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Fosroc® Renderoc DSR



constructive solutions

Polymer modified, fibre reinforced, rapid setting, low rebound dry spray repair mortar conforming to the requirements of BS EN 1504-3 Class R4

Uses

Renderoc DSR is a rapid setting dry spray material designed for concrete repairs to buildings, bridges, tunnels and marine structures such as culverts. It can be used for both isolated and large area repairs to beams, columns and panels. In addition it can be used as wide scale overlay system to increase cover to the reinforcement. The product's rapid setting and rapid early strength gain characteristics make it ideal for possession works where a fast turnaround is required.

Advantages

- Low rebound
- Can be applied at 3°C and above
- Rapid early strength gain
- High resistance to Carbon Dioxide
- Excellent bond to concrete
- Available in 25 and 500kg bags, 1000kg sacks

Description

Renderoc DSR 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.

Single application up to 200mm vertically and 140mm overhead can be achieved. Thicker sections can be applied in multiple layers.

Specification Clause


The repair mortar shall be Renderoc DSR a one component polymer modified cementitious dry spray mortar conforming to the requirements of BS EN 1504-3 Class R4. It shall be able to achieve a build thickness of up to 200mm on a vertical surface and 140mm on an overhead surface. The cured mortar shall achieve a compressive strength of at least 15MPa after 24 hours, 60 MPa at 28 days and a drying shrinkage of <300 microstrain at 7 days. The product shall be mixed, applied and cured in accordance with the manufacturer's written instructions to a correctly prepared substrate.

Standards compliance

Renderoc DSR complies with Class R4 according to BS EN 1504-3.



Renderoc DSR conforms to the requirements of Highways England, Standards for Highways, Specifications for Highways Works, clauses 5703, 5704, 5717 (Spray Applied Concrete Repair Materials) and 1704.5 (Control of Alkali-Silica Reaction).

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Renderoc DSR	
BS EN 1504-3:2006 Structural and non-structural repair Class R4	
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	≥ 20 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.

Test method	Standard	EN1504-3 Class R4 Requirement	Result
Determination of compressive strength	EN 12190:1999	≥ 45 MPa	7-10 MPa @ 3 hrs* 15 MPa @ 1 day 40 MPa @ 7 days 50 MPa @ 28 days
Measurement of bond strength by pull off:	EN 1542:1999	≥ 2.0 MPa	2.7 MPa
Chloride ion content:	EN 1015-17:2000	≤ 0.05 %	0.01%
Freeze thaw cycling with de-icing salt immersion	EN 13687-1:2002	≥ 2.0 MPa	2.3 MPa
Determination of resistance to carbonation d_k	EN 13295:2005	$d_k \leq \text{ref concrete } mc(0.45)$	Complies
Elastic Modulus in Compression	EN 13412:2008	≥ 20 GPa	31.7 GPa @28 Days
Fire rating	EN 1504-3 cl. 5.5		Class A1 Non-Combustible
Setting time			Initial set <10 minutes @ 20°C
Fresh wet density		-	Nominally 2200 kg/m ³
Shrinkage 25 x 25 x 285 prisms (ASTM C596-96) 20 °C, 55% RH		-	< 300 microstrain @ 7 days wet
Capillary absorption	EN 13057	≤ 0.5 kg/ m ² /h ^{0.5}	0.1 kg/ m ² /h ^{0.5}
Chemical resistance			The low permeability of Renderoc DSR retards chemical attack in aggressive environments. The cured mortar restricts permeation of acid gases, waterborne chloride ions and oxygen.
Chloride ion ingress 3% NaCl solution	EN13396		0.003% at 28 days (10mm depth) 0.026% at 6 months (10mm depth)
Build Characteristics Minimum thickness: Overhead: Vertical:	- - -	- - -	10 mm Up to 140 mm per layer Up to 200 mm per layer

Clarification of property values: The typical properties given are derived from laboratory testing. Results derived from field applied samples may vary. *150mm cube per EN 12390-3.

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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, hydrodem equipment or powered mechanical scraping 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. Additional reinforcement can be fixed using a suitable Lokfix product.

Renderoc DSR 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 nozzle man. 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 DSR should be completely removed and re-applied at a reduced thickness on to the correctly prepared substrate.

Finishing

Renderoc DSR 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 be adopted. The material should not be applied at an air / substrate temperature of 3°C and falling. At a static 3°C, or 3°C and rising, application may proceed.

High temperature working

At ambient temperatures above 35°C, the material should be stored in the shade.

Curing

Renderoc DSR is a cement-based mortar. In common with all cementitious materials, Renderoc DSR 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. If the finished surface is to be overcoated then Nitobond AR should be used in lieu of Concure WB and Cure B.

Cleaning

Renderoc DSR 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 DSR:	25 kg bag 500kg and 1000kg sacks
Nitoprime Zincrich Plus:	1.9ltr and 800ml cans
Fosroc Solvent 102:	5 and 25 litre tins

Coverage and yield

Renderoc DSR:	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 DSR 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.

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Renderoc DSR

Limitations

Renderoc DSR should not be used when the temperature is 3°C and falling. The product should not be exposed to 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.

Precautions

Health and safety

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

Fire

Renderoc DSR 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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