

MAKPATCH HB

Polymer Modified High Build Repair Mortar for Vertical and Overhead Repairs

Makpatch HB is a lightweight concrete repair mortar supplied as a ready to use blend of dry powders which requires only the site addition of clean water to produce a highly consistent, lightweight repair mortar. The material is based on Portland cement, graded aggregates, lightweight fillers and chemical additives and is polymer modified to provide a mortar with good handling characteristics, while minimising water demand. The hardened product exhibits excellent thermal compatibility with concrete and outstanding low permeability properties. The low water requirement ensures fast strength gain and long-term durability.

Makpatch HB is a fine filled, light weight, cementitious mortar, specifically formulated for the repair of damaged concrete where a high build is required.

Makpatch HB Repair Mortar can be applied from 10mm to 70mm without slump with ultimate adhesion to concrete and masonry.

Makpatch HB is dimensionally stable.

RECOMMENDED USES

- For the reinstatement of large areas of concrete and for small, localised patch repairs.
- **Makpatch HB** is alkaline in nature and will protect embedded steel reinforcement.
- It is specifically designed for vertical and overhead high-build applications. The mortar is suitable where medium strength, as well as exceptional chloride and carbon dioxide resistance is required.

TECHNICAL DATA SHEET

- **Makpatch HB** has been engineered for the repair of columns and beams due to a relatively low fresh wet density without slump it can readily be used for vertical and overhead repair work.
- It can be applied in sections up to 70mm thickness in vertical locations and up to 60mm thickness in overhead locations in a single application without the use of formwork.
- Thicker sections can be achieved using 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 70 - 150 mm vertically and 70 - 110mm overhead, although this will depend on substrate profiles and the distribution of steel reinforcement. (Consult **Makrete** Technical Department)

FEATURES AND BENEFITS

- No metallic iron to cause staining
- High Build – up to 70mm
- Fast Setting
- Durable
- Excellent adhesion – High bond strength to substrate
- Low permeability polymer modified
- Lightweight formulation enabling extra high build
- May be coated with Makrete or proprietary range of protective coatings
- Reduces the need for formwork
- Can be applied by the wet-spray process for fast, high-build repairs

- Extremely low permeability provides maximum protection against carbon dioxide and chloride ions (salts)
- Excellent bond to the concrete substrates
- Shrinkage compensated formula
- Pre-bagged to overcome site-batched variations - only the site addition of clean water required
- Contains no chloride admixtures
- Australian Made and Australian Owned

APPLICATION INSTRUCTIONS PREPARATION

Saw cut or cut back the extremities of the repair locations to a depth of at least 10mm to avoid featheredging and to provide a square edge. Break out the complete repair area to a minimum depth of 10mm up to the sawn edge.

Any cracked or weakened concrete should be removed prior to being repaired to provide a sound contamination free surface.

Scabbling or water blasting should be used to remove laitance or loose material and provide a mechanical key.

Concrete should be broken out to expose all rust affected reinforcement. Exposed steel reinforcement must be sound and free of rust or scale. Damaged sections of reinforcing bars should be removed and replaced with new material.

Avoid feather edging. Carefully delineate all edges of the section to be repaired. Break concrete out if necessary, to ensure a minimum depth of 10mm is achieved.

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. (Consult **Makrete** Technical Department)

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. Grit-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. The surface should immediately be primed with Makprime Zinc to avoid further corrosion.

SUBSTRATE PRIMING

The substrate should be thoroughly soaked with clean water and any excess removed prior to applying one coat of **Makprime MP** (Multi-Purpose Primer).

Prime all concrete surfaces with **Makprime MP** to ensure good adhesion and optimum build. Maximum build is achieved while the primer is still tacky. Where the substrate is very porous a second coat of **Makprime MP** may be required.

Makpatch HB can be applied as soon as the primer becomes tacky. If the **Makprime MP** is too wet, overhead and vertical build-up of the Makpatch HB may be difficult. Scrubbing by hand a thin layer of the Makpatch HB into the tacky primer will assist adhesion and minimise the chance of the primer drying out. If the **Makprime MP** primer is allowed to dry greater than 24 hours, it is highly recommended a fresh coat is applied prior to application Makpatch HB.

