



Renderoc RG

General purpose non-shrink cementitious micro-concrete

Uses

For repairs to damaged reinforced concrete elements particularly where access is restricted and where vibration of the placed material is difficult or impossible.

Advantages

- Gaseous expansion system compensates for shrinkage and settlement in the plastic state.
- Can be pumped or poured into restricted locations
- Highly fluid to allow for placement without vibration
- Pre-bagged to overcome site-batched variations
- Rapid strength gain to facilitate early reinstatement
- High ultimate strengths and low permeability of cured repair
- Contains no chloride admixtures

Standards compliance

The appropriate sections of the following specifications:

ASTM C-827-78 BS 1881

ASTM C-109-77 BS 4550

ASTM C-191-79 BS 4551

ASTM C-230-68 BS 5075. Part 2

Description

Fosroc **Renderoc RG** is supplied as a ready to use blend of dry powders which requires only the site addition of clean water to produce a free-flowing non-shrink repair micro-concrete. The material is based on Portland cements, graded aggregates and fillers, and additives which impart controlled expansion characteristics in the plastic state, while minimising water-demand. The low water requirement ensures high early strength and long-term durability

For large repairs, the mixed **Renderoc RG** may be modified by the site addition of 8 mm to 12 mm clean graded, saturated, surface dry aggregates. For exceptionally large repairs, the use of **Renderoc LA** or **Renderoc HF** should be considered. The local Fosroc office should be consulted prior to making a final decision.

Technical support

Fosroc offers a comprehensive range of high performance, high quality construction products. In addition Fosroc offers a technical support package to specifiers, end-users and contractors as well as technical on-site assistance in locations all over the world.

Design criteria

Renderoc RG can be applied in sections up to 100 mm deep. For larger sections, the addition of approved aggregate may be required. This will depend on the specific configuration of the repair location. Consult the local Fosroc office for further information.

Properties

Compressive strengths

Age (days)	N/mm ²
1	25
7	55
14	60
28	64

Results obtained when tested in accordance with BS 1881. Part 4.1970. Cubes cured under restraint. Temperature : 20°C.

Variation with temperature

Age (days)	Compressive strength N/mm ²		
	5°C	20°C	35°C
1	6	25	34
7	50	55	60
14	55	60	62
28	60	64	65

Flexural strength

Age (days)	N/mm ²
1	2.5
7	9.0
14	9.5
28	10.0

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Results obtained when tested in accordance with BS 4551, 1980, for flowable consistency at 20°C.

Coefficient of thermal expansion : 11×10^{-5} per °C.

Thermal conductivity: $1\frac{1}{2}$ w/m per °C.

Young's modulus : 28 kN/mm².

Freeze-thaw stability : Meets the requirements of BS 5075, Part 2, 1982.

Ultimate anchorage bond stress : exceeds CP110, Part 1, 1972, Table 22 - requirements for 40 N/mm² concrete at 24 hours.

Fresh wet density: approximately 2.170 kg/mm³. depending on actual consistency used.

Time for expansion

Start	Finish
15 minutes	2 hours

Note : temperatures above 20°C may slightly reduce these times.

Pressure to restrain plastic expansion : approximately 0.004 N/mm².

Specification clauses

The fluid concrete repair material shall be **Renderoc RG**, a single component, cement-based, micro-concrete to which only the site-addition of clean water (and approved, graded aggregates where specified) shall be permitted. The micro-concrete shall contain no metallic aggregates, contain no chlorides and shall be shrinkage compensated in the plastic state. The product shall be capable of-achieving a compressive strength of not less than 20 N/mm² after 24 hours at 20°C. Most importantly, the cured product shall have a coefficient of thermal expansion within the range 10 to 12×10^{-5} per°C.

Application instructions

Preparation

The unrestrained surface area of the repair must be kept to a minimum. The formwork should be rigid and tight to prevent loss of material and have an impermeable face to

prevent drying out. The formwork should include drainage outlets for pre-soaking and, beneath a soffit, provision for air-venting. Provision must also be made for suitable access points to pour or pump the mixed micro-concrete into place.

Defective concrete surfaces must be cut back to a sound base. Smooth surfaces should be mechanically roughened. Corroded reinforcing steel should be exposed around its full circumference and cleaned to remove all loose scale and corrosion deposits. It is important to clean the steel to a bright condition. Grit blasting is recommended.

