

Fosroc®

Renderoc ST 05



constructive solutions

High performance, multi-purpose cementitious protective coating, fairing and levelling mortar for applications from feather edge to 5mm, conforming to the requirements of BS EN 1504-3 Class R4

Uses

Renderoc ST 05 is a polymer modified cementitious material for application to concrete, masonry, brick/blockwork and mild steel. Renderoc ST 05 can be applied to floors, walls and ceilings, both indoors and outdoors.

It can be used as a thin-section repair mortar for discrete patch repairs, for filling of blowholes and other imperfections and as a reprofiling mortar / fairing coat over large areas. After curing the material can either be left as a self-finish or overcoated. Renderoc ST 05 acts as a chloride and carbonation barrier, it can therefore be used to increase or restore effective cover to steel reinforcement at substantially lower application thickness than normal concrete.

As a moisture barrier it provides both active and passive water pressure resistance as well as resistance to aggressive ground water, certain chemicals and mild acids. Typical applications include basement wall lining, construction joint over-banding, swimming pools (prior to application of tiles), marine structures and potable water tanks. (See Limitations)

Renderoc ST 05 provides excellent wear resistance, it can therefore be used in areas subject to traffic such as balconies and walkways.

Renderoc ST 05 can be applied to properly prepared steelwork as a barrier coating. Typical applications include onto cut ends of reinforcement bars in core holes and service penetrations, as well as where protection and repair to concrete encased steel beams and girders are required (in conjunction with a thick section Renderoc repair mortar).

Renderoc ST 05 is suitable for repair methods: 1.3, 2.2, 5.1, 6.1 and 8.2 as defined by BS EN 1504-2: 3.1, 7.1 and 7.2 as defined by BS EN 1504-3
WRAS approved when cured for 21 days at 7°C.

Advantages

- Easy to mix and apply
- Can be applied vertically, horizontally and overhead
- Excellent bond to concrete without priming
- Abrasion resistant, can be subjected to traffic
- Carbonation barrier
- Chloride barrier
- High frost resistance
- High compressive strength



CE 0370	
Fosroc Ltd Drayton Manor Business Park, Coleshill Road, Tamworth, B78 3XN, UK 09 DoP: UK9-14	
EN1504-2: Surface protection systems methods 1.3, 2.2, 5.1, 6.1 and 8.2 EN1504-3: Structural and non-structural repair methods 3 and 7 EN1504-7: Reinforcement Corrosion Protection, method 11.2.	
Adhesion strength by pull-off test	≥2.0 MPa
Reaction to fire	Class A2 s1 d0
Dangerous substances	Complies with 5.4
Permeability to CO ₂	sd > 50 m
Permeability to water vapour	Class 1
Capillary absorption and permeability to water	≤0.1 kg/m ² h ^{0.5}
Abrasion resistance	< 3000 mg
Impact resistance	Class III
Chemical resistance	Class III
Compressive strength	Class R4: ≥ 45 MPa
Chloride ion content	≤ 0.05 %
Carbonation resistance	≤ ref. concrete
Thermal compatibility: freeze-thaw cycling with immersion	≥ 2.0 MPa
Corrosion protection	Pass



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Properties

Material tested at liquid : powder ratio of 0.22 and temperature at 20°C

Test method	Standard	EN 1504 Requirement	Test result
Compressive Strength	EN 12190:1999	≥ 45 MPa	@ 1 Day 13 MPa @ 3 Days 26 MPa @ 7 Days 37 MPa @ 28 Days 50 MPa
Bond strength by pull off:	EN 1542:1999	≥ 2.0 MPa	2.8 MPa
Chloride ion content:	EN 1015-17:2000	≤ 0.05 %	0.01%
Freeze thaw cycling:	EN 13687-1:2002	≥ 2.0 MPa	2.7 MPa
Resistance to carbonation d_k	EN 13295:2005	≤ ref concrete	Pass
Fire rating	EN 13505-1	-	Class A2 S1 d0 (Non-Combustible)
Flexural strength	Method TI-B 27	-	11 MPa @ 28 days
Fresh wet density	-	-	Nominally 1950 kg/m ³
Alkali reactive particles	Method TI-B 52	-	≤ 1% vol%
Resistance to severe chemical attack	EN 13529	Hardness reduction < 50% Class III - 28 days with pressure	Class III in groups 3,10,11,12,14a
Capillary absorption	EN 13057	≤ 0.5 kg/m ² h ^{0.5}	0.2 kg/m ² h ^{0.5}
Application of repair mortar overhead	EN 13395-4	≥ 2 MPa	2.8 MPa
Permeability to water vapour	EN ISO 7783-2	-	Sd 0.48m (Class I)
Determination of liquid water transmission	EN 1062-3	≤ 0.1 kg/m ² h ^{0.5}	0.08 kg/m ² h ^{0.5}
Permeability to CO ₂	EN 1062-6	Sd > 50 m	Sd = 57 m
Abrasion resistance	EN ISO 5470 -1	Weight loss < 3000 mg	2785 mg
Impact resistance	EN ISO 6272-1	Class III ≥ 20 Nm	24.5 Nm
Chloride ion ingress	EN 13396	-	0.171% after 6 months in 3% NaCl solution at 4-6 mm depth
Chloride penetration (w/c 0.45)	NT Build 443	-	1 mm of Renderoc ST 05 is equivalent to 13mm of concrete with a 0.45 w/c ratio
Carbonation Barrier Properties	NT Build 357	-	<R(b) = 21 mm for a 2 mm thickness of Renderoc ST 05
Corrosion Protection	EN 15183:2007	Specimens free of corrosion & rust creep	Pass (bars and plates)

