

High build, high resistivity, shrinkage compensated repair mortar conforming to EN1504-3 Class R3

Uses

For the reinstatement of concrete where low permeability, high compressive strength and high resistivity characteristics are key requirements.

The lighter weight nature and high build characteristics Renderoc HB40 Plus makes it ideal for vertical and overhead concrete repair work.

Renderoc HB40 Plus achieves 50MPa @ 28 days. If higher compressive strength is required Renderoc HB70 Plus should be considered.

Renderoc HB40 Plus is not suitable for repairs where Galvashield anodes are being used - Renderoc HB40 should be considered.

Advantages

- Compatible with concrete strength in the range 25 to 50MPa
- High strength - suitable for structural repairs
- Abrasion resistant - suitable for aggressive environments
- Shrinkage compensated - provides long term dimensional stability
- Low permeability to potentially damaging water, CO₂ and chloride ions
- High build formulation - fewer applications of product
- High resistivity - provides increased durability
- Excellent bond to SSD concrete substrates – no separate primer required in most circumstances - refer to Substrate Priming section
- Can be applied using wet-spray process - providing faster high build repairs
- Pre-bagged to overcome site-batched variations - only the site addition of clean water required
- Sustainable product with lower carbon foot print - formulation based on supplementary cementitious materials
- Complies to EN 1504-3 Class R3
- RCS (Respirable Crystalline Silica) Hazard Free*

Description

Renderoc HB40 Plus, a medium weight concrete repair mortar, 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.

The material is based on the latest advances in cement, fillers and chemical additives technology and is polymer modified to provide a mortar with good handling characteristics, while minimising water demand. The low water requirement ensures fast strength gain and long term durability.

*Renderoc HB40 Plus is classified not hazardous for RCS in accordance with Australian Inventory of Industrial Chemicals; contains <0.1% RCS.

Design criteria

Renderoc HB40 Plus has been specifically engineered for vertical and overhead repair work. It can be applied in sections up to 100mm thickness in vertical locations and up to 80mm 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.

Build can be dramatically increased by wet spraying. Typical achievable thicknesses are up to 80 - 150mm vertically and up to 80 - 100mm overhead, although this will depend on substrate profiles and the distribution of steel reinforcement. Consult Fosroc for further information.

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

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Properties

The following results were obtained at a water:powder ratio of 0.15 and temperature of 20°C unless otherwise stated.

Test Method	Standard	EN1504 R3 Requirement	Test Result
Compressive Strength	AS 1478.2 - 2005	≥ 25 MPa	15 MPa @ 1 day 25 MPa @ 3 days 35 MPa @ 7 days 50 MPa @ 28 days
Flexural Strength	AS 1012.11-2000		6.2 MPa
Indirect Tensile Strength	AS 1012.10-2000		4.2 MPa
Chloride Ion Content	EN 1015-17:2000	≤ 0.05%	0.01%
Bond Strength Pull Off	EN 1542:1999	≥ 1.5 MPa	1.7 MPa
Carbonation Resistance	EN 13295:2005	Dk ≤ ref concrete	Conforms
Elastic Modulus	EN 13412:2008	≥ 15 GPa	19.8 GPa
Capillary Absorption	EN 1307:2002	≤ 0.5 kg/(m²xh ^{0.5})	0.1 kg/(m²xh ^{0.5})
Coefficient of Thermal Expansion	EN 1770:1990	Declared Value	13.2 x 10 ⁻⁶ / °C
Chloride Diffusion	Nordtest NT Build 443		0.94 x 10 ⁻¹² m²/sec
Electrical Resistivity	AASHTO TP 95:2014 (50 mm Probe Spacing)		83,000 ohm.cm @ 28 days 162,000 ohm.cm @ 56 days
Drying Shrinkage	AS 1478.2-2005		< 400 microstrain @ 7 days < 600 microstrain @ 28 days
Expansion & Contraction	UNE-EN 1542:1999	≥ 1.5 MPa	1.7 MPa Contraction 1.8 MPa Expansion
Alkali Reactive Particles	RMS T363 Rapid Mortar Bar Test		< 0.1% (Non-Reactive)
Fresh Wet Density			1900 kg / m³
Build Characteristics achievable in single layer	Hand/trowel Wet spray		
Vertical:	up to 100mm	80 - 150mm	
Overhead:	up to 80mm	80 - 100mm	

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

Application Instructions

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 sawn 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-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 paying particular attention to the back of exposed steel bars. Abrasive-blasting or high pressure water blasting 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 grit-blasting to remove corrosion products from pits and imperfections within its surface.

Reinforcing steel priming

Where a reinforcement coating is required as an active corrosion protection barrier, apply one full coat of Nitoprime Zincrich and allow to dry before continuing.



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Substrate priming

The concrete substrate should be saturated surface dry (SSD) immediately before the application of the Renderoc HB40 Plus. Any residual surface water removed prior to applying Renderoc HB40 Plus.

The surface shall not be allowed to dry before application of Renderoc HB40 Plus. Under severe drying conditions repeated soaking may be necessary to ensure the substrate is still saturated at the time of application of the repair mortar.

For improved build thicknesses apply one coat of Nitobond HAR with the Renderoc HB40 Plus applied whilst the primer is still tacky. If the Nitobond HAR primer dries before the application of the Renderoc HB40 Plus it must be re-primed before proceeding.

In exceptional circumstances, e.g. where a substrate/repair barrier is required or where the repair/substrate is likely to become immersed, permanently wet or damp subsequent to the completion and cure of the repair, Nitobond EP bonding aid should be used. Refer to the Nitobond EP data sheet.

