

BetonFIP **TIXO POLIMER MONO R4**

A polymer-modified (PCC), thixotropic, premixed cementitious mortar, class R4, resistant to aggressive environmental agents, designed to restore, repair and reinforce degraded concrete structures.



WHAT IS THE PRODUCT USED FOR?

BetonFIP TIXO POLIMER MONO R4 has been designed and formulated to enable simple and reliable interventions to restore, repair or reinforce degraded concrete structures such as:

- road infrastructure, bridges/viaducts, flyovers, retaining walls, tunnel inverts;
- railway infrastructure, bridges/viaducts, tunnel inverts, stations, shelters, warehouses;
- hydraulic infrastructure, canals, basins, reservoirs, treatment works, pipelines, dams, canal bridges;
- marine structures, quays, jetties, intake channels;
- civil engineering structures, schools, hospitals, commercial buildings, residential buildings.

BetonFIP TIXO POLIMER MONO R4 can be applied to macroscopically rough substrates that are free from dust and residues from surface treatments such as: detergents, oily substances, mineral or organic greases, waxes, traces of gypsum and salts.

It can be applied in thicknesses ranging from 5 to 50 mm, either by hand using the rough-cast technique or by spraying using a piston or screw-type plastering machine. Continuous-cycle plastering machines must not be used. Adhesion to the substrate is ensured by the high adhesive strength of the polymer contained in the mortar. Its special formulation increases the durability of the structure thanks to its high resistance to aggressive environmental agents such as chlorides, sulphates, carbon dioxide, etc.

WHAT IS IT?

BetonFIP TIXO POLIMER MONO R4 is a premixed, polymer-modified, thixotropic cementitious mortar containing polyacrylonitrile fibres. It can be applied in thicknesses ranging from 5 to 50 mm in a single coat and does not require reinforcement. Its high thixotropy allows for quick and easy application both vertically and overhead.

BetonFIP TIXO POLIMER MONO R4 bears the CE mark, is classified as strength class R4, is manufactured under the 2+ accreditation system and meets the requirements and acceptance limits of the UNI EN 1504 Part 3 standard.

REQUIREMENTS AND PERFORMANCE

The main requirements and performance characteristics of **BetonFIP TIXO POLIMER MONO R4** are:

- **High adhesion:** it is a polymer-modified mortar (PCC). The adhesion values obtained following exposure to extreme conditions of frost, heat and chemical attack demonstrate its long-term reliability and ensure a long-term monolithic repair that integrates with the original structure;
- **Excellent resistance to cracking,** a fundamental requirement for ensuring the durability of the repair, as it prevents the creation of easy entry points for aggressive environmental agents. This resistance is achieved by counteracting cracking caused by plastic shrinkage, thanks to the presence of specific polyacrylonitrile fibres in the product;
- **Excellent resistance to freeze-thaw cycles,** which increases the durability of the repair work on concrete structures frequently exposed to low temperatures;
- **Excellent resistance to aggressive environmental agents;** durability is guaranteed by the extremely high impermeability, which prevents water, chlorides, sulphates and carbon dioxide from penetrating the structure;
- **High mechanical strength;** for restoration and repair works, it is important to have high resistance to short curing times, both to allow work to be carried out whilst the structure is in use (vibrations, etc.) and to ensure rapid return to service;

The performance characteristics of **BetonFIP TIXO POLIMER MONO R4** are set out in the following table:

CHARACTERISTIC	RELEVANT STANDARD	PERFORMANCE
Appearance	-	grey powder
Particle size distribution	-	< 2 mm
Workability time	-	≈ 40 min
Application thickness	-	5 – 50 mm per hand
Density	EN 1015-6	1950 – 2050 kg/m ³
pH of the mix	-	≈ 12
Bleeding	UNI 8998	Absent
Compressive strength (28 days)	EN 12190	> 58 MPa
Modulus of elasticity	EN 13412	> 27 GPa
Adhesion to concrete	EN 1542	> 2,8 MPa
Thermal compatibility, freeze-thaw	EN 13687-1	> 2 MPa
Thermal compatibility, storms	EN 13687-2	> 2 MPa
Thermal compatibility, dry cycles	EN 13687-4	> 2 MPa
Chloride ion content	EN 1015-17	< 0,003%
Resistance to carbonation	EN 13295	NPD
Capillary absorption	EN 13057	0,16 kg x m ⁻² x h ^{-0,5}
Reaction to fire	EN 13501-1	Class A1

CONSUMPTION

Approximately 18 kg/m² is required for 1 cm of **BetonFIP TIXO POLIMER MONO R4**.

MIXING WATER

Approximately 4.0–4.5 litres of clean water are required per bag (16–18% water per bag) of **BetonFIP TIXO POLIMER MONO R4**; never exceed the maximum quantity.

PACKAGING AND STORAGE

BetonFIP TIXO POLIMER MONO R4 is available in 25 kg bags.

When stored indoors in a dry place at a temperature between +5 °C and +35 °C, **BetonFIP TIXO POLIMER MONO R4** has a shelf life of 12 months from the date of manufacture.

HOW TO CARRY OUT THE WORK

1. Preparation of the substrate

To ensure the durability of the repairs, it is necessary to remove all degraded and contaminated concrete, not just the loose sections. It may be necessary to remove layers of concrete that are still sound but carbonated, or contaminated with chlorides and no longer capable of protecting the reinforcement from corrosion. The most effective method for removing degraded concrete is hydro-demolition, which allows both the water flow rate and pressure to be adjusted according to the strength of the concrete to be removed. Alternatively, suitable milling cutters or mechanical hammers may be used. All these methods of removing degraded concrete result in a particularly rough substrate surface with a roughness of approximately 5 mm. The roughness of the substrate improves the workability of **BetonFIP TIXO POLIMER MONO R4** when it is applied in a thick layer.