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

Build characteristics	Thickness	Volume of liquid per 20kg bag of powder	Coverage per pack (Coverage can vary due to substrate)
Vertical applications: Brush/roller Trowel Trowel blow hole filler	1 mm 2 mm Skim applied	4.5 - 5.0 litres 4.0 - 4.5 litres 5 litres	11.5 - 12 m ² @ 1 mm 5.5 - 5.75 m ² @ 2 mm Circa 12m ² dependent on surface
Horizontal applications: Trowel / screed Brush / roller	5 mm 2 mm	4.5 - 5 litres 5 litres	2.2 - 2.4m ² @ 5mm 5.75 - 6.0 m ² @ 2 mm

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Description

Renderoc ST 05 consists of powder and polymer components. The powder is added to the liquid, the mixing ratio depends on the required consistency and use. The consistency of the product may be adjusted as required for application by trowel, brush or roller, in thicknesses from 0-5mm in a single layer.

The powder consists of a blend of cements, graded aggregates and chemical additives, with a maximum grain sizes of 0.5 mm.

The liquid component, based on modified acrylic polymers, gives Renderoc ST 05 a creamy consistency with extremely good application and barrier characteristics.

The product exhibits excellent thermal compatibility with concrete and is fully compatible with other Renderoc mortars and Dekguard coatings.

Specification Clause

The protective and levelling mortar shall be Renderoc ST 05, a two component powder and polymer mortar conforming to the requirements of BS EN 1504-3 Class R4. The cured mortar shall achieve a compressive strength of 50 MPa at 28 Days and Carbonation Barrier Properties of $<R(b) = 21$ mm for a 2 mm thickness when tested in accordance with NT Build 357. The product shall be mixed, applied and cured in accordance with the manufacturer's written instructions to a correctly prepared substrate.

Standards Compliance

Renderoc ST 05 complies with repair principles 1.3, 2.2, 5.1, 6.1 and 8.2 as defined by BS EN 1504-2

Renderoc ST 05 complies with Class R4 according to BS EN 1504-3, repair principles 3.1, 7.1, 7.2.

Renderoc ST 05 is defined as a barrier coating according to BS EN 1504-7, repair principle 11.2.

Renderoc ST 05 complies with LU Standard 1-085 'Fire Safety Performance of Materials'

Water Regulations Advisory Scheme Approved.
BS 6920:2014 Effect on Water Quality.

Application Instructions

Preparation

Concrete, masonry, brick, block and steel surfaces must be clean and sound, with no traces of loose material, cement paste, laitance, dust, plaster, oil, grease, corrosion deposits or algae. Prepare the surfaces by mechanical means. Remove oil and grease with suitable detergent. Finally the cleaned surfaces should be blown clean with oil free compressed air before continuing.

For repairs to concrete clad steel beams, break out any spalled concrete back to the steel below. Prepare steel surface as described above.

On floors or walls, small areas greater than 5mm depth should be filled with Renderoc Patch. On floors, larger areas >12mm depth may also be filled with Patchroc GP. Finish either material with a scratch comb. Application of Renderoc ST05 may commence once the chosen infill material has reached its final set (typically 1 – 2 hours depending on temperature). Refer to the Renderoc Patch or Patchroc GP datasheets for further details.

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

Pre-soaking

Porous substrates should be thoroughly soaked with clean water prior to application of Renderoc ST 05, to achieve a saturated surface dry condition. Any residual surface water should be removed prior to application.

Priming

Under normal circumstances priming is not required. However, very porous substrates may require sealing with Nitobond AR, diluted 1:10 with water. This is scrubbed onto the pre-wetted substrate and allowed to become tacky before applying Renderoc ST 05.

Mixing

Renderoc ST 05 should be mixed in a forced action mixer of adequate capacity. Mixing in a suitable sized drum using a Conbextra paddle with a slow speed (500 rpm) heavy-duty drill is acceptable.

Place the required amount of Renderoc ST 05 liquid component - see table - in the mixer and add the full bag of Renderoc ST 05 powder. Mix for 5 minutes until fully homogeneous. Let the mix rest for 5-10 minutes and adjust the consistency, if necessary by addition of additional liquid component. Mix for another minute until the required consistency is obtained. Polymer level can be varied to application method.

Mixing ratios: Refer to table on previous page.