In exceptional circumstances, e.g., where a substrate/repair barrier is required or where the substrate is wet or likely to remain permanently damp, **Makcote Binder** should be used as the primer. The **Makcote Binder** should be tacky but not dry prior to application of **Makpatch HB**. (Contact **Makrete** for further information)

REINFORCING STEEL PRIMING

Prime all exposed steel reinforcement with **Makprime Zinc** primer and allow to dry before continuing. If any doubt exists about having achieved an unbroken coating, a second application should be made and allowed to dry before continuing to apply the **Makpatch HB**.

MIXING

Makpatch HB is suitable for mixing using a drill and suitable mixing paddle. Use 3.3 - 3.6 litres of water per bag of **Makpatch HB** repair mortar to achieve a smooth, soft mortar consistency. Excess water will reduce the final strength and make application of the repair mortar more difficult.

Always add the powder to the water while mixing slowly to avoid lumps. Only mix quantity of material that can be used within the setting time.

Do not attempt to rework or re-temper any partially set product.

Care should be taken to ensure that **Makpatch HB** is thoroughly mixed. A forced-action mixer is essential. Mixing at a slow speed (400/500 rpm).

Free-fall mixers must not be used.

Place 3.3 - 3.6 litres of drinking quality water into the mixer and, with the machine in operation, add one full 20kg bag of **Makpatch HB** and mix for 3 to 5 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 3.6 litres per 20kg bag of **Makpatch HB**.

Always add the powder to pre-measured water.

DO NOT ATTEMPT TO RE-WORK PARTIALLY CURED MORTAR

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 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

Apply the mixed **Makpatch HB** to the prepared substrate by hand or trowel. First, work a thin layer of the mortar into the primer and then build the mortar on to this layer. Apply the mortar on to the primed substrate ensuring compaction around the exposed reinforcement.

Feather edging must be avoided in carrying out the patch repair.

The maximum thickness applied in any application should be limited to 70mm. A minimum thickness of 10mm should be maintained by saw cutting the edge of repairs. Where the depth of repair is greater than 70mm, the repair mortar may be built up in layers with 24 hours between applications. For large scale repairs consult **Makrete** Technical Department.

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

Makpatch HB can be applied in sections up to 70mm thickness in vertical locations and up to 60mm 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 **Makpatch HB** should be completely removed and reapplied at a reduced thickness on to the correctly reprimed substrate.

Note: the minimum applied thickness of **Makpatch HB** is 10mm.

Avoid application in direct sunlight.

MULTIPLE LAYER APPLICATION

Additional thickness or build can be achieved by application of multiple layers. Each layer must be finished off to a rough finish to obtain a mechanical key. The finished surface should be cured with **Makgrip A**. Allow mortar to set then reprime with **Makprime MP** and apply a subsequent layer of **Makpatch HB**.

SPRAY APPLICATION WET/SPRAY

Makpatch HB can be quickly and efficiently applied by the wet spray technique. Makrete recommend application using a wet spray method. This is achieved by using a mechanical mixer with a spray gun. This makes large applications and higher builds possible in a shorter time period, compared to a hand trowel applied method. (Consult **Makrete** Technical Department for additional information)

FINISHING/TOOLING OFF

Makpatch HB 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.

DO NOT OVERWORK THE SURFACE

Excess material can be cut back with a steel trowel and may be finished off with a damp sponge.

On completion of finishing off the surface the area must be cured with **Makgrip A**. This is to avoid dehydration and cracking.

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 chilled water should be used for mixing.

CURING

The application of a thin coat of **Makgrip A** as a curing membrane will reduce premature drying and potential surface cracking. Avoid application where strong winds and direct sunlight are present.

For large areas **Makpatch HB** should be cured as trowelling progresses without waiting for completion of the entire area. General curing should conform to good concreting practices. Makrete recommend **Makgrip A** for all curing of patch repair mortars.

