Fosroc® Renderoc GP

constructive solutions

General purpose medium density concrete reinstatement mortar conforming to the requirements of BS EN 1504-3 Class R3

Uses

For the reinstatement of concrete where low permeability characteristics are required but where high compressive strength is not the most important consideration. Where higher compressive strengths and low permeability characteristics are required, Renderoc HB45 should be used.

Renderoc GP has been specifically developed as a general purpose repair mortar that can also be used as a render coat.

Renderoc GP is suitable for repair methods 3.1, 3.3, 4.4, 7.1, 7.2 as defined by BS EN 1504-3.

Advantages

- Compatibility with concrete of compressive strength 20- 35 N/mm²
- Frequently obviates the need for formwork
- Extremely low permeability to water, carbon dioxide and chlorides
- Exceptional system of shrinkage compensation provides long-term dimensional stability
- Can be applied quickly and efficiently by wet spraying
- One component, pre-bagged to overcome site-batched variations
- Contains no chloride admixtures
- Shade can be varied with Renderoc Lightener / Darkener*

Description

Renderoc GP is supplied as a ready to use blend of dry powders requiring only the site addition of clean water to produce a highly consistent, lightweight repair mortar.

It is based on Portland cements, graded aggregates and chemical additives which provide a mortar with good handling characteristics while minimising water demand. The low water requirement ensures good strength gain and long-term durability.

Renderoc GP has been specifically engineered for vertical repair work. It can be applied in sections up to 70 mm thickness in vertical locations and up to 60 mm thickness in overhead locations in a single application and without the use of formwork. Thicker sections can be achieved by the use of formwork or can be built up in layers. Deep pockets can sometimes be filled in a single application dependent on the configuration of the pocket and the volume of exposed reinforcing steel.

Renderoc GP can be quickly and efficiently applied by the wet spray technique. Consult the local Fosroc office for further information.

The material should not be applied at less than 10 mm thickness.

**Refer to separate datasheet*

CE	UK CA
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DOP: UK9-13

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EN 1504-3:
Structural and non-structural repair methods 3, 4 and 7

Compressive strength	Class R3: ≥ 25 MPa
Chloride ion content	≤ 0.05%
Adhesive strength by pull-off test	≥ 1.5 MPa
Thermal compatibility: freeze thaw cycling with immersion	≥ 1.5 MPa
Carbonation resistance	Pass
Elastic modulus	15.1 GPa
Reaction to fire	Class A1
Dangerous substances	Complies with 5.4

Specification clause

The repair mortar shall be Renderoc GP, a one component, medium density cementitious mortar, conforming to the requirements of BS EN 1504-3 Class R3. The cured mortar shall achieve a compressive strength of 15 MPa at 1 Day, 30 MPa at 28 Days and a drying shrinkage of <300 micro-strain at 7 days. It shall be able to be applied in sections up to 70 mm thickness in vertical locations and up to 60 mm thickness in overhead locations in a single application without formwork. The product shall be mixed, applied and cured in accordance with the manufacturer's written instructions to a correctly prepared substrate.

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Properties

The following results were obtained at a water : powder ratio of 0.18 and at a temperature of 20°C unless otherwise stated.

Test Method	Standard	EN 1504 R3 Requirement	Test Result
Compressive strength	EN 12190:1999	≥ 25 MPa	@ 1 Day 15 MPa @ 28 Days 30 MPa
Bond strength by pull off:	EN 1542:1999	≥ 1.5 MPa	1.8 MPa
Chloride ion content:	EN 1015-17:2000	≤ 0.05 MPa	0.03%
Freeze thaw cycling:	EN 13687-1:2002	≥ 1.5 MPa	1.6 MPa
Resistance to carbonation d_k	EN 13295:2005	d_k ≤ ref concrete	Conforms
Fire rating	EN 1504-3 cl. 5.5	-	Class A1Non-Combustible
Flexural strength	BS 6319 Pt 3:1990	-	7.1 MPa @ 28 days
Setting time	BS4551:2005+A2:2013	-	Initial set: 3 1/2 hours Final set: 4 hours
Elastic Modulus	EN 13412	≥ 15 GPa	15.1 GPa @ 28 days
Fresh wet density	-	-	Nominally 1800kg/m³
Shrinkage **25 x 25 x 285 prisms,** **27 °C, 55% RH**	-	-	< 300 microstrain @ 7days
Chemical resistance	-	-	The low permeability of Renderoc GP severely retards chemical attack in aggressive environments. The cured mortar is impermeable to acid gases, waterborne chloride ions and oxygen.
Build Characteristics **(hand applied)** **Minimum thickness:** **Overhead:** **Vertical:**	-	-	 10 mm Up to 60 mm Up to 70 mm

Clarification of property values: The typical properties given above are derived from laboratory testing. Results derived from field applied samples may vary. Maximum build thickness is dependent on location of repair, water content and application technique.