Application to porous substrates

Renderoc ST 05 can be applied by brush, roller or trowel depending on consistency and application. See table.

The surface finish of the final coat can be obtained in the following ways:

- 1) Smooth surface: Finish with a sponge.



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- II) Rough, granulated surface: Finish with a roller.
- III) Skid resistant surface: Sprinkle dry quartz sand in the wet surface or brush finish.

Application to steel

Apply two coats, each at a minimum of 1mm thickness. The 2nd coat should be finished in a direction at right angles to the first.

For application over cut ends of reinforcement bars, ensure a 20mm overlap onto the surrounding concrete.

For repairs to concrete encased steel frames, once the 2nd coat of Renderoc ST 05 has cured, a thick section repair system can be subsequently applied. Refer to the chosen Renderoc product for further details.

Multiple layers

When applying multiple layers, allow the first application to dry for between 2-4 hours (at 20°C). Lightly scratch and dampen surface between layers.

Note: when applying in layers, the maximum total thickness is 15mm.

Low temperature working

Normal precautions for winter working with cementitious materials should be adopted. In cold conditions down to +5°C, both components should be kept at +15°C to +25°C prior to use. Protect applied product from freezing for the first 24 hours.

Note: working time and time taken to gain strength will be increased at lower temperatures.

High temperature working

At ambient temperatures above 35°C both components should be stored in the shade. Note working times will be reduced at elevated temperatures.

Curing

Renderoc ST 05 is a cement-based repair mortar. In common with all cementitious materials, it must be cured immediately after finishing in accordance with good concrete practice. The use of Nitobond AR, sprayed on to the surface of the finished mortar in a continuous film, is recommended. A low pressure atomising sprayer is essential for applying the Nitobond AR. Any excessive run-off on verticals or drips on soffits should be removed by brush before they harden.

Large areas should be cured as trowelling progresses (0.5 m² at a time) without waiting for completion of the entire area. If applying Renderoc ST 05 in multiple layers, only the final layer requires curing with Nitobond AR.

Renderoc ST 05 can be subjected to foot traffic after 12 hours at 20°C.

Applications covered by the Water Regulations Advisory Scheme - Approved Material: mix and apply as per manufacturer's instructions. WRAS approved when cured for 21 days at 7°C. Cold water use only.

Application over Existing Coatings

Renderoc ST 05 is formulated for application to clean, sound substrates, however application over existing acrylic based coatings or paints may be possible in certain circumstances where filling or smoothing over undulations in the substrate is required before overcoating. Before proceeding, the bond strength of the existing coating to the substrate should be assessed, followed by a test panel application of Renderoc ST 05 with a bond strength test and compatibility assessment conducted.

Renderoc ST 05 should not be applied over elastomeric coatings, epoxy, polyurethane, polyurea, polyaspartic or MMA based coatings, or over any coating subject to traffic. In such circumstances the existing coating should be removed. The existing coating should be prepared by high pressure water jetting, any areas of flaking or crazing in the existing coating should be removed back to an area soundly bonded. Application thickness of Renderoc ST 05 when applied over existing coatings should not exceed 2mm.

When applied over existing coatings or paints, the performance characteristics and bond of Renderoc ST 05 may be impaired and its fire rating invalidated.

Overcoating with protective decorative finishes

Renderoc ST 05 is extremely durable and will provide long-term protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will benefit from the application of a barrier/decorative coating to limit the advance of chlorides and carbon dioxide, bringing them to the same protective standard as the repair itself. Fosroc recommend the use of the Dekguard range of protective, anti-carbonation coatings. These products provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment. Dekguard products may be applied over the repair area without prior removal of the Nitobond AR curing membrane. Other curing membranes must be removed prior to the application of Dekguard products.

Cleaning

Renderoc ST 05 should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Estimating

Supply

Renderoc ST 05 is supplied in 20kg bags of powder and 5.0 litres of liquid.

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Coverage and yield

Approximately 12 litres per pack depending on mix ratio - see table for coverage.

Limitations

Renderoc ST 05 should not be applied when the substrate and/or air temperature is below +5°C and falling.

Application at high humidity and/or on a falling thermometer may result in a white surface discolouration. This will not affect product performance and should decrease with time.

Potable water tanks are for use on consumer premises only. This product is not DWI listed.

Not suitable for heavily trafficked floors.

Exposure to rainfall prior to the final set may result in water uptake and severe reduction in the performance of the hardened product. Exposure to mist or high humidity prior to sufficient hardening may result in discolouration of the surfaces. These white discolourations will decrease with time.

Storage

Renderoc ST 05 Powder has a shelf life of 12 months if kept in a dry store in the original, unopened packaging. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced.

Renderoc ST 05 Liquid has a shelf life of 12 months if kept in a dry store in the original, unopened packaging. The liquid should be protected against frost. If the product has been exposed to frost and the liquid component becomes grainy, it should not be used.

Precautions

Health and safety

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

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Important note

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