

High performance, medium weight, very low shrinkage, patch repair mortar

## Uses

For the reinstatement of large areas of reinforced concrete where low permeability characteristics are required and where higher compressive strength is an important consideration. Renderoc HB40 has been engineered for the repair of columns and beams but, because of its relatively low fresh wet density, is also suitable for soffits and other overhead repair work. The mortar can also be used for small, localised patch repairs.

Where compatibility with lower strength concrete is required, but low permeability and high-build characteristics are important, Renderoc HB25 should be used. For higher strengths Renderoc HB70 should be used.

Renderoc HB40 is approved for use with Galvashield XP, with a resistivity <math><15,000 \Omega \text{ cm}</math> @ 28 days.

## Advantages

- Maximum compatibility with concrete of compressive strengths 30 - 45 MPa
- High-build applications possible while maintaining higher compressive strengths - fewer cold joints
- Frequently obviates the need for formwork
- Polymer-modification provides 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
- Suitable for internal and external applications
- Potable water approved - complies to AS/NZS 4020:2005

## Description

Renderoc HB40 concrete reinstatement 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, medium-weight repair mortar. It is based on Portland cements, graded aggregates, lightweight fillers 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.

## Technical Support

Parchem offers a technical support package to specifiers, end-users and contractors, as well as on-site technical assistance.

## Design Criteria

Renderoc HB40 exhibits a series of performance characteristics designed to achieve maximum compatibility with concrete with a compressive strength greater than 30 MPa. It is capable of being hand applied up to 40mm thick and wet spray applied up to 110mm thick in vertical applications.

## Specification Clauses

### High-build concrete reinstatement mortar

The reinstatement mortar shall be a single component polymer-modified, cement based blend of powders to which only the site-addition of clean water shall be permitted. It shall be manufactured to achieve maximum compatibility with reinforced concrete with a compressive strength greater than 30 MPa.

The cured mortar shall achieve a compressive strength of 35MPa at 28 days; a drying shrinkage of <math><400</math> microstrain at 7 days and <math><600</math> microstrain at 28 days and Flexural Strength of 5.8 MPa @ 28 days.

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## Properties

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

Test Method	Standard	EN 1504 R3 Requirement	Test Result	
<b>Compressive Strength</b>	EN 2190:1999 AS 1478.2 - 2005	≥ 25 MPa -	38 MPa @28 days  10 MPa @ 1 day 25 MPa @ 7 days 35 MPa @ 28 days	
<b>Bond strength by pull off</b>	EN 1542:1999	≥ 1.5 MPa	without primer	1.8 MPa
			Nitobond HAR primer	2.5 MPa
<b>Chloride ion Content</b>	EN 1015-17:2000	≤ 0.05%	0.004%	
<b>Capillary Absorption</b>	EN 1307:2002	≤ 0.5 Kg/(m <sup>2</sup> x h <sup>0.5</sup> )	0.2 Kg/(m <sup>2</sup> x h <sup>0.5</sup> )	
<b>Carbonation Resistance</b>	EN 13295:2005	d ≤ ref concrete	Conform	
<b>Coefficient of thermal expansion</b>	EN 1770:1990	Declared Value	13.7 x 10 <sup>-6</sup> /°C	
<b>Shrinkage and Expansion</b>	EN 12617-4:2002	> 1.5 MPa	Shrinkage: 1.7 MPa Expansion: 1.7 MPa	
<b>Elastic Modulus</b>	EN 13412:2008	> 15 GPa	18.4 GPa	
<b>Chloride Diffusion</b>	Nordtest NT Build 443	-	4.47 x 10 <sup>-12</sup> /sec	
<b>Flexural Strength</b>	AS 1012.11 - 2000	-	5.8 MPa @ 28 days	
<b>Tensile Strength</b>	AS 1012.10 - 2000	-	3.1 MPa @ 28 days	
<b>Setting Time</b>	AS 1012.18 - 1996	-	Initial Set: 3 hours Final Set: 5 hours	
<b>Fresh Wet Density</b>		-	1780 Kg/m <sup>3</sup>	
<b>Drying Shrinkage (25 x 25 x 285) prisms @ 23°C, 50% RH)</b>	AS 1478.2 - 2005	-	< 400 microstrains @ 7 days < 600 microstrains @ 28 days	
<b>Alkali reactive particles</b>	RTA Rapid Mortar Bar Test RTA T363	-	<0.1% (Non-Reactive)	
<b>Build Characteristics achievable in a single layer</b>				
<b>Overhead</b>	-	-	Hand/Trowel up to 30mm	Wet Spray 60-85mm
<b>Vertical</b>	-	-	up to 40mm	70-110mm

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

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## Renderoc HB40

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### Application Instructions

#### Preparation

Saw cut or cut back the extremities of the repair locations to a depth of at least 10 mm to avoid feather-edging and to provide a square edge. Break out the complete repair area to a minimum depth of 10 mm up to the sawn edge and 20mm behind any exposed reinforcement steel.

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 where possible, paying particular attention to the back of exposed steel bars. Abrasive-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 abrasive-blasting to remove corrosion products from pits and imperfections within its surface.

#### Reinforcing steel priming

Apply one full coat of Nitoprime Zincrich 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. (If Galvashield XP are to be embedded into the Renderoc HB40 patch repair, refer to current Galvashield XP Technical Data Sheet for priming instructions).

#### Substrate priming

The substrate should be thoroughly soaked with clean water and any excess removed prior to applying one coat of Nitobond HAR primer and scrubbing it well into the surface. Renderoc HB40 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 HB40 mortar may be difficult. Scrubbing by hand a thin layer of the Renderoc into the tacky primer will assist adhesion and also minimise the chance of the primer drying out. If the Nitobond HAR primer dries before the application of the Renderoc, the area must be re-primed before proceeding.

