

Fastfill

Class R4 Rapid Setting Structural Repair Mortar



Product Overview

Rapid setting, high strength, fibre reinforced, shrinkage compensated waterproof mortar for structural repair and reinstatement of concrete. CE-marked in accordance with BS EN 1504-3 Class R4.

Uses

Durable repair of concrete subject to heavy wear such as roads, runways, bridges, decks, floors and footpaths. Suitable for repair methods 3.1, 3.2, 4.4, 7.1, 7.2 as defined by BS EN 1504-3. When bulked out produces a pourable mortar or micro-concrete especially for potable water applications.

Advantages

- Incorporates the latest proven cement chemistry, microsilica, fibre and styrene acrylic copolymer technology.
- Pre-packaged material only requiring mixing with water on-site. Can be bulked out with sand or aggregate.
- Rapid strength development, even at sub-zero temperatures. Allows early return to service.
- Sets in 10 minutes at 20°C yielding a durable, high strength mortar.
- Repairs can be walked on in 1 hour, and subject to vehicular traffic in 2 hours.
- Ideal for use in tidal applications due to rapid setting properties.
- High bond strength exceeds tensile strength of concrete, ensuring monolithic performance of the repair.
- Portland cement base.
- Dense matrix resists 10 bar water pressure. Very high diffusion resistance to acid gases and chloride ions.
- Resistant to a wide range of chemicals. Sulphate resistant to class DS-5/5m of BRE Special Digest 1 and ideally suited for sewage and wastewater applications.
- Non-toxic when cured and listed as authorised under Regulation 31 for use in the supply of drinking water.
- Economic mortar requiring no substrate or inter-layer priming. Part bags can be mixed.

Description

FASTFILL is a single component, polymer modified, fibre reinforced Portland cement based repair mortar. It is rapid curing with enhanced polymeric properties and reliable strength development which is not significantly affected by low temperature use. Can be used as supplied up to 100mm deep, or bulked out with sharp sand or aggregate to a flowing consistency for floor or deck repairs up to a maximum depth of 300mm.

Compliance

- CE-marked in accordance with BS EN 1504-3 Class R4. Suitable for repair methods 3.1, 3.2, 4.4, 7.1, 7.2 as defined by BS EN 1504-3.
- BBA Approved, Certificate No. 05/4276.
- Listed under Regulation 31 - England and Wales: Regulation 33 - Scotland: Regulation 30 - NI: for use with potable water. WRAS Approved for use with potable water.
- Compliant with Highways Agency Standard BD27/86 for the repair of Highway Structures.
- Compliant with LU Standard 1-085 'Fire Safety Performance of Materials'.

Specification Clause

The repair mortar shall be a single component, polymer modified, fibre reinforced, Portland cement based repair compound, which is physically and chemically compatible with the host concrete. It shall be BBA Certified and CE-marked in accordance with BS EN 1504-3 Class R4, and comply with the following performance specification:

- Ability to set in 10 minutes at 20°C, achieving a compressive strength of at least 14 MPa in 1 hour and 60 MPa in 28 days.
- Sulphate resistance to class DS-5/5m of BRE Special Digest 1.
- Impermeable to water under 10 bar hydrostatic pressure such that 7.5mm of mortar is equivalent to 1000mm of concrete.
- Oxygen diffusion coefficient to be no greater than $2.60 \times 10^{-4} \text{ cm}^2/\text{sec}$.

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EN1504-3: Concrete repair product for structural repair
PCC mortar (based on hydraulic cement polymer modified)

Compressive Strength	: Class R4 $\geq 45 \text{ MPa}$
Adhesive Bond	: Class R4 $\geq 2.0 \text{ MPa}$
Chloride Ion Content	: $\leq 0.05\%$
Carbonation Resistance	: Passes
Elastic Modulus	: 26.1 GPa
Thermal Capability Part 1	: Class R4 $\geq 2.0 \text{ MPa}$
Capillary Absorption	: $0.108 \text{ kg.m}^{-2}.\text{h}^{-0.5}$
Dangerous Substances	: Complies with 5.4
Reaction to Fire	: Euroclass A2-s1, d0

