# Cempatch HB45

## High strength, fibre reinforced, hand/wet-spray applied concrete reinstatement mortar

### DESCRIPTION

Cempatch HB45 is a high-build, hand/wet-spray applied, one-component polymer modified and fibre reinforced structural repair mortar. Cempatch HB45 is a thixotropic mortar made up of dry powders, selected aggregates, polymers and fibres, which when mixed with water allows it to be used vertically and overhead.

Without the use of formwork, Cempatch HB45 can be applied in a single application of up to 80 mm thickness in vertical applications and up to 60 mm thickness in overhead applications. When larger thicknesses are necessary, sections can be built up in stages or with the use of formwork.

### APPLICATIONS

- Repair of all types of structural concrete where high strength and extremely low shrinkage properties are required.
- For the repair of vertical and overhead elements.
- As a repair mortar for all structural elements in buildings, water retaining structures, industrial plants, bridges, etc.
- Deep pockets can be filled in a one application depending on the shape of the pocket and the volume of exposed reinforcement.

### ADVANTAGES

- Polymer modified, provides extremely low permeability to water, carbon dioxide and chlorides.
- Shrinkage compensated, providing exceptional long-term dimensional stability.
- Easy to apply. Single component, requires only addition of water.
- High bond strength, ensuring monolithic performance of the repair.
- Can be spray applied efficiently by the wet spray technique.
- Thixotropic properties allowing extra high build for vertical and overhead applications.
- Contains no chlorides.
- Suitable for internal and external application.
- Water vapour permeable.
- Suitable for use in contact with potable water.
- Easy to finish.
- Cost effective, hand or wet spray applied no formwork is required.
- Suitable for use with cathodic protection systems.
- Extremely low permeability, which retards chemical attacks in aggressive environments.

| TECHNICAL PROPERTIES. W/P= 0.14: | |
|---|---|
| Colour: | Grey |
| Fresh wet density: | 2.15 ± 0.10 g/cm$^3$ |
| Mixing ratio: | 3.5 litre of water for 25 kg |
| Minimum application temperature: | 5°C |
| Working time: | 20 - 30 min |
| Flexural strength: BS 6319-3 | ≥ 9 N/mm$^2$ |
| Tensile strength: BS 6319-3 | ≥ 3 N/mm$^2$ |

| Performance Characteristics | EN 1504-3 Requirement | Measured Value. W/P = 0.14 |
|---|---|---|
| Compressive strength: BS EN 12190 | ≥ 45 N/mm$^2$ | ≥ 50 N/mm$^2$ @ 28 days |
| Chloride content: BS EN 1015-17 | ≤ 0.05% | ≤ 0.04% |
| Adhesive bond: BS EN 1542 | ≥ 2 N/mm$^2$ | ≥ 2.25 N/mm$^2$ |
| Thermal compatibility freeze-thaw: BS EN 13687-1 | ≥ 2 N/mm$^2$ | ≥ 2 N/mm$^2$ |
| Carbonation resistance: BS EN 13295 | ≤ control concrete MC (0.45) | Pass |
| Elastic Modulus: EN 13412 | ≥ 20 GPa | ≥ 20 GPa |
| Capillary Absorption: EN 13057 | ≤ 0.5 kg.m$^{-2}$.h$^{-0.5}$ | ≤ 0.2 kg.m$^{-2}$.h$^{-0.5}$ |
| Reaction to fire: EN 1504-3 cl 5.5 | A1 | |
| Dangerous substance: | Complies with 5.4 | |

**Don Construction Products Ltd.**
Helions Bumpstead Road, Haverhill CB9
United Kingdom
*info.uk@dcp-int.com; info@dcp-int.co.uk*
*www.dcp-int.com*

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## STANDARDS

Cempatch HB45 complies with:

- The requirements of BS EN 1504-3 Class R4 for repair principles 3.1, 3.3, 4.4, 7.1, and 7.2.
- Complies with Highways England, Standards for Highways, Specifications for Highways Works, clauses 5703, 5704, 5716 (Repair Mortar).

## METHOD OF USE

## SUBSTRATE PREPARATION

The perimeters of the repair area should be saw cut to a minimum depth of 10 mm to avoid feather-edging and to provide a square edge. All damaged and weak concrete should be cut back to reach sound concrete and/or to a minimum depth of at least 10 mm.

Corroded steel reinforcement should be grit blasted to remove all rust traces; In case of significant loss in the steel reinforcement cross section, the steel should be replaced. in all cases, the steel should be clean and bright after cleaning.

Exposed reinforcement that is contaminated with chloride or other material which may cause corrosion should be water blasted with high pressure to provide a clean surface and remove the corrosion products.

In case of any oil and grease deposits, surfaces must be degreased using degreasing products, steam cleaning, or any other suitable method which assures the surface is free from any oil traces.