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 your local Parchem sales office for further information.

Note: Nitobond HAR primer is not used when wet spraying Renderoc HB40. Refer to the separate information document "Wet Spraying Renderoc mortars" available from Parchem branches.

**Important Note:** When Renderoc HB40 is used in conjunction with Impressed Current Cathodic Protection, the substrate bonding primer should be an OPC: Water slurry mixed at a 2:1 ratio.

Polymer bonding agents should not be used. No steel primer should be applied. Please refer to Parchem for further advice.

#### Mixing

Care should be taken to ensure that Renderoc HB40 is thoroughly mixed. A forced-action mixer is essential. Mixing at a slow speed (400/500 rpm) in a suitably sized drum using appropriate equipment such as the Ransom 140 x 600 M14 Helical mixing paddle (product code: MH-MDR59) fitted to a heavy-duty 1600W mixer, such as Ransom 1602 E (product code: MH-EV160E) or equivalent is acceptable for one-bag mixes.

Free-fall mixers (cement mixers) must not be used.

For normal applications, place 3.0 - 3.2 litres of drinking quality water into the mixer and, with the machine in operation, add 1 full 20 kg bag of Renderoc HB40 and mix for 3 - 5 minutes until fully homogeneous. Note that the powder must always be added to the water. Initially add 3.0 litres of water, mix the product for a minimum 3 minutes to allow the polymers in the mix to activate; then make any necessary water adjustments after this time up to the maximum 3.2 litres.

#### Mixing part bags

It is recommended that full bags be mixed, however for applications where smaller quantities of product are required, experienced applicators may elect to mix half bags by weighing out 10kg of Renderoc HB40 and mixing with half the recommended quantity of water. In doing so the contractor accepts the risk of any off-ratio mixing. Agitate the dry product before weighing out to minimise any segregation. Reliable scales should be used to weigh out individual components.

#### 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 to the prepared substrate by gloved hand or trowel. Thoroughly compact the mortar on to the primed substrate and around the exposed reinforcement. Renderoc HB40 can be applied in sections up to 40 mm thickness in vertical locations and up to 30 mm 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 dependent on the actual configuration of the repair area and the volume of exposed reinforcing steel. Thicker applications can be achieved by spray application - see below.

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

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



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## Renderoc HB40

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### Build-up

Additional build-up can be achieved by application of multiple layers. The final thickness is dependent on the material consistency and substrate profile.

The surface of the intermediate layers should be scratch-keyed and cured with Nitobond AR. Repriming with Nitobond HAR and a further application of Renderoc HB40 may proceed as soon as this layer has set.

### Wet spray application

Renderoc HB40 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 the wet spray technique, including selection of spraying machines and nozzles, consult the document "Wet Spraying Renderoc mortars" or contact your local Parchem sales office.

### Finishing

Renderoc HB40 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 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.

### 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 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 or Concure A99, sprayed on to the surface of the finished mortar in a continuous film, is recommended. Large areas should be cured as trowelling progresses (0.5 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 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 generally benefit from the application of a 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. Parchem recommend the use of the Emer-Clad and 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. Emer-Clad and Dekguard products may be applied over the repair area without prior removal of the Nitobond AR / Concure A99 curing membrane. Other curing membranes must be removed prior to the application of Emer-Clad and Dekguard products.

### Cleaning

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

Equipment used with Nitoprime Zincrich and Nitobond EP should be cleaned with Solvent 10.

### Limitations

Renderoc HB40 should not be used when the temperature is below 5°C and falling. Do not mix part bags. Due to the relatively lightweight nature of Renderoc HB40, it should not be used in areas subjected to traffic. Neither should it be exposed to moving water during application. Exposure to heavy rainfall prior to final set may result in surface scour. If any doubts arise concerning temperature or substrate conditions, consult Parchem for advice.

NOTE: Renderoc HB40 is not designed to be used as a broad-scale building render. For large scale areas of repair please contact your local branch for further advice.

### Estimating

#### Supply

Renderoc HB40 product code: 302020

<b>Renderoc HB40:</b>	20 kg bag
<b>Nitoprime Zincrich:</b>	1 litre can
<b>Nitobond HAR:</b>	1, 5 and 20 litre containers
<b>Nitobond AR:</b>	5 and 20 litre containers
<b>Nitobond EP:</b>	1.5 and 6 litre packs
<b>Solvent 10:</b>	4 and 20 litre cans



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## Renderoc HB40

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### Coverage and yield

<b>Renderoc HB40:</b>	Approx 12.9 litres/20 kg bag
<b>Nitoprime Zincrich:</b>	8 /litre
<b>Nitobond HAR:</b>	3 - 4 /litre
<b>Nitobond AR:</b>	6 - 8 /litre
<b>Nitobond EP:</b>	4 - 5 /pack

Notes: actual yield per bag of Renderoc HB40 will depend on the consistency used. The yield will be reduced if the material is applied by a spray technique. 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

#### Shelf life

Renderoc HB40 has a shelf life of 12 months from date of manufacture if kept in a dry store in the original, unopened bags or packs. Refer to the Use by Date indicated on the packaging.

#### Storage conditions

Store in dry conditions in the original, unopened bags or packs. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced to 4 - 6 months. Nitobond HAR and Nitobond AR should be protected from frost and or freezing temperatures during storage and use.

### Important notice

A Safety Data Sheet (SDS) and Technical Data Sheet (TDS) are available from the Parchem website or upon request from the nearest Parchem sales office. 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.