

Fosroc® Renderoc DS

constructive solutions

Polymer modified dry spray repair mortar conforming to the requirements of BS EN 1504-3 Class R4

Uses

Renderoc DS is designed for large area repairs such as bridges, tunnels, retaining walls, dams, etc. The aggregates are chosen so as to be classified as 'non-reactive', and the product has an alkali content (expressed as Na₂O) of less than 3.0 kg/m³.

Renderoc DS is specifically designed to comply with the Highways Agency Specification Series 1700 and BD27/86 PE5).

Renderoc DS is suitable for repair method 3.3 and 4.4 as defined by BS EN 1504.

Advantages

- Non-reactive aggregates
- Controlled alkali level
- Low rebound
- Rapid strength gain
- Low water absorption and chloride ion diffusion
- High resistance to carbon dioxide penetration
- Excellent bond to the concrete substrate
- Single component — ready to use
- No added caustic accelerators
- Contains no chloride admixtures

Description

Renderoc DS is supplied as a ready to use blend of dry powders which is formulated for application using the dry spray process. The material is based on Portland cements, graded aggregates silica fume, chemical additives and polymer modifiers, providing a spray mortar with low rebound and good handling characteristics. The low water requirement ensures good strength gain and long term durability.

Builds of up to 150 mm vertically and 90 mm overhead can be achieved in a single application.

Specification Clause


The repair mortar shall be Renderoc DS a one component polymer modified cementitious dry spray mortar conforming to the requirements of BS EN 1504-3 Class R4.

The cured mortar shall achieve a compressive strength of 60 MPa at 28 days and a drying shrinkage of <300 microstrain at 7 days.

Standards compliance

Renderoc DS complies with class R4 according to BS EN 1504-3 repair principals 3.3 and 4.4

Renderoc DS conforms to the requirements of the UK Highways Agency Design Manual for Roads and Bridges (BD27/86, Clause 5) 'Materials for the Repair of Concrete Highway Structures' and has been formulated to comply with the requirements of the Specification for Highways Works Clause 1704.5 Control of Alkali-Silica Reaction.

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Renderoc DS	
EN 1504-3 Structural and non structural repair methods 3 and 4	
Compressive strength	Class R4 (>45 MPa)
Chloride ion content	<0.05%
Adhesion strength by pull-off test	≥ 2.0MPa
Thermal compatibility: freeze thaw cycling with immersion	≥ 2.0MPa
Carbonation resistance	Passes
Elastic modulus	28.6 GPa
Reaction to fire	Class A1
Dangerous substances	Complies with 5.4
Capillary absorption (water permeability)	≤ 0.5kg / m ² .h ^{-0.5}

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Properties

The following results were obtained at a temperature of 20°C. For further information, refer to the Product Safety Data Sheet.

Test method	Standard	EN 1504 R4 Requirement	Result
Compressive Strength	EN 12190:1999	≥ 45 MPa	@ 1 Day 20 MPa @ 7 Days 45 MPa @ 28 days 60 MPa
Bond strength by pull off:	EN 1542:1999	≥ 2.0 MPa	2.7 MPa
Chloride ion content:	EN 1015-17:2000	≤ 0.05 %	0.02%
Freeze thaw cycling:	EN 13687-1:2002	≥ 2.0 MPa	2.9 MPa
Resistance to carbonation d_k	EN 13295:2005	$d_k \leq$ ref concrete	Complies
Elastic Modulus in Compression	EN 13412	≥ 20 GPa	28.6 GPa @28 Days
Fire rating	EN 1504-3 cl. 5.5		Class A1 Non-Combustible
Setting time	BS 4551 Pt 14:1980	-	Initial set: 3.5 hours Final set: 5.0 hours
Fresh wet density		-	Nominally 2200 kg/m ³
Shrinkage 25 x 25 x 285 prisms, 27 °C, 55% RH		-	< 300 microstrain @ 7 days
Alkali reactive particles	Method TI-B 52	-	≤ 1.0 % vol%
Capillary absorption	EN 13057	≥ 0.5 kg/ m ² /h ^{-0.5}	0.41 kg/ m ² /h ^{-0.5}
Resistivity	-	-	28 - 30000 ohm cm
Coefficient of thermal Expansion	-	-	15 x 10 ⁻⁶ /°C
Chemical resistance		-	The low permeability of Renderoc DS severely retards chemical attack in aggressive environments. The cured mortar is impermeable to acid gases, waterborne chloride ions and oxygen.
Build Characteristics			
Minimum thickness:	-	-	10 mm
Overhead:	-	-	Up to 90 mm
Vertical:	-	-	Up to 150 mm
Chloride ion ingress	EN 13396	-	0.146% after 6 months in 3% NaCl solution at 8-10mm depth

