

MAKPATCH HB 85 ULTRA

Polymer Modified High Ultimate Strength Structural High Build Fibre Reinforced Repair Mortar with Corrosion Inhibitor

Makpatch HB 85 Ultra is a polymer modified fibre reinforced high strength, high build shrinkage compensated structural repair mortar with corrosion inhibitor.

Makpatch HB 85 Ultra complies with EN 1504-3 Class R4.

Makpatch HB 85 Ultra is a concrete repair mortar which 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, high strength 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 hardened product exhibits excellent thermal compatibility with concrete and outstanding water repellent properties. The low water requirement ensures fast strength gain and long-term durability.

Makpatch HB 85 Ultra has high ultimate compressive strength as is used where high abrasion resistance is required.

Makpatch HB 85 Ultra is designed to be used for vertical, horizontal and overhead applications.

TECHNICAL DATA SHEET

Makpatch HB 85 Ultra has been specifically engineered for vertical, horizontal and overhead repair work. It can be applied in sections up to 150mm thickness in vertical locations and up to 100mm 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 200mm vertically and up to 150mm overhead, although this will depend on substrate profiles and the distribution of steel reinforcement. Contact **Makrete** for further information.

RECOMMENDED USES

- High build repairs for vertical, overhead and horizontal repairs
- Repairing damaged concrete panels where ultimate high strength structural is required
- High build repair applications 5mm to 150mm for vertical surfaces in a single application
- May be applied in verticals up to 150mm in isolated areas or with minimal formwork
- Can be applied up to 200mm in horizontal and vertical surfaces using wet spray method
- Suitable for structural strengthening
- Repairing concrete due to steel reinforcement corrosion and concrete spalling (Concrete Cancer)
- Use on Bridges, Infrastructure and superstructure works
- Suitable for light traffic

- Structural repairs to
 - Columns
 - Stairs
 - Decks
 - Balconies
 - Walls
 - Concrete Paths

FEATURES AND BENEFITS

- Complies to EN 1504-3 Class R4
- Dimensionally stable
- Compatible with concrete strength
- > 45MPa
- High strength - suitable for structural repairs
- Abrasion resistant - suitable for aggressive environments
- Shrinkage compensated - ensuring long term dimensional stability
- Low permeability to reduce the ingress of water, CO₂ and chloride ions
- High build formulation - allows for single application
- High resistivity - provides increased durability
- Can be applied using wet-spray process - providing faster more compact high build repairs
- Pre-bagged to overcome site-batched variations - only the site addition of clean water required
- High ultimate compressive strength
- Excellent workability
- May be coated with Makrete and proprietary range of protective coatings
- Exceptional bond strength to concrete substrates
- Internal or external applications
- Easy to use - simply add water and mix
- Fibre reinforced for low shrinkage
- Contains corrosive inhibitor
- Eliminates the need for formwork
- 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 horizontal and 5mm vertical to avoid featheredging and to provide a square edge. Break out the complete repair area to a minimum horizontal depth of 10mm up to the sawn edge (5mm for vertical).

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 horizontal depth of 10mm is achieved (5mm vertical application).

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 be immediately 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 85 Ultra 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 85 Ultra** may be difficult. Scrubbing by hand a thin layer of the **Makpatch HB 85 Ultra** 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 85 Ultra**.

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 Epoxy Binder** should be used as the primer. The **Makcote Epoxy Binder** should be tacky but not dry prior to application of **Makpatch HB 85 Ultra**. (Contact **Makrete** for further information) **Makpatch HB 85 Ultra** can be used in immersed conditions only if **Makcote Epoxy Binder** is used as a primer.

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 85 Ultra**.

MIXING

Makpatch HB 85 Ultra is suitable for mixing using a drill and suitable mixing paddle. Use 2.6 – 2.8 litres of water per bag of **Makpatch HB 85 Ultra** 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 85 Ultra** is thoroughly mixed. A forced-action mixer is essential. Mixing at a slow speed (400/500 rpm).

Free-fall mixers must not be used. Only use forced action mixing.

Place 2.6 – 2.8 litres of drinking quality water into the mixer and, with the machine in operation, add one full 20kg bag of **Makpatch HB 85 Ultra** 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 2.8 litres per 20kg bag of **Makpatch HB 85 Ultra**.

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 85 Ultra** 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 steel reinforcement.

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

The maximum thickness applied in any application should be limited to 150mm for vertical and horizontal areas.

A minimum thickness of 5mm should be maintained by saw cutting the edge of repairs. Where the depth of repair is greater than 150mm, 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 85 Ultra can be applied in sections ranging from 5 -150mm thickness in vertical locations and up to 5 -100mm 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 85 Ultra** should be completely removed and reapplied at a reduced thickness on to the correctly reprimed substrate.

Note: the minimum applied thickness of **Makpatch HB 85 Ultra** is 10mm for horizontal and 5 mm for vertical and overhead. 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 85 Ultra.

SPRAY APPLICATION WET/SPRAY

Makpatch HB 85 Ultra 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 85 Ultra 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.

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. Chilled water should be made by using ice in the water.

CURING

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 85 Ultra** 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 85 Ultra 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 when imminent rainfall
- Do not apply with temperatures less than 5 degrees
- 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
- If **Makpatch HB 85 Ultra** is applied over any live cracks, reflective cracking will occur in the **Makpatch HB 85 Ultra** if the substrate moves.
- Do not featheredge or apply in areas less than 5mm
- Do not expose to water or immersion for a minimum of 24 hours after application
- Always use a mechanical mixer to mix full or part bags
- For heavy vehicle traffic consult **Makrete**

PACKAGING

Makpatch HB 85 Ultra 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 85 Ultra 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 85 Ultra 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 Solution**

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 EN 1504-3 CLASS R4	2.6 litres per bag	20	35	65	80
		28 Days	8.1 MPa			
Flexural Strength (Modulus of Rupture)	AS 1012.11 - 2000	28 Days	8.1 MPa			
Indirect Tensile Strength	AS 1012.10.2000	28 Days	5.4 MPa			
Setting Time	AS 1012.18:1996 ASTM C191-2008	Initial Set @ 20°C	Final Set @ 20°C	Litres of water per bag		
		3.0 hours	5.5 hours	2.8		
Fresh Wet Density	AS1012.5	Approx. 2110 kg/m ³ - depending on consistency mixed				
Application Thicknesses	Trowel applied	5 mm vertical - min 150 mm vertical - max	5mm overhead - min 100mm overhead-max	10mm horizontal min 150 mm horizontal-max		
Application Thicknesses	Wet Spray applied	5 – 200 vertical - min 5 – 150 overhead - max				
Working Time	AS1012.18	40 - 50 minutes @ 20°C				
Bond Strength	ASTM C882-1987 Slant Shear Method	>15 MPa @ 28 days				
Application Temperature		Min 10°C Max 35°C				
Drying Shrinkage 25x25x285 prism	AS1478.2	<300 microstrain @ 7 Days at 23°C and 50% RH <450 microstrain @ 28 Days at 23°C and 50% RH <550 microstrain @ 56 Days at 23°C and 50% RH				
Coefficient of Thermal Expansion (CTE)		8-11x10 ⁻⁶ /°C				
Capillary Absorption	ASTM C 1585	3.6 x 10 ⁻⁴ mm/sec				

YIELDS

Consistency	Troweable
Water per 20 kg bag - LITRES	2.6 – 2.8
Yield per 20 kg bag - LITRES	11
Fresh Wet Density in kg/m ³	2110
Bags required per cubic metre (m ³)	91 Bags

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Item Code	MAKP36
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.