All surfaces must be clean and free from dust, oil, grease, paints, or any loose material, and the prepared area should be cleaned thoroughly by brush and/or compressed air.

Areas to be repaired with Cempatch HB45 should be soaked with clean water before applying the repair mortar. All excess water should be removed prior to applying Cempatch HB45.

## PRIMING

*Reinforcing Steel Priming*
If steel reinforcement is corroded, all corroded steel should be grit blasted and then primed within 2 - 4 hours with one or two coats of zinc rich epoxy coating Repcoat ZR.

Passive corrosion protection can be provided using Cempatch Primer alternatively.

*Substrate Priming*
Areas to be repaired with Cempatch HB45 should be soaked with clean water before applying the repair mortar. All excess water should be removed prior to applying Cempatch HB45.

*Substrate Priming using a primer (Optional)*
Areas to be repaired with Cempatch HB45 should be soaked with clean water before applying Cempatch Primer and repair mortar. All excess water should be removed prior to applying Cempatch Primer.

Use a stiff brush or spray gun to apply a thick coat of Cempatch Primer (As a bonding agent slurry) to presoaked surfaces. Application of Cempatch HB45 repair mortar should take place while the bond coat is still wet (tacky).

## MIXING

To ensure proper mixing, a mechanically powered mixer or drill fitted with a suitable paddle should be used.

3 - 3.5 litre of clean water should be added to clean container. The powder is then added slowly to the water while mixing continuously with low speed mixer/drill (400 - 600 rpm). Mixing time should be continued for 3 minutes until uniform consistency is obtained.

*Note: Always mix full bags. Do not mix partial bags.*

## PLACING AND FINISHING

Ensure all exposed steel reinforcement bars are firmly secured to prevent any movement during application.

Cempatch HB45 can be applied by trowel, or hand gloves. The mixed mortar should be applied with firm pressure to fully compact the mortar and ensure good adhesion with the steel reinforcement and substrate.

Finishing and levelling should be carried out initially by a straight edge or a steel float. Final finishing should be carried out using wooden or plastic float followed by a damp sponge. However, the completed surface should not be overworked.

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For spray application, where large areas of repair are required, Cempatch HB45 can be efficiently applied by wet spray technique. This will provide rapid placement, higher build of the product, and enhanced bond compared to trowelling application.

After spray application, Cempatch HB45 may need to be finished and [cut back] to the required profile using a steel float and then finished with damp sponges as described before.

*Notes:*

- *Cempatch HB45 should not be applied at a thickness less than 10 mm.*
- *If any sagging or slumping occurs, Cempatch HB45 should be completely removed and reapplied at a lower thickness.*

## CURING

As Cempatch HB45 is a cementitious based material, it should be cured in a similar method to concrete. Appropriate curing methods include using Setseal 6 curing memrane, Setseal AW309, or polythene sheeting.

## CLEANING

All tools should be cleaned immediately after application using fresh water. Hardened materials must be cleaned mechanically.

## PACKAGING

Cempatch HB45 is available in 25 kg sacks.

## THICKNESSES AND SIZE LIMITATIONS

Cempatch HB45 can be applied in a single application for sections up to 60 mm thick in overhead applications and 80 mm thick in vertical applications. Thickness should not be less than 10 mm deep in all applications.

Additional thickness can be achieved by applying multiple layers. The surface of each intermediate layer should be comb-scratch keyed, allow to cure, then follow the steps from "Priming" section as desired.

## PRECAUTION:

- In temperatures as low as 5°C, using warm water (up to 30°C) for mixing is recommended to speed up strength development. Standard winter precautions for cementitious materials should be followed.
- Do not apply if the substrate or air temperature is 5°C and falling. Application can proceed at 5°C if the temperature is stable or rising.
- At temperatures above 35°C, store the material in the shade and use cool water for mixing.
- Always mix full bags. Do not mix partial bags..

## YIELD

Approximately 12.6 – 13.9 litre per 25 kg bag. (approx. 75 bags/m³).

## STORAGE

Cempatch HB45 has a shelf life of 12 months from the date of manufacture if stored at temperatures between 2°C and 35°C in original unopened bags.

If these conditions are exceeded, DCP Technical Department should be contacted for advice.

## CAUTIONS

## HEALTH AND SAFETY

Cempatch HB45 may cause irritation to skin or eyes.
In case of accidental contact with eyes, immediately flush with plenty of water for at least 10 minutes and seek medical advice if necessary.

For further information, refer to the Material Safety Data Sheet.

## FIRE

Cempatch HB45 is nonflammable.
Repcoat ZR is flammable. Ensure adequate ventilation. Do not use near a naked flame and do not smoke during use. Extinguish with $CO_2$ or foam. Do not use a water jet.

*Flash Point:*
Repcoat ZR: 23°C.

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