Tiefill

Class R4 Waterproof Tiehole Filler

Product Overview

Single component, polymer modified cementitious mortar. CE-marked in accordance with BS EN 1504-3 Class R4.

Uses

Filling of tieholes formed by formwork bolts in new construction, particularly where a rapid setting, durable, waterproof mortar is required. Can also be used for sealing grout holes and voids around fixings in pre-cast elements. Suitable for repair methods 3.1, 7.1, 7.2 as defined by BS EN 1504-3.

Advantages

- Incorporates the latest proven cement chemistry, polymer and fibre technology.
- Pre-packaged materials in convenient pack sizes only requiring mixing with clean water on-site.
- High bond strength exceeds tensile strength of concrete, thus ensuring monolithic performance.
- Sets in 30 minutes at 20°C, yielding a durable, high strength mortar.
- Waterproof seal which withstands 10 bar water pressure after only 72 hours curing.
- Polymer modification gives enhanced adhesion and low permeability, providing excellent protection from acid gases, moisture ingress and chlorides.
- Improved tensile and impact strength. Excellent low sag properties.
- Non-toxic when cured and WRAS approved for use in contact with potable water.
- Economic mortar generally requiring no substrate or inter-layer priming. Part bags can be mixed.

Description

TIEFILL is a single component, polymer modified, fibre reinforced, Portland cement based repair compound which exhibits unique hydraulic properties to produce a rapid setting curing mortar with enhanced polymer properties.

TIEFILL is ideally suited for the filling of voids, particularly in new construction, which needs to be rapidly put into service, such as tieholes, grout holes and voids around fixings.

Compliance

- CE-marked in accordance with BS EN 1504-3 Class R4. Suitable for repair methods 3.1, 7.1, 7.2 as defined by BS EN 1504-3.
- 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 compound shall be a single component, polymer modified, fibre reinforced, Portland cement based repair compound that is CE-marked in accordance with BS EN 1504-3 Class R4. It shall comply with the following performance specification:

- Ability to set in 10 minutes at 20°C., achieving a compressive strength of at least 8.5MPa in 1 hour and 55MPa in 28 days.
- Impermeable to water under 10 bar hydrostatic pressure such that an 8.75mm coating is equivalent to 100mm of concrete.

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Flexcrete Technologies Ltd
Tomlinson Road, Leyland PR25 2DY England
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0086-CPD-530942

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

Compressive Strength	:	Class R4 ≥ 45MPa
Adhesive Bond	:	Class R4 ≥ 2.0MPa
Chloride Ion Content	:	≤ 0.05%
Carbonation Resistance	:	Passes
Elastic Modulus	:	R4 ≥ 20GPa
Thermal Capability Part 1	:	Class R4 ≥ 2.0MPa
Capillary Absorption	:	≤ 0.5 kg.m^{-2}.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 R4 Requirement	Result
Compressive Strength	EN 12190	≥ 45MPa	28 days: 50.2MPa
Compressive Strength Development @20°C	BS4551		1 hour 8.5 MPa 1 day 34.0 MPa 2 hours 15.0 MPa 7 days 51.0 MPa 4 hours 25.0 MPa 28 days 55.0 MPa
Adhesive Bond	EN 1542	≥ 2MPa (Class R4)	2.35MPa
Carbonation Resistance	EN 13295	≤ ref concrete	Passes
Elastic Modulus	EN 13412	≥ 20 GPa	20GPa
Capillary Absorption	EN 13057	≤ 0.5 kg/m^{-2}/h^{-05}	0.1kg/m^{-2}/h^{-05}
Freeze/Thaw Cycling	EN 13687-1	≥ 2.0MPa	2.25 MPa
Water Permeability Coefficient Equivalent Concrete Thickness	Taywood Test	-	1.62 x 10^{-12}m/sec 8.75mm of Tiefill = 1000mm of concrete
Flexural Strength	BS EN 196-1	-	10.5MPa
Thermal Capability Part 1	EN 13687	≥ 2.0MPa	2.25MPa
Mixed Density		-	2150kg/m³
Mixed Colour		-	Concrete grey
Min Application Thickness Max Application Thickness		-	5mm 75mm
Min Application Temperature Max Application Temperature		-	5°C. 40°C.
Working Life (approx.)		-	20 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