2. Removal of rust from the reinforcement

The reinforcement brought to the surface during the hydro-demolition phase will be perfectly clean and free from rust. If the removal of the degraded concrete was carried out mechanically, any rust present on the reinforcement must be removed by sandblasting, hydro-sandblasting or mechanical brushing.

3. Installation of additional reinforcement

Any additional reinforcement must be fixed at least 10 mm away from the substrate to allow the mortar to flow behind the bars. A concrete cover of at least 20 mm must be ensured for the reinforcement.

4. Cleaning and saturation of the substrate

Shortly before applying **BetonFIP TIXO POLIMER MONO R4**, it is essential to clean the concrete substrate, preferably using pressurised water at approximately 80 bar. Pressurised water also removes any surface dirt left by hydro-demolition; if, on the other hand, milling machines or pneumatic hammers have been used, it will remove any parts of the substrate that come away during the stripping process. Immediately before application, any water remaining on the surface from the substrate cleaning operation must be removed using compressed air. Do not apply to surfaces with a film of water on the surface.

5. Mixing

Before starting to mix **BetonFIP TIXO POLIMER MONO R4**, ensure that the ambient temperature is between +5 and +35 °C; do not carry out the application if temperatures are lower or higher than this range.

When temperatures are low, i.e. around +5/+10 °C, bear in mind that the development of mechanical strength will be slower; it is advisable to clean the substrate with heated water and carry out the application during the middle of the day.

Conversely, when applying the product at high temperatures, i.e. around +30/+35 °C, it is advisable to use cool mixing water, to keep the bags of **BetonFIP TIXO POLIMER MONO R4** out of direct sunlight and to carry out the application during the coolest part of the day.



BetonFIP TIXO POLIMER MONO R4 can be mixed in a drum-type concrete mixer, taking care to use the entire contents of the bags. For small quantities – though never less than a full bag – a low-speed electric whisk mixer should be used.

Each bag of **BetonFIP TIXO POLIMER MONO R4** should be mixed with approximately 4.0–4.5 litres of clean water per bag (16–18 per cent). It is recommended to first add 3/4 of the total water to the mixer, then introduce the contents of the bags to be mixed whilst the mixer is running, and, after the mixture has been homogenised initially, add the remaining water.

The mixing time is 4–5 minutes; this allows all the product's components to interact, ensuring a homogeneous, lump-free mix.

The mixing water must be measured precisely so as not to compromise the product's performance.

6. Application

Manual application is carried out using a standard trowel, 'throwing' the product with vigour, without ever spreading it over the substrate to avoid trapping air. When thicknesses of 30–50 mm need to be applied, it is advisable to apply an initial scratch coat using **BetonFIP TIXO POLIMER MONO R4** mixed with the maximum amount of water specified. As soon as this initial rough coat has begun to set, apply the remainder of the product at its normal consistency.

Spray application is straightforward, drastically reducing wastage, and allows thicknesses of up to 50 mm to be applied in a single layer using piston or screw-type plastering machines; continuous-cycle machines must not be used. For overhead applications, it is recommended to apply layers no thicker than 20 mm per coat, until the required thickness is achieved. Thanks to its excellent rheological properties and sustained workability, **BetonFIP TIXO POLIMER MONO R4** can be pumped through the spray machine's hose over considerable distances before reaching the spray nozzle. To ensure the plastering machine operates efficiently, particular attention must be paid to keeping the machine, the nozzles and the pump hoses clean.

In the case of particularly porous and therefore absorbent substrates, or in high temperatures, the substrate must be re-wetted prior to application to prevent the dehydrated substrate from absorbing excessive amounts of water from the mixture.

If application in thicknesses exceeding 50 mm is required, the product must be applied in two or three coats, ensuring that the second or third coat is applied at least 12 hours after the previous coat; it is also essential that the intermediate coats are left visibly rough.

7. Trowelling

Shortly after completing the application of **BetonFIP TIXO POLIMER MONO R4**, the surface can be levelled with a straight edge and then smoothed with a plastic trowel. As soon as the product begins to take on a 'rubbery' consistency that allows a fingerprint to be left on the surface, trowelling should be carried out using a sponge trowel. This operation helps prevent the formation of hairline cracks caused by the initial evaporation of the mixing water.

8. Curing

For surfaces exposed to the sun, in windy conditions or in a dry climate, it is recommended to carry out wet curing by misting water onto the surface, or alternatively to apply the curing agent **BetonFIP STAGIONANTE**, which does not form a film that would prevent subsequent applications.

PRODUCT FOR PROFESSIONAL USE

The information contained in this data sheet and, in particular, the technical advice regarding the methods of use and application of our products is provided in good faith based on **licata FIP Chemicals'** current knowledge and experience of its products, provided that they are correctly stored, handled and used in accordance with the recommendations set out. It is the Customer's responsibility to determine whether **licata FIP Chemicals'** products are suitable for the intended use and purposes, and to ensure that workplaces and disposal procedures comply with applicable laws and regulations. The various substrates and actual site conditions may vary to such an extent that no guarantee can be given as to suitability for a particular purpose. **licata FIP Chemicals** reserves the right to amend the technical specifications, descriptions and illustrations of the product covered by this data sheet at any time. The Customer is required to check that they have downloaded the latest version of the technical data sheet from the product page on our website www.licataspa.it. For further information, please contact the **Technical Service** department at **licata FIP Chemicals** at serviziotecnicoinfrastrutture@licataspa.it or serviziotecnicoedilizia@licataspa.it

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