

MONNELI BETOCEM FLOW

Fluid Non-Shrinking Mortar for Degraded Concrete Repair

Product Description

A non-shrinking mortar composed of high resistance hydraulic binders, silica sand, selected aggregates and special additives. The product is characterized with excellent properties such as: free flowing, high adhesion to the support and resistance against Sulphates. It is fibre reinforced, and very fluid which makes it suitable to be casted into tight shuttering.

Uses

BETOCEM FLOW is used in repairing and constructing of elements that are degraded or damaged. It is ideal for the reinstatement of large, structural sections of concrete as well as for small structural elements where it is difficult to cast or to apply mortar. Structural consolidation of concrete beams, columns, walls, honey combed concrete, floors and pillars, for preparation of concrete pavements (roads, airports, industries), for rigid joints filling, up to 4 cm of thickness, in prefabricated residential and industrial building.

Advantages

- Easy to use, simply by adding water
- After curing, the product has high mechanical resistance both flexure and compression, even after a short time of curing.
- It is characterized by the thermal expansion coefficient and permeability coefficient which is similar to those of high quality concrete.
- Low alkali content minimizes the risk of alkali silica reaction.
- Exceptional bond to concrete substrates without independent primer.
- Suitable for placement by pumping or pouring techniques.

- Self compacting nature eliminates honey combing while applying without vibration (ensures a complete filling of damaged areas).
- Low permeability and high strength which cause very good protection against chlorides and carbon dioxide.

Instructions for Use

Surface Preparation

Concrete preparation

The surface of the concrete to be repaired should be sound, clean and uncontaminated. The decayed or damaged area to be repaired should be marked. Cut the marked area to a depth of at least 10mm using a hand held concrete saw or disc grinder to avoid feather edging and to provide a square edge. Break out or chip the complete repair area down to sound base using sharp tools or chipping hammer.

Prepare the formwork to be rigid and tight to prevent loss of material. The formwork should include drainage outlets for presoaking.

Oil and grease deposits should be removed by stiff brushing, detergent scrubbing with a heavy duty cleaner/ degreaser or steam cleaning.

Steel preparation

Any corroded steel in the repair area must be fully

exposed. All exposed reinforcement shall be cleaned of corrosion products by wet grit blasting or other approved means to achieve a clean and bright finish. In case that reinforcing bars section is reduced due to oxidization, integrate them with additional bar reinforcement.

Priming

Steel priming

The cleaned steel should be coated within 3 hours.

Apply one coat of BETOFER, a corrosion proof cementitious based primer or EPOZINC, a two component Zinc rich EPOXY PRIMER, continuously with brush onto the cleaned bar reinforcement ensuring that the whole steel surface area is completely covered. Allow to dry before proceeding with the repair.

Concrete priming

Surface to be repaired should be soaked with water for several hours prior to application of BETOCEM FLOW, to minimize local absorption and to assist in the free flow of material. If the concrete deterioration is due to Chloride attack, it is recommended to use EPORIPRESA, an epoxy bonding agent. It will cure to form a barrier against Chloride ions. However if the cause is Carbonation, dampen the surface with clean water (avoiding free standing water) and apply thin coat of AR LATEX RIPRESA, an Acrylic bonding agent.

BETOCEM FLOW must be applied before the bonding agent dries while it's still tacky to achieve a better bond between the fresh and cured section.

Mixing

To prepare the mortar, it is recommended to have a forced-mixer of spiral paddle in a slow speed (300/400 rpm) heavy duty drill. It is essential that machine mixing capacity and labour availability is adequate to enable the placing operation to be carried out continuously. Add 3.3 – 3.5 liters of cold clear water in the mixing drum then add the full bag of BETOCEM FLOW and mix for at least 4 – 5 minutes till obtaining a fluid, uniform lump free consistency mix.

Do not part mix the bags, nor use additional water than specified. Note that powder must always be added to water.

To obtain the full benefit of the fluidity provided, apply BETOCEM FLOW immediately after mixing.