Standard compliance

Renderoc GP complies with the class R3 according to EN1504-3, repair methods 3.1, 3.3, 4.4, 7.1 and 7.2.

Application instructions

Preparation

Form a square edge perimeter to the repair area using appropriate methods (feather edging must be avoided), break out the complete repair area up to a minimum depth of 10mm up to the square 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 abrasive-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. Abrasive blasting, hydrodem equipment, powered mechanical scraping or other suitable means 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

Apply one full coat of Nitoprime Zincrich Plus and allow 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.

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Concrete Priming

The concrete substrate should be saturated surface dry immediately before the application of the primer i.e. it should be thoroughly saturated with clean water and any residual surface water removed prior to applying Nitobond HAR.

Under severe drying conditions repeated soaking may be necessary to ensure the substrate is still saturated at the time of application of the primer.

Scrub Nitobond HAR into the surface.

Renderoc GP can be applied as soon as the primer becomes tacky. If the Nitobond HAR is too wet, overhead and vertical build-up of the Renderoc GP may be difficult.

In exceptional circumstances, 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 the local Fosroc office for further information.

Mixing

Care should be taken to ensure that Renderoc GP is thoroughly mixed. A forced-action mixer is essential. Mixing in a suitably sized drum using an approved Renderoc Mixing Paddle (MR4) with a slow speed (400/500 rpm) heavy-duty drill is acceptable for the occasional one-bag mix.

Free-fall mixers must not be used. Mixing of part bags should never be attempted.

For normal applications, place 4.0 to 5.0 litres of drinking quality water into the mixer.

With the machine in operation, add one full bag of Renderoc GP and mix, for a minimum of 3 minutes and a maximum of 5 minutes, until fully homogeneous.

The consistency may be adjusted by the addition of small amounts of water up to the maximum total water content of 5.0 litres.

Note that the powder must always be added to the water.

Mixing warning

As with other ‘one pack’ repair mortars, Renderoc GP may exhibit satisfactory handling characteristics even though inadequately mixed. This will result in a significantly lower level of performance or possible failure. It is therefore essential that mixing instructions are strictly adhered to with particular emphasis on the quantity of water used and the time of the mixing operation.

Application

Exposed steel reinforcing bars should be firmly secured to prevent movement during application.

Apply the mixed Renderoc GP by gloved hand or trowel, thoroughly compacting onto the primed substrate and around exposed reinforcement.

If sagging or slumping occurs the Renderoc GP should be completely removed and reapplied at a reduced thickness to a correctly primed substrate

Build-up

Additional build-up can be achieved by application of multiple layers.

The surface of the intermediate layers should be comb scratch-keyed and cured with Nitobond AR. Repriming with Nitobond HAR and a further application of Renderoc GP may proceed as soon as this layer has set.

Spray application

Renderoc GP can be quickly and efficiently applied by the wet spray technique. In circumstances where large areas of repair are required, the rapid placement and higher build attainable by this method offer economic advantages over hand-trowelling. The resultant repair also offers a generally more dense compound with enhanced mortar/substrate bond characteristics.

For further details on wet spray techniques contact the local Fosroc office.

Finishing

Renderoc GP 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. After spray application, the mortar may need to be ‘cut back’ to the required profile using a steel float and then finished with damp sponges as described above.

Low temperature working

In cold conditions down to 3°C, the use of warm mixing water (up to 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 3°C and falling. At 3°C static temperature or at 3°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 GP 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 m^2 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 GP 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 GP and Primer should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Clean tools used with Nitoprime Zincrich Plus and Nitobond EP before material cures, using Fosroc Solvent 102.

Estimating

Supply	
Renderoc GP:	25 kg bags
Nitoprime Zincrich Plus:	1.9 litre and 800 ml cans
Nitobond HAR	5 litre drums
Nitobond AR:	5 litre drums
Fosroc Solvent 102:	5 and 25 litre tins

Coverage and yield	
Renderoc GP:	Approximately 16 litres / 25 kg bag (approximately 1.6 m² at 10 mm thickness)
Nitoprime Zincrich Plus:	8 m^2/ litre
Nitobond AR:	6 - 8 m^2/ litre
Nitoprime HAR	3 - 4 m^2/ litre

Notes: the actual yield per bag of Renderoc GP will depend on the consistency used. The yield will be reduced if the material is applied by a spray technique.

Limitations

Renderoc GP should not be used when the temperature is below 3°C and falling. Do not mix part bags. Due to the nature of Renderoc GP, the product should not be used in areas subjected to traffic (in these circumstances, Renderoc S should be considered).

Renderoc GP 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 local Fosroc office.

Storage

The product has a shelf life of 12 months from the date of manufacture if kept in dry storage in the original, unopened bags. If stored at high temperatures and/or high humidity the shelf life may be reduced to less than 6 months.

Nitobond AR and Nitobond HAR should be protected from frost.

Precautions

Health and safety

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

Fire

Renderoc GP 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 CO_2 or foam. Do not use a water jet

Flash points

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

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