

## Two component structural grade polymer modified reinstatement mortar

### Uses

For the reinstatement of concrete in small localised patch repairs. Renderoc S2 is alkaline in nature and will protect embedded steel reinforcement. It is specially designed for location where high compressive strengths are required. The mortar is suitable where superior resistance is required to chlorides and carbon dioxide.

### Advantages

- High strength
- Can be applied by hand, like conventional mortars
- Extremely low permeability provides maximum protection against carbon dioxide and chlorides
- Excellent bond to the concrete substrate
- Shrinkage compensated
- No site batching required, supplied in pre-weighed prepacked condition
- Only addition of water at site to be made while mixing the powder and liquid parts
- Contains no chlorides.

### Description

Renderoc S2 is supplied as a grey powder along with a liquid polymer and has to be mixed with water on site to produce a highly consistent, high strength repair mortar. The material is based on carefully blended cement, graded fillers and chemical additives and is polymer modified to provide a mortar with good handling characteristics, while minimising water demand. The hardened product exhibits excellent thermal compatibility with concrete and outstanding water requirement ensures fast strength gain and long-term durability.

### Technical support

Fosroc offers a technical support package to specifiers, end users and contractors as well as on-site technical assistance in locations all over the country.

### Design criteria

Renderoc S2 is designed for vertical or horizontal applications. It can be applied from a minimum of 5mm to 15mm thickness in vertical sections. Higher thicknesses can be achieved by the use of formwork. Thicker sections can be built up in layers. In horizontal locations Renderoc S2 can be applied up to 50mm thickness. The material should not be applied at less than 5mm thickness. Consult Fosroc for further information.

### Properties

The following results were obtained at a Water:Powder ratio of 0.13 and temperature @ 27°C.

<b>Compressive strength</b>	1 Day	12 N/mm <sup>2</sup>
	28 Days	45 N/mm <sup>2</sup>

<b>Flexural strength</b>	28 days	8 N/mm <sup>2</sup>
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<b>Percentage water absorption (immersion test ) after 24 hrs</b>	0.45
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<b>Chloride ion diffusion</b> (Accelerated electrochemical chloride ion diffusion test ) in mg/litre After 24 hours	Nil
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<b>Depth of carbonation,mm</b> ( Accelerated carbonation test)	
2 hours	Nil
4 hours	Nil

<b>Coefficient of thermal expansion</b>	7 to 12 x 10 <sup>-6</sup> / °C
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<b>Setting time</b>	Initial set	3 hrs 15 mins
	Final set	4 hrs 30 mins

<b>Fresh wet density</b>	Approx 2100 kg/m <sup>3</sup> (varies depending on actual consistency)
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### Chemical resistance

The low permeability of Renderoc S2 severely retards chemical attack in aggressive environment. The cured mortar is highly impermeable to acidic gases, chloride ions, oxygen and water.

# Renderoc® S2

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## Specification clauses

### Steel reinforcement primer

The steel reinforcement primer shall be Nitozinc Primer, a two component zinc rich epoxy primer. The primer shall be an 'active' type capable of avoiding the generation of incipient anodes in the immediately adjacent locations. It shall be fully compatible with the Renderoc system of concrete repair.

### Repair mortar

The polymer modified shrinkage compensated reinstatement mortar shall be Renderoc S2, a two component cement based blend of powder and a liquid polymer to which only the site addition of clean water shall be permitted. The cured mortar shall achieve a minimum of 45N/mm<sup>2</sup> compressive strength and 8 N/mm<sup>2</sup> flexural strength at 28 days. Chloride diffusion coefficient shall be Nil after 24 hours when tested by Accelerated Electrochemical chloride ion diffusion test method and the depth of carbonation shall be Nil after 4 hours when tested by Accelerated carbonation test.

## Application instructions

### Preparation

Saw cut or cut back the extremities of the repair locations to a depth of at least 10mm to avoid feather edging and to provide a square edge. Break out the complete repair area to a minimum depth of 10mm up to the saw edge.

Clean the surface and remove any dust, unsound or contaminated material, plaster, oil, paint, grease, corrosion deposits or algae. Where breaking out is not required, roughen the surface and remove any laitance by light scabbling or grit sand blasting.

Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser. The effectiveness of decontamination should then be assessed by a pull off test.

Expose fully, any corroded steel in the repair area and remove all loose scale and corrosion deposits. Steel should be cleaned to a bright condition paying particular attention to the back of exposed steel bars. Grit blasting is recommended for this purpose.

Where corrosion has occurred due to the presence of chlorides, the steel should be high pressure washed with clean water immediately after grit sand blasting to remove corrosion products from pits and imperfections within its surface.

### Reinforcing steel priming

Apply one full coat of Nitozinc Primer and allow to dry before continuing.

### Substrate priming

The substrate should be thoroughly soaked with clean water and any excess water removed prior to applying one coat of Nitobond AR primer and scrubbing it well into the surface. Renderoc S2 can be applied as soon as the primer becomes tacky. If Nitobond AR is too wet, vertical build up of the Renderoc S2 mortar may be difficult.

In exceptional circumstance, e.g. where a substrate/repair barrier is required or where the substrate is wet or likely to remain permanently damp, Nitobond EP bonding aid should be used. Contact Fosroc for further information.

### Mixing

Care should be taken to ensure that Renderoc S2 is thoroughly mixed. A forced-action mixer is essential. Mixing in a suitable sized drum using an approved spiral paddle in a slow speed ( 500 rpm) heavy duty drill is acceptable for the occasional one bag mix. Free fall mixers must not be used.

