

# Fosroc® Patchroc 250

**Versatile, fast setting micro-concrete for thick section patch repairs to concrete carriageways, pavements, floors, columns and beams. BS EN 1504-3 Class R4 approval.**

## Uses

For rapid and permanent reinstatement of discrete thick section areas in concrete carriageways, pavements, airport aprons, access ramps, floors, columns and beams.

Fosroc Patchroc 250 has a unique cement chemistry to rapidly reinstate thick sections of concrete without excessive heat generation and associated cracking. Particularly useful when interruption of traffic must be minimised.

Patchroc 250 is suitable for repair methods 3.1, 3.2, 4.4, 7.1 and 7.2, as defined by BS EN 1504-3.

Patchroc 250 forms part of Fosroc's Rapid Return to Service (RR2S) offer.

## Advantages

- Rapid strength gain — will generally accept traffic in 2 hours at 20°C reducing downtime.
- Versatile - consistency can be adjusted to suit the application.
- High strength, abrasion and weather resistance, making it ideal for external works
- May be left as a trafficable finish
- Suitable to be overlaid with compatible deck membranes and coatings when the moisture content is <6%, typically 3-4 hours after final setting
- One component, pre-bagged to overcome site-batched variations requires only the site addition of clean water
- Does not normally require a primer to achieve high bond strengths
- Shrinkage compensation ensures no cracking
- Controlled heat of hydration minimizes risk of thermal cracking, even in thick sections
- Contains no chloride admixtures
- Suitable for use with Cathodic Protection systems
- Shade can be varied with Renderoc Lightener / Darkener\*

## Description

Patchroc 250 is supplied as a ready to use blend of dry powders which requires only the site addition of clean water to produce a highly consistent repair mortar.

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

Patchroc 250 may be applied in depths between 25 and 250mm in bays of up to 4m<sup>2</sup>. Larger areas can be reinstated using a chequer-board "hit and miss" approach.



When used with a low water content, Patchroc 250 is designed for horizontal use, though it can be applied at gradients up to 2.5%.

When used with a high water content, Patchroc 250 becomes flowable and can be applied into shuttered areas of congested reinforcement such as beams and columns.

The product is alkaline in nature and will protect embedded steel reinforcement. It may be used internally and externally.

 <b>0370</b> <b>18</b> <b>0370-CPR-0845</b>	
<b>DOP: UK9-206</b>	
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<b>Patchroc 250</b>	
BS EN 1504-3 Structural and non-structural repair methods 3, 4 and 7	
Compressive strength	Class R4 (> 45 MPa)
Chloride ion content	≤ 0.05 %
Adhesive strength by pull-off test	≥ 2.0 MPa
Thermal compatibility: freeze-thaw cycling with immersion	≥ 2.0 MPa
Carbonation resistance	Pass
Elastic modulus in compression	≥ 20 GPa
Capillary absorption	0.5 kg / (m <sup>2</sup> .h <sup>-0.5</sup> )
Reaction to fire	Class A1
Dangerous substances	Complies with 5.4

\*Refer to separate datasheet

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## Properties

The following results were obtained at a temperature of 20°C unless otherwise stated.

Test method	Standard	BS EN 1504 R4 Requirement	Test result (water : powder ratio of 0.10)	Test result (water : powder ratio of 0.144)
Compressive Strength	EN 12190:1999	≥ 45 MPa at 28 days	20 MPa @ 2 hours** 45 MPa @ 1 day 55 MPa @ 7 days 60 MPa @ 28 days	10 MPa @ 2 hours** 29 MPa @ 1 day 39 MPa @ 7 days 48 MPa @ 28 days
Bond strength by pull off:	EN 1542:1999	≥ 2.0 MPa	2.4MPa	2.7 MPa
Chloride ion content:	EN 1015-17:2000	≤ 0.05 %	0.03%	
Freeze thaw cycling:	EN 13687-1:2002	≥ 2.0 MPa	2.2MPa	2.4 MPa
Resistance to carbonation $d_k$	EN 13295:2005	≤ ref concrete	Dk< reference concrete MC(0.45)	
Capillary absorption	EN 1305:2002	≥ 0.5kg/(m <sup>2</sup> .h <sup>0.5</sup> )	0.05kg/(m <sup>2</sup> .h <sup>0.5</sup> )	0.1kg/(m <sup>2</sup> .h <sup>0.5</sup> )
Elastic Modulus in Compression	EN13412:2008	≥ 20 GPa	33.3GPa	32.6 GPa
Fire rating	EN 13505-1		Class A1 Non-Combustible	
Flexural strength	EN12190:1999	-	8.2N/mm <sup>2</sup> at 28 days	Not tested
Resistivity			Not tested	10 – 15 k.ohm.cm
Setting time	BS 4551 Pt 14:1980	-	Initial set:	40 mins
			Final set:	60 mins
Working life	-	-	10°C:	60 mins
			20°C:	30 mins
Traffic time			10°C	20°C
Pedestrian:	-	-	2 hours	1.5 hours
Light traffic:			2.5 hours	2 hours
Workability	EN13395-1:2002	-	120mm (10 min)	Not applicable
Chemical resistance	-	-	The low permeability of Patchroc 250 retards chemical attack in aggressive environments. The cured mortar restricts permeation of acid gases, waterborne chloride ions and oxygen.	
Build Characteristics.				
Minimum thickness:	-	-		25 mm
Maximum thickness:	-	-		250 mm
Maximum individual bay area:	-	-		4 m <sup>2</sup>

\*\* To give a more accurate representation of site strengths, early age test samples were cured at a temperature equivalent to the exotherm generated from whole bag mixes.