Mixing Renderoc HB40 Plus

Care should be taken to ensure that Renderoc HB40 Plus is thoroughly mixed. A forced-action mixer is essential. Mix for 3 to 5 minutes at a slow speed (400/500 rpm) in a suitably sized drum using appropriate equipment such as a 120/140mm helical mixing paddle fitted to a heavy-duty 1600W mixer.

Free-fall mixers must not be used.

Mixing of part bags is not recommended however when necessary mixing half bags with the appropriate half water content is acceptable. Materials must be weighed out and the dry powder should be stirred through to eliminate any segregation before weighing out.

For normal applications, place 3.0 litres of drinking quality water into the mixer and, with the machine in operation, add half the 20kg bag of Renderoc HB40 Plus and mix for 30 seconds, then gradually add the remaining powder and mix for a further 3 to 4 minutes until fully homogeneous. Dependent on the ambient temperature and the desired consistency, a small additional amount of water may be added up to a maximum total water content of 3.1 litres per 20kg bag of Renderoc HB40 Plus.

Note: In all cases Renderoc HB40 Plus powder must be added to water.

Application

Exposed steel reinforcing bars should be firmly secured to avoid movement during the application process as this will affect mortar compaction, build and bond.

Apply the mixed Renderoc HB40 Plus to the prepared substrate by gloved hand or trowel. First, work a thin layer of the mortar into the primer or presoaked substrate and then build the mortar on to this layer.

Thoroughly compact the mortar on to the primed substrate and around the exposed reinforcement. Renderoc HB40 Plus can be applied in sections up to 100mm thickness in vertical locations and up to 80mm thickness in overhead locations in a single application and without the use of formwork. Thicker sections should be built up in layers but are sometimes possible in a single application depending on the actual configuration of the repair area and the volume of exposed reinforcing steel.

If sagging occurs during application, the Renderoc HB40 Plus should be completely removed and reapplied at a reduced thickness on to the correctly reprimed substrate.

Note: the minimum applied thickness of Renderoc HB40 Plus is 10mm.

Build-up

Additional build-up can be achieved by application of multiple layers. The surface of the intermediate layers should be comb scratch-keyed. Repriming with Nitobond HAR and a further application of Renderoc HB40 Plus may proceed as soon as this layer has set.

Spray application

Renderoc HB40 Plus 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 denser compound with enhanced mortar/substrate bond characteristics. For further details on the wet spray technique, including selection of spraying machines and nozzles, consult the document "Wet Spraying Renderoc mortars" or contact Fosroc.

Finishing

Renderoc HB40 Plus is finished by striking off with a straight edge and closing with a steel trowel. Wooden or plastic

floats, or damp sponges may be used to achieve desired surface texture. The completed surface should not be overworked. Allow the applied Renderoc to stiffen before attempting to finish off - this will minimise slumping. After spray application, the mortar may need to be 'cut back' to the required profile using a steel trowel and then finished with damp sponges as described above.

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 5°C and rising, the application may proceed.



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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 HB40 Plus is a cement-based repair mortar. In common with all cementitious materials, Renderoc HB40 Plus must be cured immediately after finishing in accordance with good concrete practice. The use of Concure A99, sprayed on to the surface of the finished Renderoc in a continuous film, is recommended. Large areas should be cured as trowelling progresses (0.5m² 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 HB40 Plus is extremely durable and will provide excellent protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will generally benefit from the application of a protective barrier/decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repair itself.

Fosroc recommends the use of the Fosroc 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 following the removal of **any** curing membranes prior to the application of Dekguard system to allow penetration of the silane primers.

When applying other decorative coating systems over curing compounds independent adhesion tests of the primer is recommended. Solvent based primers may compromise the curing compound.

Cleaning

Renderoc HB40 Plus, Nitobond HAR and Concure A99 should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Limitations

Due to the lightweight nature of Renderoc HB40 Plus, the product should not be used in areas subjected to traffic nor exposed to moving water during application.

Exposure to heavy rainfall prior to the final set may result in surface scour.

NOTE: Renderoc HB40 Plus is not designed to be used as a broad-scale building render and is not suitable for repairs where Galvashield anodes are being used.

Supply

Renderoc HB40 Plus 20kg:	FC302023-20KG
Nitoprime Zincrich 1 litre:	FC322100-1L
Nitobond HAR 1 litre:	FC322070-1L
Nitobond HAR 5 litre:	FC322070-5L
Nitobond HAR 20 litre:	FC322070-20L
Nitobond EP base 1.5 litre pack:	FC321025-1L
Nitobond EP hdnr 1.5 litre pack:	FC321026-500ML
Nitobond EP base 6 litre pack:	FC321025-4L
Nitobond EP hdnr 6 litre pack:	FC321026-2L
Concure A99 20 litre:	FC600909-20L
Fosroc Solvent 10 4 litre:	FC600800-4L
Fosroc Solvent 10 20 litre:	FC600800-20L

Coverage and yield

Renderoc HB40 Plus:	11.6 litres / 20 kg bag (mid water)
Nitoprime Zincrich:	8m ² /litre
Nitobond HAR:	3 - 4m ² /litre
Nitobond EP:	4 - 5m ² /litre
Concure A99:	5m ² /litre

Note: the coverage figures for liquid products are theoretical - due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

Storage

Renderoc HB40 Plus has a shelf life of 36 months from date of manufacture if kept in the original, unopened bags. Do not use if there are lumps in the product, or a loss of workability (requiring more water to be added) is experienced.

If stored at high temperatures and/or high humidity conditions the shelf life may be reduced.

Nitobond HAR and Concure A99 to be protected from frost.

Important notice

A Safety Data Sheet (SDS) is available from the Fosroc website. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

Product disclaimer

This Technical Data Sheet (TDS) summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read this TDS carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Parchem does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.



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