

# Renderoc® HSXtra

**Shrinkage compensated, fibre reinforced, single component, polymer modified, cementitious, repair mortar system**

## Uses

Renderoc HSXtra is suitable for hand and trowel application for repairs where high load bearing is required. Typical applications would include, but not be limited to, the following:

- Vertical and overhead repairs to restore 'covercrete'
- General concrete and masonry repairs
- Voids greater than 10 mm deep
- Repairs to honeycombing
- Larger scale repairs where formwork cannot be erected

## Advantages

Renderoc HSXtra features **Dimensional Stability Technology** - a new materials technology which controls the rate of drying shrinkage such that, when used correctly :

- i. the dimensions of the repair remain stable; and thus
- ii. eliminating failure, due to shrinkage cracking.

This in turn leads to a series of associated benefits :

- Cost effective - shrinkage control enables repairs to be completed 'right first time'
- Enhanced durability - works in tandem with extremely low permeability to prolong effective working life
- Compatibility - aligns performance closer than ever before, to that of host concrete
- User friendly - specifically developed to provide an easy-to-apply product, suitable for local conditions
- Definable performance - positive benefits are easily demonstrated via a single, simple measurement

## Description

Renderoc HSXtra is a Dual Shrinkage expansion, fibre reinforced, single component, polymer modified, cementitious, repair mortar system supplied as a ready to use blend of dry powders, which requires only the addition of clean water to produce a highly consistent, repair mortar suitable for structural concrete and masonry repairs. Renderoc HSXtra may be hand & trowel applied, please see application method statement for details.

## Properties

The following typical results were obtained at a water to powder ratio of 0.16 or 4 ltrs/ 25 kg bag of Renderoc HSXtra.

Test method	Typical result
Drying shrinkage to ASTM C 157-93	
7 days	: < 300 microstrain
28 days	: < 500 microstrain
Permeability (DIN 1048 Part 5)	: < 5 mm

Flexural strength (BS EN196 Pt. 1)	: > 9 N/mm <sup>2</sup> at 28 days
Tensile strength (BS 6319 Pt. 7)	: > 4 N/mm at 28 days
Compressive strength (BS 6319 Pt. 2)	: 50 N/mm <sup>2</sup> at 7 days 70 N/mm <sup>2</sup> at 28 days
Water absorption (BS 1881 Pt. 121)	: < 2%
Rapid chloride permeability (AASHTO 277-93)	: < 1800 coulombs
Fire rating (EN 1504-3 cl 5.5)	: Class A1
Pot life @27°C	: 30 minutes

## Design criteria

**Dimensional Stability Technology** is a major step forward in the general compatibility of repair mortar systems with the host concrete, and the control of shrinkage in particular. Attention to the basic design criteria given below should ensure that the full benefits of this technology are gained in use :

- (i) Recommended limits for a single application are:

Minimum applied thickness	: 10 mm
Overhead sections	: up to 10 mm thick
Vertical sections	: up to 12 mm thick
Small pockets or horizontal	: up to 100 mm thick

## Application Instructions

### Surface preparation

Saw cut or cut back the extremities of the repair locations to a depth of at least 10mm to avoid feather edging and to provide a square edge. Break out the complete repair area to a minimum depth of 10mm up to the saw 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 grit sand 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. For vertical renders the concrete substrate should have surface profile of min 500 microns.

### Anti-corrosion Protection to Reinforcement

It is likely that, steel reinforcement in the area around a patch repair, particularly in a chloride contaminated environment, will typically corrode after the repairs are carried out, referred to as the incipient anode or Halo effect.

Fosroc Nitozinc Primer, two component, zinc rich epoxy based anti-corrosive protective coating should be brush applied over the prepared & dry surface of the exposed rebars and allowed to completely dry prior to application of Renderoc HS Xtra repair mortar.

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Performance as per EN 1504 -3 R4 Grade				
S.No	Performance Characteristic	Test Method	Requirement based on EN:1504-3(R4)	Renderoc HS XTRA Test Results
1	Compressive strength	EN:12190	≥ 45 MPa	Pass
2	Chloride ion content	EN:1015-17	≤ 0.05%	Pass
3	Adhesive bond	EN:1542	≥ 2.0 MPa	Pass
4	Carbonation resistance	EN:13295	dk ≤ control concrete [MC(0,45)]	Pass
5.	Elastic modulus	EN:13412	≥ 20.0 GPa	Pass

## Application of Epoxy Bonding Agent

Mix the base and hardener components of Nitobond EP, two component epoxy bonding agent with a paddle mixer for 3-5 minutes and brush apply in a thin layer over the prepared old concrete substrate to be repaired and allow the epoxy bonding agent to become tacky. Tacky condition will exist from 1-2 hours @30°C from the application time.

## Mixing and application

Renderoc HSXtra repair mortar shall be prepared by adding & mixing the 25 kg dry powder and recommended water of 4 litres (w/p = 0.16) into a plastic container of suitable size using a paddle mixer for 3 - 5 minutes until it attains a trowellable consistency. The mixed mortar should be applied to the prepared concrete surface or to the tacky Nitobond applied surface. Nitobond EP applied surface will attain tacky condition from 1-2 hours @ 30°C from the application time.

Note : i) Do not apply Renderoc HSXtra repair mortar over tack free or pre-tacky condition of Nitobond EP since it acts as a debonding agent.

ii) Under no circumstances should part bags be used or additional water be employed. Either of these two actions will adversely affect material performance.

## Estimating Packaging

Renderoc HSXtra	:	25 kg bags
Nitobond EP	:	1 & 4 litres
Yield	:	13.4 litres per 25 kg bag

## Limitations

- Renderoc HSXtra should not be used when the ambient temperature is below 5°C and falling.
- Renderoc HSXtra should not be part mixed, nor part bags used.
- Renderoc HSXtra should not be exposed to running water either during application or prior to final set.

## Storage

### Shelf life

Renderoc HSXtra has a shelf life of 6 months; if kept in a dry environment, in its original, unopened packing. If stored in conditions of high humidity and/or temperature, the shelf life will be reduced.

### Standards compliance

Renderoc HSXtra repair mortar system complies with the following international standards :

ASTM C157-93	:	Test for drying shrinkage
DIN 1048 Pt. 5	:	Test for permeability
BS 1881 Pt. 121	:	Test for water absorption

### Precautions

### Health and safety

Renderoc HSXtra contains cement powders which, when mixed with water or upon becoming damp, release alkalis which can be harmful to the skin. During use, avoid inhalation of the dust and contact with the skin or eyes. Wear suitable protective clothing - eye protection, gloves and respiratory equipment (particularly in confined spaces). The use of barrier creams to provide additional skin protection is also advised. In case of contact with the skin, rinse with plenty of clean water, then cleanse thoroughly with soap and 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.

### Fire

Renderoc HSXtra, is non-flammable and thus presents no fire hazard.

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### Important note :

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