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

## Specification Clause

The repair mortar shall be Patchroc 250, a one component rapid strength gain micro-concrete conforming to the requirements of BS EN 1504-3 Class R4 suitable for thicknesses between 25mm and 250mm generally. At a trowellable consistency for horizontal applications, the cured material shall be able to achieve a compressive strength of 30 MPa at 3 hours, 50MPa at 28 days and a drying shrinkage of <300 micro-strain 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

Patchroc 250 complies with the classification R4 according to BS EN 1504-3, repair methods 3.1, 3.2, 4.4, 7.1 and 7.2



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## Application Instructions

### Preparation

\*Angle form the edges of the repair to provide a defined straight edge to a depth of at least 12mm, feather edging must be avoided.

Subsequently, break out the complete repair area to a total minimum depth of 25mm (i.e. >13mm in addition to the angle formed 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.

If using Patchroc 250 within formwork on columns or beams, the formwork should include drainage outlets for pre-soaking and, if beneath a soffit, provision for air-venting. Provision must also be made for suitable access points to pour the mixed micro-concrete into place.

\*(Refer to HSE information sheet CIS36 regarding control of exposure to construction dust, available at [www.hse.gov.uk](http://www.hse.gov.uk))

### Reinforcing steel priming

Apply one full coat of Nitoprime Zincrich Plus and allow this 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 Conditioning

The concrete substrate should be saturated surface dry immediately before the application of Patchroc 250. This is best achieved by filling the prepared areas to be repaired with clean water. Immediately prior to the application of Patchroc 250, any excess water should be removed.

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

### Mixing

Care should be taken to ensure that Patchroc 250 is thoroughly mixed. For multiple bag batches a forced-action mixer is essential. For smaller volumes where single bag mixes are more appropriate, 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.

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

For mixers without a bottom exit, place the required quantity of drinking quality water into the mixer. With the machine in operation, add the required number of full bags of Patchroc 250 and mix, for a minimum of 3 minutes, stop the machine and scrape the bowl & blades to ensure there is no unmixed powder, mix for a further 2 minutes until fully homogeneous.

For mixers with a bottom exit, add 1 bag of powder to the mixer and start the mixer, add the water, then add any remaining full bags of powder. Mix as above.

For horizontal applications, the consistency may be adjusted by varying the water content between 2.2 and 2.8 litres per bag. Do not exceed 2.8 litres per bag.

For application into formwork on beams and columns, add between 3.2 and 3.6 litres per bag to obtain a flowable consistency. Do not exceed 3.6 litres per bag.

### Mixing warning

As with other 'one pack' repair mortars, Patchroc 250 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.

When using the material in horizontal applications at the low water content range, tamp into place to ensure complete compaction. Thoroughly compact the material around any exposed steel reinforcement.

When using the material at the high water content range, pour the mixed material into the prepared formwork, ensuring any trapped air at the top of the formwork is released. Patchroc 250 can be applied between thicknesses of 25 - 250mm in a single application.

Aim for an uninterrupted mix and pour of material to the repair area, keeping time between successive pours to less than 10 minutes.

Patchroc 250 should be struck off to the correct level and finished with a steel trowel to a fully closed surface. The finished surface should not be overworked.



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## Build-up

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

The surface of the intermediate layers should be comb scratch- keyed. A further application of Patchroc 250 may proceed 1 hour after the material has reached its final set.

## Low temperature working

In cold conditions down to 5°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 5°C and falling. At 5°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.

## Surfacing Systems

Where the completed product application is to be overcoated with a resin based surfacing system, such as Nitodek FS or Nitodek UR, Nitoflor Coarse Anti-Slip Grains should be broadcast onto the finished surface immediately after application. Remove any unbound aggregate prior to application of the surfacing system.

## Curing

In fast drying conditions, curing with either Concure WB, Nitobond AR or polythene sheeting polythene sheeting taped down at the edges must be used. In cold conditions, the finished repair must be protected from freezing. Where Patchroc 250 is to be later overcoated with a deck membrane or other coating system, the use of only polythene sheeting for curing is recommended.

## Cleaning

Patchroc 250 should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

## Supply

Patchroc 250	25kg bag, 500kg sack
Concure WB	20 and 200 litre drums
Nitobond AR	5 litre bottles

## Coverage and yield

Patchroc 250	Approximately 12 litres / 25kg bag
Concure WB	5 m <sup>2</sup> / litre
Nitobond AR	6-8 m <sup>2</sup> / litre

Note: the actual yield per bag of Patchroc 250 will depend on the consistency used.

## Limitations

Patchroc 250 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.

## Precautions

### Health and safety

For further information refer to the appropriate Safety Data Sheets available at [www.fosroc.com](http://www.fosroc.com).

## Environmental Data (EPD)

GWP Total, A1 – A3: 0.284 kgCO<sub>2</sub>e per 1kg product.

GWP Total, A1 – D: 0.481 kgCO<sub>2</sub>e per 1kg product.

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### Important note

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