Technical Data / Mechanical Characteristics

Property	Standard	BS EN 1504-3 R4 Requirement	Result
Compressive Strength	EN 12190	≥ 45 MPa	28 days: 60 MPa
Compressive Strength Development @ 20°C			1 hour 14.0 MPa 1 day 40.0 MPa 2 hours 20.0 MPa 7 days 50.0 MPa 4 hours 30.0 MPa 28 days 60.0 MPa
Adhesive Bond	EN 1542	≥ 2.00 MPa	2.39 MPa
Chloride Ion Content	EN 1015-17	$\leq 0.05\%$	0.012%
Carbonation Resistance	EN 13295	\leq ref concrete	Passes
Elastic Modulus	EN 13412	≥ 20 GPa	26.1 GPa
Capillary Absorption	EN 13057	≤ 0.5 kg/m ² /h ^{0.5}	0.108kg/m ² /h ^{0.5}
Thermal Compatibility Freeze/Thaw Cycling	EN 13687-1	≥ 2.0 MPa	2.45 MPa
Water Permeability Coefficient Equivalent Concrete Thickness	Taywood Test	-	2.60 x 10 ⁻¹⁴ m/sec 7.5mm of Fastfill = 1000mm of concrete
Flexural Strength	EN196-1	-	11.6 MPa
Tensile Strength	BS 6319: 7		3.657 MPa
Shrinkage	BS EN 12617-4	-	0.025% after 7 days
Mixed Density		-	2150kg/m ³ at 0.14 water: powder ratio
Mixed Colour		-	Concrete grey
Min Application Thickness Max Application Thickness		-	5mm 50mm per layer on vertical and 100mm on decks and floors 300mm when bulked out
Min Application Temperature Max Application Temperature		-	-10°C (refer to Technical Department) 40°C
Working Life (approx.)		-	10 minutes at 20°C
Reaction to Fire	EN 13501-1	Euroclass	Euroclass A2 – s1, d0

The properties given above are obtained from laboratory tests: results obtained from on-site testing may vary according to site conditions

Application Instructions

Preparation

Mechanically remove all damaged concrete or failed repairs back to a sound core. Wherever possible, the full circumference of the steel reinforcement should be exposed to at least 25mm behind the bars and 50mm beyond the point at which corrosion is visible.

On cutting back, feather edges must be avoided. The perimeter of the repair area should be stepped to a depth of 10mm by means of saw, disc cutting or preferably using a power chisel.

The areas to be repaired must be free from all unsound material, dust, oil, grease, corrosion by-products and organic growth. Smooth surfaces should be roughened, all loose material and surface laitance removed and reinforcement cleaned to bright steel using wet grit blasting techniques or equivalent approved methods.

If chlorides are absent from the concrete and environmental constraints preclude the use of blasting then hand held power tools such as a needle gun, angle grinder

or power wire brush can be used to remove all loose corrosion by-products back to bright metal.

The strength of the concrete sub-base should be a minimum of 20 MPa.

The prepared substrate should be thoroughly soaked with clean water until uniformly saturated without any standing water. In winter, use warm water or a heat source to ensure the substrate temperature is $\geq 5^\circ\text{C}$ before application.

Treatment of Steel Reinforcement

All exposed steel reinforcement should be treated with 2 x 1mm coats of **STEEL REINFORCEMENT PROTECTOR 841** applied by brush (See separate Data Sheet for full details). NB: When carrying out repairs in new construction, it is not necessary to fully expose any reinforcing bars.

Priming of Concrete

FASTFILL is highly polymer modified and as a result concrete surfaces do not generally require a primer. Highly porous substrates should be primed with **BONDING BRIDGE 842** prior to the application of the repair mortars (See separate Data Sheet for full details).