Clarification of property values: The typical properties given are derived from laboratory testing. Results derived from field applied samples may vary

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Application instructions

Preparation

* 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, i.e. concrete is sound and of good quality, but cover is to be increased, roughen the surface and remove any laitance by light scabbling or abrasive-blasting. It will still be necessary to cut back the perimeter to a depth of 10 mm so that the repair patch may be 'toed-in' and finished flush with the surrounding concrete.

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. Abrasive-blasting is recommended for this process.

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

*(Refer to HSE information sheet CIS36 regarding control of exposure to construction dust, available at www.hse.gov.uk)

Reinforcing steel priming

Extra protection to the reinforcing steel can be achieved by application of one full coat of Nitoprime Zincrich Plus and allowing to dry before continuing. If any doubt exists about having achieved an unbroken coating, a second application should be made, and again, allowed to dry before continuing.

Substrate priming

Soak the prepared concrete surface thoroughly, allowing surplus water to drain off.

Application

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

Renderoc DS should be emptied from the bags directly into the hopper of the dry spray process machine. The amount of water added should be controlled by the nozzleman. Too little water will increase rebound and dust emission, too wet a mix will slump.

If sagging occurs during application to vertical or overhead surfaces, the Renderoc DS should be completely removed and re-applied at a reduced thickness on to the correctly prepared substrate.

Finishing

Renderoc DS is finished by striking off with a straight edge and closing with a steel float. Wooden or plastic floats, or damp sponges may be used to achieve the desired surface texture. The completed surface should not be overworked.

Low temperature working

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 falling. At 5°C static temperature or at 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.

Curing

Renderoc DS is a cement-based mortar. In common with all cementitious materials, Renderoc DS must be cured immediately after finishing in accordance with good concrete practice, i.e. using Concure WB, wet hessian or polythene. In cold conditions, the finished repair must be protected from freezing..

Cleaning

Renderoc DS should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Equipment used with Nitoprime Zincrich Plus should be cleaned with Fosroc Solvent 102.

Estimating

Supply

Renderoc DS:	25 kg bags
Nitoprime Zincrich Plus:	1.9ltr and 800ml cans
Fosroc Solvent 102:	5 and 25 litre tins

Coverage and yield

Renderoc DS:	Approx. 12.5 litres / 25 kg bag (approx. 80 bags/m ³)
Nitoprime Zincrich Plus:	8 m ² / litre

Notes: The actual yield per bag of Renderoc DS will depend on the water addition during application. The coverage figures are theoretical — due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

Limitations

Renderoc DS should not be used when the temperature is below 5°C and falling. The product should not be exposed to

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moving water during application. Exposure to heavy rainfall prior to the final set may result in surface scour. If any doubts arise concerning temperature or substrate conditions, consult the Technical Services Department.

Storage

The product has a shelf life of 12 months from the date of manufacture if kept in a dry storage in the original, unopened bags.

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

Precautions

Health and safety

For further information refer to the appropriate Safety Data Sheets available at www.fosroc.com.

Fire

Renderoc DS is non-flammable.

Nitoprime Zincrich Plus and Fosroc Solvent 102 are flammable. Keep away from sources of ignition. No Smoking. In the event of fire, extinguish with CO₂ or foam. Do not use a water jet.

Flash points

Nitoprime Zincrich Plus:	41°C
Fosroc Solvent 102:	33°C

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Important note

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