Application

Cast the mortar into the formwork, allowing air to escape. It's advisable to spray the formwork by water prior to placing the mortar to avoid water absorption from the mix. BETOCEM FLOW should be placed in a single continuous operation. The material should be poured slowly to prevent air entrapment. BETOCEM FLOW can be used for thickness that ranges from 20 mm to 200 mm. For higher thickness, the addition of suitable graded 5-8 mm aggregate (up to 30% can be added). This could increase the thickness of applied mortar by 80 mm. Vibration process to the mixture is not necessary.

Curing

The repaired area shall be cured in accordance with good concrete curing practice and protected from drying winds, sun or excessive heat. Curing shall be done with non-degradable curing compound BETOCURE AR.

Alternatively; a wet hessian cloth covered with polyethylene sheet can also be employed. Curing should begin as soon as final finish is achieved.

Cleaning

BETOCEM FLOW should be removed from tools and equipment and mixers with clean water immediately after use. Cured material should be removed mechanically.

Equipment used for applying EPORIPRESA, the epoxy bonding agent should be cleaned with SOLVENTE 10.

Recommendations

- Avoid rapid evaporation of water that may cause small superficial fissures appearance due to plastic shrinkage after application.
- Damp the surface for the initial 24 hours
- Do not apply the product at the temperature less than +5°C.
- Variation of temperature increases or reduces the initial and final setting of the mortar
- In warm weather, store the material in cool place.
- Make sure to use cool water to keep the mixed mortar temperature below 30 +°C.

Technical Data

Properties	Results
Appearance	Grey powder
Density	2.3 kg/L
VOC	8.3 g/L
pH Value	12-13mm
Flexural strength (ASTM C580) at 7 days at 28 days	6 N/mm ² 9 N/mm ²
Tensile strength at 28 days (BS 6319-7)	5 N / mm ²
Compressive strength at 7 days at 24 days (ASTM C579)	48 N / mm ² 60 N / mm ²
Adhesion to concrete at 28 days (BS 1881 Pt 207)	1.8 N / mm ² breakup of concrete
Slant shear strength	7.8 N / mm ²
Coefficient of thermal expansion (BS 6431-15)	1 x10 ⁻⁶ μm
Water absorption (BS 1881 Pt122)	1%
Water penetration (BS 12390 Pt8)	3mm
Chloride ion penetration (ASTM C1202)	Low
Porosity (ASTM C642)	4.4%
Elastic module after 28 days	25,000 N / mm ²
Drying shrinkage at 28 days (ASTM C157-93)	<500 microstrain
Initial setting	1.5-2 hours
Final setting	3-3.5 hours
Noxiousity according to ECM 88/379	No

Test performed at 25°C, 50% of relative humidity and in absence of ventilation.

All values are subject to 5-10 % tolerance

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DUBAI
ABU DHABI
ITALY

P.O. Box 123808 Dubai UAE
P.O. Box 127326 Abu Dhabi, UAE
Z.I. Ponte d'Assi 06024 Gubbio (PG)

T. +971 4 8803488 F. +971 4 8803450
T. +971 2 5511949 F. +971 2 5511749
T. +39 75 9221297 F. +39 75 9221174

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colmef@colmef.ae

www.colmef-me.com

Yield

12.5 liters / 25 kg bag with 3.5 liters water addition

Packaging

BETOCEM FLOW is supplied in 25 kg bags.

Storage

Keep the product in dry and sheltered place. In these conditions its stability is of at least 12 months.

Health & Safety

BETOCEM FLOW can be harmful to skin as it contains cement powders which may releases alkalis when mixed with water.

During application, wear appropriate protective clothing, goggles, gloves and respiratory equipment if necessary.

In case of contact with skin, rinse with water and again wash thoroughly with soap and water. In case of contact with eyes, rinse with plenty of water and seek medical advice accordingly.

If ingested, obtain medical attention immediately. Do not induce vomiting.