For normal application, use 3.25 to 3.50 litres of drinking quality water per 25 kg bag of Renderoc S2. Always add polymer in to water and mix for 2 minutes. Then add powder slowly and mix for 3 minutes until homogeneous material results. Depending on the ambient temperature and the desired consistency, the amount of water required may vary slightly but should not exceed 3.5 litres per 25 kg bag of Renderoc S2 under any circumstances.

### Application

Exposed steel reinforcing bars should be firmly secured to avoid movement during the application process as this will effect mortar compaction, build and bond.

# Renderoc® S2

Apply the mixed Renderoc S2 to the prepared substrate by gloved hand or trowel. Thoroughly compact the mortar on to the primed substrate and around the exposed reinforcement. Renderoc S2 can be applied from a minimum of 5mm to 15mm thickness in smaller pockets or with the use of form work. If form work is used it should have properly sealed faces to ensure that no water is absorbed from the repair material. In horizontal locations, Renderoc S2 can be applied up to 100mm thickness.

If sagging occurs during application to vertical surfaces, the Renderoc S2 should be completely removed and reapplied at a reduced thickness on the correctly reprimed substrate. Renderoc S2 should not be applied as a render on large areas.

Note : The minimum applied thickness of Renderoc S2 is 5mm.

## Finishing

Renderoc S2 is finished by striking off with a straight edge and closing with a wooden or plastic floats, or damp sponges may be used to achieve the desired surface texture. The completed surface should not be over worked.

## Low temperature working

In cold conditions down to 5°C, the use of warm water ( upto 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted. The material should not be applied when the substrate and / or air temperature is 5°C and rising, the application may proceed.

## High temperature working

At ambient temperatures above 35°C, the material should be stored in the shade and cool water used for mixing.

## Curing

Renderoc S2 is a cement based mortar. In common with all cementitious materials, Renderoc S2 must be cured. Surface of the finished Renderoc S2 in a continuous film, is recommended. Large areas should be cured as trowelling progresses ( 0.5m at a time ) without waiting for completion of the entire area. In fast drying conditions, supplementary curing with polythene sheeting taped down at the edges must be used. In cold conditions, the finished repair must be protected from freezing.

## Overcoating with protective decorative finishes

Renderoc S2 is extremely durable and will provide excellent protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will generally benefit from the application of a barrier/decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repair itself. Fosroc recommends the use of Dekguard range of protective, anticarbonation coatings. These products be applied over the repaired area after removal of the curing membranes.

## Cleaning

Nitobond AR, Concure WB should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Equipment used with Nitozinc primer and Nitobond EP should be cleaned with Nitoflor Sol.

## Limitations

Renderoc S2 should not be used when the temperature is below 5°C and falling. The product should not be exposed to moving water during application. Exposure to heavy rainfall may result in the surface scour. The material should not be applied on large continuous areas in single application as a render. If any doubts arise concerning temperature or substrate conditions, consult the local Fosroc office.

## Estimating

### Packaging

Renderoc S2	Part A 25 kg Powder Part B 1/4 kg polymer
Nitozinc Primer	1 & 5 litres
Nitobond AR	1,5 & 20 litres
Nitobond EP	1 & 4 L packs
Nitoflor Sol	5 & 20 litres Cans
Concure WB	20 litres Cans

### Coverage and Yield

Renderoc S2	Approximately 13.5 litres/ 25 kg bag (1.30m <sup>2</sup> at 10mm thickness)
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# Renderoc® S2

Nitozinc Primer	5 - 7 m <sup>2</sup> / litre
Nitobond AR	6 - 8 m <sup>2</sup> / litre
Nitobond EP	2.5 m <sup>2</sup> / litre
Concure WB	4 to 6 m <sup>2</sup> / litre

**Note :** The actual yield per bag of Renderoc S2 will depend on the consistency used. The coverage figures for liquid products are theoretical. Due to wastage factors and the variety and nature of possible substrates, practical coverage figures may be reduced.

## Storage

### Shelf life

Renderoc S2 has a shelf life of 6 months if kept in a dry store in the original, unopened bags or packs. If stored at high temperature and/or high humidity conditions shelf life may be reduced to 4 - 6 months. Nitobond AR should be protected from frost. Nitozinc Primer has a shelf life of 6 months in unopened condition.

## Precautions

### Health and Safety

Renderoc S2 contain cement powder which when mixed or become damp, release alkalis which can be harmful to the skin. During use, avoid inhalation of dust and contact with skin and eyes. Wear suitable protective clothing, gloves, eye protection and respiratory protective equipments. The use of barrier cream provides additional skin protection. In case of

contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed seek medical attention immediately. Do not induce vomiting.

Nitozinc Primer, Nitobond products and Nitoflor Sol should not come in contact with the skin and eyes, or be swallowed. Ensure adequate ventilation and avoid inhalation of vapours. Some people are sensitive to resin, hardeners and solvents. Wear suitable protective clothing, gloves and eye protection. If working in confined areas, suitable respiratory protective equipment must be used. The use of barrier cream provide additional skin protection. In case of contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of skin contact with Nitozinc Primer and Nitobond EP, remove immediately with resin removing cream followed by washing with soap and water. Do not use solvent. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately. Do not induce vomiting.

### Fire

Renderoc S2, Nitobond AR and Nitobond EP are non flammable. Nitozinc Primer and Nitoflor Sol are flammable.

### Flash points

Nitozinc Primer	16°C
Nitoflor Sol	33°C

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### Important note :

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