2 Dekguard E2000 may be applied by the use of suitable brushes, rollers or airless spray equipment. Queries relating to spray application should be referred to the local Fosroc office prior to the commencement of work.
- 3.3 All primed substrates should be treated with two coats of Dekguard E2000. The material should be stirred thoroughly before use.

Table 1

	<i>Dekguard Primer DG</i>	<i>Dekguard E2000</i>
Number of coats	: Flood coat	2
Theoretical application rate per coat	: 0.25 litres/m ²	0.2 litres/m ²
Theoretical wet film thickness per coat	: N/A	200 microns
Overcoating time -		
@ 20°C	2 hours	when firm to
@ 35°C	1 hour	the touch

Proposal

To provide a protective and decorative coating to protect concrete from attack by acidic gases, chloride ions, sulphates and water in cases where inadequate concrete cover has been provided, and crack opening or movement is expected.

- 3.4 The first coat should be applied to all areas to achieve a uniform coating with a wet film thickness not less than 200 microns. This coat should be allowed to dry before continuing.
- 3.5 Prior to application of the second coat, a close visual inspection of the surface should be made to check for any pinholes or surface irregularities. Any such irregularities should be filled using Dekguard Filler, and allowed to dry before proceeding.
- 3.6 To ensure a final full unbroken coating to the substrate the second coat of Dekguard E2000 should be applied at 90° to the first coat. Again exactly as detailed above and achieving a wet film thickness not less than 200 microns.

Note:

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Refer to Section 1.3 for high temperature working.



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Product data

- *Primer, bonding and cì ring agents*
- *Cementitioi s repair prodì cts*
- *Resin-based repair prodì cts*
- *Resin-based cracâ injection prodì cts*
- *Protective coatings*
- *Joint sealants*
- *Application gî ides*

Product data

Primer, bonding and cì ring agents

- ***Nitoprime Zincrich***
- epoxy zinc primer
- ***Nitobond AR***
- acrylic bonding agent
- ***Nitobond EP***
- epoxy bonding agent and/or barrier coat
- ***Rendercì re***
- curing compound for concrete repairs

Product data

Cementitious repair products

- ***Renderoc TGXtra***
 - shrinkage controlled, cementitious repair mortar system
- ***Renderoc SXtra***
 - shrinkage controlled, structural grade repair mortar system
- ***Renderoc LAXtra***
 - shrinkage controlled, fluid microconcrete for structural repairs
- ***Renderoc SPXtra***
 - shrinkage controlled, repair mortar system, specifically designed for spraying
- ***Renderoc FC***
 - single component polymer modified cementitious pinhole filler
- ***Renderoc BF2***
 - two component polymer modified cementitious blow hole filler
- ***Conbextra GP***
 - general purpose, void filling cementitious grout
- ***Renderoc Plug***
 - rapid setting mortar for halting the flow of running water



Product data

Resin-based repair products

- ***Nitomortar FC***
- epoxy filler/fairing mortar
- ***Nitomortar FC(B)***
- epoxy resin, fairing coat
- ***Nitomortar S***
- high strength, epoxy reinstatement mortar



Product data

Resin-based crack injection products

- **Nitofill EPLV**
- epoxy, crack injection resin
- **Nitofill UR63**
- flexible polyurethane, crack injection resin
- **Nitofill WS60**
- foaming and rapid setting, polyurethane, crack injection resin to stop water flow

Product data

Protective coatings

- ***Bri shbond***
 - protective, cementitious coating
- ***Deâgì ard S***
 - high performance, protective/decorative coating
- ***Deâgì ard E2000***
 - high performance, crack accommodating, protective/decorative coating
- ***Deâgì ard Filler***
 - acrylic pinhole filler



Product data

Joint sealants

- ***Thioflex 600***
- two part polysulphide sealant

- ***Colpor 200PF***
- cold applied, high performance, pitch free, pavement joint sealant



Product data

Application gî ides

- *Spray application gî ide*
- *Application gî ide*
- for Renderoc TGXtra and Renderoc SXtra
- *Application gî ide*
- for Renderoc LAXtra