Emer-Patch™ Repair 40

Technical Data Sheet

Medium weight, shrinkage compensated concrete patch repair mortar

Uses

Use in vertical or overhead concrete repairs including columns and beams where low permeability is required.

Also suitable for small, localised patch repairs..

Advantages

- Up to 40mm thick application on vertical surfaces
- Compatible with concrete strength 30 to 45MPa
- Achieves 35 MPa after 28 days
- Abrasion resistant - suitable for aggressive environments
- Shrinkage compensated - provides long term dimensional stability, long term durability
- Low permeability
- Only requires the addition of clean water
- Suitable for use in contact with drinking water

Design Criteria

Emer-Patch Repair 40 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 in vertical applications.

Specification Clause

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.

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

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	Test Result	
Compressive Strength AS 1478.2 - 2005:	10 MPa @ 1 day 25 MPa @ 7 days 35 MPa @ 28 days	
Bond strength by pull off	without primer	1.8 MPa
	with primer	2.5 MPa
Chloride ion Content	0.004%	
Capillary Absorption	0.2 Kg/(m² x $h^{0.5}$)	
Carbonation Resistance	Conform	
Coefficient of thermal expansion	13.7 x 10^{-6} /°C	
Shrinkage and Expansion	Shrinkage: 1.7 MPa Expansion: 1.7 MPa	
Elastic Modulus	18.4 GPa	
Chloride Diffusion	4.47 x 10^{-12} m²/sec	
VOC content	13g / litre	
Flexural Strength	5.8 MPa @ 28 days	
Tensile Strength	3.1 MPa @ 28 days	
Setting Time	Initial Set: 3 hours Final Set: 5 hours	
Fresh Wet Density	1780 Kg/m³	
Drying Shrinkage (25 x 25 x 285) prisms @ 23°C, 50% RH)	< 400 microstrains @ 7 days < 600 microstrains @ 28 days	
Build Characteristics achievable in a single layer **Overhead:** **Vertical:**	 up to 30mm up to 40mm	

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 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 unsound material 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 Dulux® Metal Shield Cold Galv 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.

Substrate priming

The substrate should be thoroughly soaked with clean water and any excess removed prior to applying one coat of Emer-Patch Primer HAR primer and scrubbing it well into the surface. **Emer-Patch Repair 40 must be applied as soon as the primer becomes tacky.** If the Emer-Patch Primer HAR is too wet, overhead and vertical build up of the Emer-Patch Repair 40 mortar may be difficult. Scrubbing by hand a thin layer of the repair mortar into the tacky primer will assist adhesion and also minimise the chance of the primer drying out. **If the Emer-Patch Primer 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, contact your local Parchem sales office for further information.

Mixing

Care should be taken to ensure that Emer-Patch Repair 40 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 the Ransom MDR59 140 x 600 M14 Helical mixing paddle fitted to a heavy-duty 1600W mixer, such as Ransom RAN160 or equivalent.

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

For normal applications, place 2.7 - 2.9 litres of drinking quality water into the mixer and, with the machine in operation, add 1 full 18 kg bag of Emer-Patch Repair 40 and mix for 3 - 5 minutes until fully homogeneous. Note that the powder must always be added to the water. Initially add 2.7 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 2.9 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 9kg of Emer-Patch Repair 40 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 Emer-Patch Repair 40 to the prepared substrate by gloved hand or trowel. Thoroughly compact the mortar on to the primed substrate and around the exposed reinforcement. Emer-Patch Repair 40 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.

If sagging occurs during application, the Emer-Patch Repair 40 should be completely removed and reapplied at a reduced thickness on to the correctly re-primed substrate.

Note: the minimum applied thickness of Emer-Patch Repair 40 is 10mm.

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 Emer-Patch Primer HAR. Repriming with Emer-Patch Primer HAR and a further application of Emer-Patch Repair 40 may proceed as soon as this layer has set.

Finishing

Emer-Patch Repair 40 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 Emer-Patch 40 to stiffen before attempting to finish off - this will minimise slumping.

Emer-Patch™ Repair 40

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

Emer-Patch Repair 40 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 a curing compound (such as Fosroc 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 (0.5m^2 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

Emer-Patch Repair 40 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. The Emer-Clad range of protective, anti-carbonation coatings provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment.

The use of curing membranes for curing the repair mortar may impact application of coatings by after trades. Emer-clad Façade may be applied over the repair area without the prior removal of Concure A99 curing membrane. Other curing membranes must be removed prior to the application of Emer-clad Façade

Cleaning

Emer-Patch Primer HAR and Emer-Patch Repair 40 should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Limitations

Emer-Patch Repair 40 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 Emer-Patch Repair 40, 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 Emer Customer Service for advice.

NOTE: Emer-Patch Repair 40 is not designed to be used as a broad-scale building render. For large scale areas of repair please contact Emer Customer Service for further advice.

Estimating

Supply

Emer-Patch Repair 40:	18kg bag
Material code:	FE400120-18KG
Emer-Patch Primer HAR:	5 litre drums
Material code:	FE400100-5L

Coverage and yield

Emer-Patch Repair 40:	11 litres / 18 kg bag
Emer-Patch Primer HAR:	3 - 4 m²/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

Emer-Patch Repair 40 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.

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