The areas to be repaired must be free from all unsound material, i.e. dust, oil, grease, corrosion by-products and organic growth. Smooth surfaces should be roughened, all loose material and surface laitance removed using wet grit blasting techniques, but for smaller areas needle gunning or bush hammering is effective. The strength of the concrete sub-base should be a minimum of 20MPa.

For the treatment of tie-holes formed by through-ties, any remaining plastic tube should be cut back and removed to approximately 40-50mm from the concrete face. Additionally, to eliminate the possibility of water tracking around the plastic tube, it should be plugged with a proprietary stopper. The prepared substrate should be thoroughly soaked with clean water until uniformly saturated without any standing water.

Mixing

Mix sufficient **TIEFILL** to use within the working life of the material. Using the mixing scoop provided, proportion the material using the initial guide **TIEFILL**:water ratio of 6:1 by volume or 9.4:1 by weight. Thus, an 8kg pack requires 850ml of clean water. Always add powder to water. Small quantities, i.e. less than 2kg, can be mixed by hand. Larger quantities should be mechanically mixed in a clean drum using a slow speed drill and paddle.

A normal mixer is **NOT** suitable. Mix together thoroughly for 2-3 minutes to produce a cohesive thixotropic mortar. If necessary, the consistency can be adjusted by the minimum addition of extra powder or water. Use without delay.

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, **TIEFILL** should be compacted, using a placing technique to remove entrapped air, in layers not exceeding 75mm deep. 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 30-45 minutes dependent upon temperature) prior to the application of subsequent layers.

When the colour and surface texture of the surrounding concrete has to be matched, the final 15-25mm layer should be filled with **UNIMATCH**. Consult the relevant Data Sheet for further information. Final profiling of a high quality can be easily achieved with a clean, dampened steel float.

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 full 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 containers at 20°C.

Packaging

TIEFILL is supplied in 8kg buckets.

Yield and Coverage

4 litres per 8kg bucket.

A 8kg bucket covers 0.4m² at 10mm thickness.

RAPID TIE BOLT SYSTEM			
TIE ROD COVER (mm)	**TIE ROD SIZE (mm)**	**TYPICAL NUMBER OF HOLES**	
		8kg PACK (4 LITRES)	**6 : 1 SCOOP MIX (235CC)**
38	15	90	5
50	15	74	4
75	15	57	3
THROUGH TIE TYPE			
30	25	229	13

Limitations

Do not use **TIEFILL** when the temperature is below 5°C. and falling. Do not use **TIEFILL** on waterproof concrete without referring to the Flexcrete Technical Department. Not suitable for use on trafficked areas.

Health and Safety

Safety Data Sheets are available on request.

Application Top Tips

1. Take care if using very cold mixing water as this will accelerate setting of **TIEFILL**.

2. **DO NOT WET OUT OR PRIME** between layers.

3. **DO NOT OVER TROWEL**. If the mortar begins to slump, allow to stabilise and refinish.

4. When finishing, trowel from centre out towards the perimeter working into the edges of the tie hole.

5. **TIEFILL** is particularly suited to cold weather use but should not be applied to frozen substrates.

6. Hot Weather Working (See separate Guide)

- Store material in cool conditions to maximise working life.
- Shade applied material from strong sunlight.
- Spray apply a second coat of **CURING MEMBRANE WB.**
- If possible, avoid extreme temperatures by working at night.

CONCRETE REPAIR ASSOCIATION

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FM 41091 Quality
EMS 597350 Environmental
OHS 597351 Health & Safety