

# TECHNICAL INFORMATION

## TOPROC MF (MACRO FIBRE)

A high performance, macro fibre reinforced concrete specifically designed to replace 'A' grade crack control steel fabric

### PRODUCT DESCRIPTION

Toproc MF is a high performance, high strength concrete aimed at replacing 'A' grade crack control steel fabric (ranging from A142-A393). Replacing the steel fabric and maintaining the equivalent crack control performance is achieved by incorporating high strength, high modulus macro synthetic fibres into the concrete matrix. As with the entire Toproc range of concretes, Toproc MF is a very cohesive concrete with a dense micro structure imparting benefits including high strength, low permeability and increased durability

### APPLICATIONS

#### GROUND SUPPORTED SLABS

- Industrial floors
- Heavy industrial applications
- External hardstandings
- Commercial applications
- Retail outlets
- Recycling units

#### NON-MAGNETIC APPLICATIONS

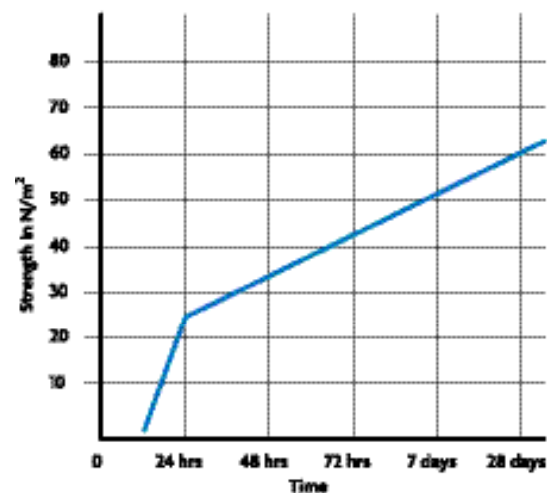
Applications such as railways which are unable to use conventional steel reinforcement due to interference issues (macro synthetic fibres only)

#### COASTAL/MARINE/INLAND FLOOD

#### WATER DEFENCE

Elimination of corrosion associated with steel  
Improved impact resistance

Toproc MF - Typical strength development



#### 24 HOUR COMPRESSIVE STRENGTH

Toproc MF typically achieves a 24 hour compressive strength of 25N/mm<sup>2</sup> but can typically achieve in the range of 28-32N/mm<sup>2</sup>.

#### 28 DAY COMPRESSIVE STRENGTH

Toproc MF typically achieves a 28 day compressive strength of 60N/mm<sup>2</sup> but can typically achieve in the range of 70-90N/mm<sup>2</sup>.

Cube strengths based on 100mm cubes made and cured in accordance with BS EN 12390-2..

### KEY FEATURES OF TOPROC MF

- Improved post-crack toughness
- Faster build time
- Reduced labour costs
- On-site health and safety benefits
- High early compressive strength
- Improved ultimate compressive strength
- Low permeability giving improved durability

### CRACK CONTROL PERFORMANCE

The main performance benefit of Toproc MF is that it will enhance the post-cracking toughness of the concrete or its ability to sustain loads after cracking. Toproc MF will achieve a post-cracking flexural strength (Re3) in excess of 30% and can be designed to replace the following conventional crack-control steel fabric A142, A193, A252 and A393. Crack reduction in concrete containing conventional steel fabric is reliant on the steel fabric being placed in the correct position, otherwise the level of protection is reduced. The fibres within Toproc MF are uniformly distributed throughout the concrete matrix ensuring cracks are restrained from propagating, regardless of where they initiate, therefore providing a robust 3D matrix of fibres throughout the concrete. In order to replace the crack control steel fabric the client should disclose the following design parameters:  
Concrete compressive strength (N/mm<sup>2</sup>) required e.g. C32/40  
Slab thickness (mm)  
Grade of steel wire fabric to be replaced and how many layers e.g. 2 layers of A252  
The data will then be used to calculate an equivalent Toproc MF design using established engineering formulae and submitted to specifiers for their approval.

### FINANCIAL SAVINGS

- Reduces labour time and cost, fixing and manual handling
- Faster build time
- No need to crane the steel mesh around the site
- No need to stockpile mesh on-site
- Eliminates the use of ancillary fixings (i.e. chairs and ties)
- Reduced equipment hire
- In precast works, Topforce eliminates the

construction of complex fabrications, reduction in scrap, reworking and returns

### 24 HOUR COMPRESSIVE STRENGTH

Toproc MF typically achieves a 24 hour compressive strength of 20N/mm<sup>2</sup>.