Several hours prior to placing, the prepared concrete substrates should be saturated with clean water. Immediately prior to placing, any free water should be removed. Alternatively, all prepared concrete substrate should be primed using Nitobond EP, a slow-setting epoxy bonding aid.

Note :

For repair sections generally deeper than 100 mm it may be necessary to 'fill out' the **Renderoc RG** with properly graded 8 mm to 12 mm silt-free aggregate minimise temperature rise. Aggregate should be in a saturated, surface dry condition and should be tested ASTM C-289-81 if doubt exists about the suitability aggregate. Fosroc's local office should be contacted.

The quantity of aggregate required may vary depend on the nature and configuration of the repair location. Generally, for sections 100 mm to 200 mm deep, which high fluidity is required, the following mix design should be considered:

25.0 kg **Renderoc RG**

4.3 kg clean water

10.0 kg 8 mm to 12 mm approved aggregate

For sections deeper than 200 mm, the use of Fosroc **Renderoc HF** or **Renderoc LA** should be considered, Contact the local Fosroc office for further advice.

Actual water demand may vary depending on the condition of the aggregate. Trial mixes should be done in order to ensure the optimum addition of both water and aggregate.

Mixing

Care should be taken to ensure that **Renderoc RG** is thoroughly mixed in a forced-action mixer of adequate capacity. Alternatively, mix in a suitably sized drum with a high torque (400/500 rpm) rotary drill fitted with an approved mixing paddle.



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It is essential that machine mixing capacity and labour availability is adequate to enable the placing operation to be carried out continuously. The rate of water addition will generally be between 4.3 litres and 4.5 litres per 25 kg bag of **Renderoc RG**. The optimum water content should be determined and accurately measured into the mixer. With the mixer running, add the total contents of the **Renderoc RG** bag. Mix continuously for 3 to 5 minutes, making sure that a smooth even consistency is obtained.

Where the addition of graded aggregate has been specified, this should be added after the water and **Renderoc RG** are properly mixed. Mixing should then continue for a further 1 minute to ensure correct dispersion.

It is recommended that the mixed product be passed through a suitable coarse metal screen prior to placing or pumping to highlight any unmixed material.

Placing

The mixed material should be placed immediately. If placing by pump, standard concrete pumping practice should be followed. The pump and pipeline must be 'grouted' with a cement slurry or mortar, discharging the 'grout' as waste. Pumping should be commenced immediately after 'grouting' in this way.

Low temperature working

In cold conditions down to 5°C, the use of warm water (up to 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted.

High temperature working

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

Curing

Renderoc RG is a cement-based repair compound. In common with all cementitious materials, **Renderoc RG** must be cured immediately after striking the formwork in accordance with good concrete practice. The use of Nitobond AR or one of Fosroc's Concure range of curing compounds, sprayed on to the surface of the hardened **Renderoc RG** in a continuous film, is recommended. In harsh drying conditions supplementary curing such as wet hessian and/or polythene sheeting must be used.

Estimating

Supply

Renderoc RG : 25 kg bags

Yield

Renderoc RG : approximately 13.25 litres per 25 kg bag.

Actual yield per bag will depend on the consistency used.

Storage

Shelf life

Renderoc RG has a shelf life of 12 months if kept in a dry store in the original, unopened bags.

Storage conditions

Store in dry conditions in the original, unopened bags. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced.

Precautions health and safety

Renderoc RG contains cement powders which, during normal use, have no harmful effect in dry skin. However, when **Renderoc RG** is mixed, or becomes damp, alkali is released which can be harmful to the skin. During use, avoid inhalation of dust and contact with skin and eyes. Wear suitable gloves, eye protection and dust masks. The use of barrier creams is recommended. In case of contact with skin, wash with clean 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. **Renderoc RG** is non-flammable.

Additional Information

Fosroc manufactures a wide range of products specifically designed for the repair and refurbishment of damaged reinforced concrete. These include : hand-placed and spray grade repair mortars, fluid micro-concretes, chemical resistant epoxy mortars and a comprehensive package of protective coatings. In addition, a wide range of complimentary products are available.

These include joint sealants, waterproofing membranes, grouting, anchoring and specialised flooring materials.

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Fosroc has also produced several educational training videos which provide more detail about the mechanisms which cause corrosion within reinforced concrete structures and the solutions which are available to arrest or retard these destructive mechanisms. Further information is available from the publication : Concrete Repair and Protection -The Systematic Approach, available in seven language formats.

For further information about products, training videos or publications, contact the local Fosroc office.



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