Mixing

FASTFILL should be mechanically mixed using a forced action pan mixer or in a clean drum using a drill and paddle. A normal concrete mixer is **NOT** suitable. For normal applications, typically use 3.5 litres of clean water per 25kg bag. For part bags, use 5.5 volumes of powder to one volume of water. In cold temperatures, tepid water may be used to adjust working life.

For screeding applications or larger pockets in decks up to a maximum depth of 100mm; a clean, washed, Medium Grade concreting sand can be introduced, up to 50% by weight. For deep repairs up to a maximum of 300mm in a single application, or where a pourable concrete is required, coarse, clean aggregates (5-10mm size) can be introduced into the mix, in up to equal proportions by weight, without adversely affecting its physical performance.

Please Note: It is vital to the success of the application that these instructions are strictly adhered to. Flexcrete cannot be held responsible for any product failures due to incorrect mixing.

Placing

For normal applications, **FASTFILL** should be compacted, using a placing technique to remove entrapped air, in layers not exceeding 50mm in vertical situations, or 100mm deep in pockets. When bulking out to the maximum of 300mm, support with shuttering and compact to remove entrapped air.

For repairs which require multi-layer applications, it is important to ensure that the previous layers are well keyed and stable but not fully set (usually 15-30 minutes dependent upon temperature) prior to the application of subsequent layers. Final profiling of a high quality is achieved with a steel float. When applying material to floors, the area should be divided up and each bay completed within the working life of the **FASTFILL**. Typically, bay sizes should be restricted to 1m² but please consult our Technical Department for further advice. Do not polish the surface with a steel float, but use a stiff brush on the wet surface to provide a slip-resistant finish.

Note: FASTFILL must be allowed to cure for a minimum of 30 minutes prior to total immersion.

Curing

Normal concreting procedures should be strictly adhered to. It is important that the surface of the mortar is protected from strong sunlight and drying winds with **FLEXCRETE CURING MEMBRANE WB**, polythene sheeting, damp hessian or similar (See separate Data Sheet for details).

Cleaning and Storage

All tools should be cleaned with water immediately after use. Materials can be stored for 12 months in dry, frost free conditions with unopened bags at 20°C.

Packaging

FASTFILL is supplied in 25kg bags.

Yield and Coverage

13.3 litres per 25kg bag. Up to 23 litres when bulked out with aggregate.

A 25kg bag as supplied covers 1.33m² at 10mm thickness.

Health and Safety

Safety Data Sheets are available on request.

Application Top Tips

1. When bulking out, base the initial quantity of water on the amount of **FASTFILL** in the mix. Add the minimum amount of extra water to achieve the desired consistency, as table below:

Extra Water	Flow (mm)	Set Time (mins)
10% (3.9 litres)	160	30
20% (4.3 litres)	175 - 180	35 - 40
30% (4.5 litres)	210 - 220	40 - 45

2. Take care if using very cold mixing water as this will accelerate setting of **FASTFILL**.
3. **DO NOT WET OUT OR PRIME** between layers.
4. **DO NOT OVER TROWEL**. If the mortar begins to slump, allow to stabilise and refinish.
5. When finishing, trowel from centre out towards the perimeter working into the edges of the repair.
6. Due to the rapid set of **FASTFILL**, only mix as much material to use within the working life of the mortar.
7. Do not hand mix smaller volumes.
8. For large floor repairs, divide into bays and adopt a checkerboard pattern limiting individual bay sizes to a maximum of 1m².
9. **FASTILL** is particularly suited to repairs at temperatures as low as -10°C, but should not be applied to frozen substrates. In cold temperatures use tepid water to adjust working life. Very cold water will shorten working life and accelerate set.
10. Hot Weather Working (See separate Guide)
 - Store material in cool conditions to maximise working life.
 - Shade applied material from strong sunlight.
 - Spray apply a 2nd coat of **CURING MEMBRANE WB**.
 - If possible, avoid extreme temperatures by working at night.

The information herein is correct to the best of our knowledge, but it does not necessarily refer to the particular requirements of the customer. If the customer has any particular requirements it should make them known in writing to Flexcrete Technologies Limited, and obtain further advice accordingly.



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