APPLICATION OF PROTECTIVE DECORATIVE FINISHES

Makpatch HB can be overcoated with Makrete range of decorative and protective coatings as well as proprietary commercial coatings. (Consult **Makrete** for additional information)

Most coatings are compatible with **Makgrip A** and can be applied directly over the **Makgrip A** without the need for removal. (Consult **Makrete** for additional information)

PRECAUTIONS

- Do not apply in immersed conditions unless substrate primed with **Makcote Epoxy Binder**
- Do not apply on horizontal/trafficable surfaces
- Do not use as high strength structural repair applications (Consult **Makrete**)
- Do not apply when imminent rainfall is likely to occur

- Do not apply with temperatures less than 5 °C
- Do not apply at temperatures above 35°C and where strong winds are present
- Do not add excess water
- Do not rework the surface once set

PACKAGING

Makpatch HB is supplied in 20kg bags.

Makprime MP is supplied in 5 and 20 litres containers.

Makgrip A is supplied in 5 litre containers

SHELF LIFE

Makpatch HB has shelf life of 12 months if stored in the original sealed packaging in dry, low humid environments. Do not use if there are any lumps in the product.

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

CLEAN UP

Makpatch HB should be removed from tools and equipment with clean water immediately after use. Cured material can only be removed mechanically.

HEALTH AND SAFETY INFORMATION

Avoid contact with skin. Protective gloves and clothing are recommended when mixing or using this product. Please refer to full Safety Data Sheet for this product, which is available from Makrete Building Solutions.

TECHNICAL SPECIFICATIONS PERFORMANCE CHARACTERISTICS

TEST	STANDARD	TYPICAL PROPERTIES (RESULTS) MPa				
		Water Addition	1 Day	3 Days	7 Days	28 Days
Compressive Strength MPa	AS 1478.2:2005 AS 1012-11	3.4 litres per bag	12	18	25	30
		28 Days	3.8 MPa			
Flexural Strength (Modulus of Rupture)	AS 1012.11 - 2000	28 Days	3.8 MPa			
Indirect Tensile Strength	AS 1012.10.2000	28 Days	2.3 MPa			
Setting Time	AS 1012.18:1996 ASTM C191-2008	Initial Set @ 20°C	Final Set @ 20°C	Litres of water per bag		
		2.0 hours	4.5 hours	3.4		
Fresh Wet Density	AS1012.5	Approx. 1450 kg/m ³ - depending on consistency mixed				
Application Thicknesses	Trowel applied	10 mm vertical – min 70 mm vertical – max	10mm overhead min 60 mm overhead max			
Application Thicknesses	Wet Spray applied	70 – 150 vertical - min 70 – 110 overhead - max				
Working Time	AS1012.18	50 -60 minutes @ 20°C				
Bond Strength	ASTM C882-1987 Slant Shear Method	>10 MPa @ 28 days				
Application Temperature		Min 10°C Max 35°C				
Drying Shrinkage 25x25x285 prism	AS1478.2	<350 microstrain @ 7 Days at 23°C and 50% RH <550 microstrain @ 28 Days at 23°C and 50% RH				

YIELDS

Consistency	
Water per 20 kg bag - LITRES	3.4
Yield per 20 kg bag - LITRES	16
Fresh Wet Density in kg/m ³	1450
Bags required per cubic metre (m ³)	63 Bags

CONTACT & TECHNICAL SUPPORT

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Issue No:	1
Item Code	MAKP34
Pack Size	20 kg Bag

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.

The TDS should be carefully read 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. Makrete 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.

The information and any recommendations relating to the application and end-use of all MAKRETE products are provided in good faith based on MAKRETE's knowledge and experience of the products. In applications, the differences in materials, and variances of substrates and actual site conditions can vary such that no warranty in respect of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be taken as inferred either from this information, or from any written recommendations, or from any other advice offered by MAKRETE. The proprietary rights of third parties must be observed. All orders are accepted subject to our sale terms and conditions.

It is recommended that all products be properly stored, handled and applied in accordance with the printed literature (TDS).

PLEASE CONSULT OUR TECHNICAL DEPARTMENT FOR FURTHER INFORMATION.