#### 28 day Compressive Strength

Toproc MF achieves a minimum 28 day compressive strength of 60N/mm<sup>2</sup> but can typically achieve in the range of 70–80N/mm<sup>2</sup>.

Cube strengths based on 100mm cubes made and cured in accordance with BS EN 12390-2.

### PERMEABILITY/DURABILITY

Due to its very cohesive nature Toproc MF allows very little, if any, bleed water to migrate to the surface. Combined with a dense micro structure it results in a concrete with a low permeability. The effectiveness of concretes to resist the ingress of water, gases, chloride/sulfate solutions and aggressive liquids depends to a high degree on their impermeability. As a consequence the low permeability of Toproc MF helps slow the ingress of these substances when compared to a typical RC32/40 concrete. This, combined with a very low water/cement ratio, means Toproc MF will improve the concrete's durability to a variety of conditions including weathering, chemical attack, abrasion and freeze/thaw attack.

### ABRASION RESISTANCE

Abrasion resistance will develop over time and is essentially a function of the concrete matrix, maximum water/cement ratios, minimum cement contents along with effective finishing and curing techniques. Evidence has shown that moist curing for seven days produces significantly higher long-term abrasion resistance than concrete stripped and exposed after 24 hours.

### SHRINKAGE

Plastic Shrinkage – Toproc MF is more susceptible to plastic shrinkage cracking due to the lack of bleed water. Whilst the polypropylene fibres in the mix will help, correct curing is essential (see curing). The 3D matrix created by the inclusion of macro fibres in Toproc MF limits the impact of long-term drying shrinkage.

### PUMPABILITY

Toproc MF can be easily pumped and does not require specialist equipment and is typically delivered at an S3 consistence.

### PLACING, COMPACTING AND FINISHING

Placing and levelling of Toproc MF can be carried out exactly as normal concrete. The ability to produce a 'fibre-free' floor surface finish depends on several factors, the most important being that compaction must be applied from the surface by such means as a laser screed or vibrating beam. Poker vibrators can be used to compact the lower layers in thick slabs, but should not be employed to reduce fibres at the surface. After the surface vibration has been applied an easy float is usually passed over the concrete to close up the surface. Toproc MF can be power floated as normal, although ride on power float machines will usually produce a fibre-free surface. If a brush finish is required, then some of the fibres closest to the surface may lift during finishing. Due to its cohesive nature Toproc MF releases very little if any bleed water. The lack of bleeding means that finishing can commence immediately after compaction has been completed without having to wait for bleed water to evaporate. If a power floated finish is not required then a 'one pass finish' can be employed to significantly speed up construction time.

### EARLY ACCESS

Due to its high early strength, Toproc MF can be lightly trafficked after 24 hours, however, if abrasion resistance is paramount it is preferable to leave the concrete for at least three days, preferably seven days, prior to trafficking as abrasion resistance develops over time. Curing is still essential, so a suitable high efficiency curing membrane should be considered.

### CURING

As with all concretes, proper curing is essential to ensure that all of the benefits of Toproc MF are achieved. Due to the fact that Toproc MF undergoes virtually no bleed, it is essential that curing should start as soon as possible, ideally within 10-15 minutes of placing to reduce the probability of plastic shrinkage cracking.

If the concrete is to be used in any sort of flatwork such as bridge decks, slabs etc. then the concrete should be cured for a minimum of seven days. If the flatwork needs to be trafficked early a suitable high-efficiency grade curing membrane should be used. If a power floated finish is required, appropriate curing of the concrete is recommended during the interval between initial floating and application of the final trowelled finish with either a curing membrane or sheeting. A reapplication of the curing membrane after the final power trowelling is also recommended. All normal curing methods are acceptable, but the most effective curing is best achieved by using spray on curing membranes such as 90% efficiency resin based compounds or acrylic sealers, as these can be applied earlier in the construction process.

### TYPICAL SPECIFICATION STATEMENT

The maximum aggregate size and consistency shall be agreed between the specifier and Tarmac. The concrete shall be placed, compacted and cured in accordance with current good practice, the specification for the contract and any additional requirements of Tarmac.

### PRECAUTIONS OF USE

#### SAFETY

There is a real danger of contact dermatitis or serious burns if skin comes into contact with wet cement mixes such as fresh concrete, mortar or screed. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly or through saturated clothing, wash immediately with soap and water. For eye contact, immediately wash out eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water.

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