



CRACKSTOP[®] M

High-performance synthetic micro fibre
for crackfree concrete surfaces

Achieves more durable concrete • Proven technology • Simple to apply

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Plastic shrinkage cracks, freeze/thaw damage and bleed water capillaries are a concern to contractors and project owners alike. They affect the visual appearance of the concrete surface and its expected service life. Suitable for all mixes, designs and end-uses, Crackstop M synthetic micro fibres are the answer to the increasing demand for durable crackfree concrete surfaces. Their diameter is significantly finer than that of alternative fibres. This leads to superior crack control.

Proven alternative to steel mesh reinforcement

The addition of only 900g of Crackstop M per m³ of concrete avoids the propagation of cracks and enhances the durability of the finished surface. The micro fibre serves as an alternative to crack control mesh. Its performance has been confirmed by independent test institutes. Worldwide thousands of concrete indoor floors, agricultural areas, hard standings and many more project types have been built with this easy to use BBA certified fibre.

Significantly finer than alternative fibres

According to the ACI materials journal study "The influence of different fibres on plastic shrinkage cracking on concrete" (Naaman et al, 2005) the performance of micro fibres in concrete is predominantly determined by the dosage and the specific surface. For a given volume fraction of fibres, a decrease in fibre diameter (i.e. an increase in specific surface) leads to a substantial improvement in plastic shrinkage crack control. A key advantage of Crackstop M over alternative fibres is its finer diameter

(22µ vs. 32µ). The finer the fibre, the more fibres per kg and the better the fibre will be at stopping crack propagation.

Reduces plastic shrinkage

When water evaporates rapidly from the surface of fresh concrete, this process causes plastic shrinkage in the hardened concrete and leads to cracks. As soon as evaporation losses exceed 1kg/m²h, plastic shrinkage will occur. Determinant factors are the relative humidity, air and concrete temperature as well as wind velocity. These factors have been quantified and interrelated in norm ASTM C1579-13. Independent testing according to this norm has shown that Crackstop M increases the initial tensile strength of the green concrete and keeps the water inside the concrete. The resulting reduction of water evaporation can fully eliminate plastic shrinkage cracking outperforming steel mesh and fibres.

Enhances the concrete's freeze-thaw-resistance

The application of air-entraining agent is a common way to enhance the

freeze-thaw resistance of concrete. But is difficult to control on site. If the air content is too low the freeze-thaw-resistance will not increase. If it is too high it brings the structural integrity in question. The addition of Crackstop M is a proven, easy to apply and safe alternative. Testing at WTCB according to EN12390-9 has shown that the synthetic micro fibre minimizes the amount of water absorbed by the concrete and so enhances its freeze-thaw-resistance. The concrete's compression strength remains unchanged (report no. BE18D034).

Minimizes the water permeability of concrete structures

Crackstop M is simple to mix homogeneously throughout the whole volume of the concrete. The fibre matrix discourages the development of capillaries caused by bleed water migration to the surface and so reduces the permeability of the concrete. This improves the structure's resistance against de-icing salts and chemicals. During BBA certification of Crackstop M the surface water absorption reduction has been tested and confirmed according to BS 1881-122.



Fig. 1 / 3 in 1 solution

Left without Crackstop M, right with Crackstop M

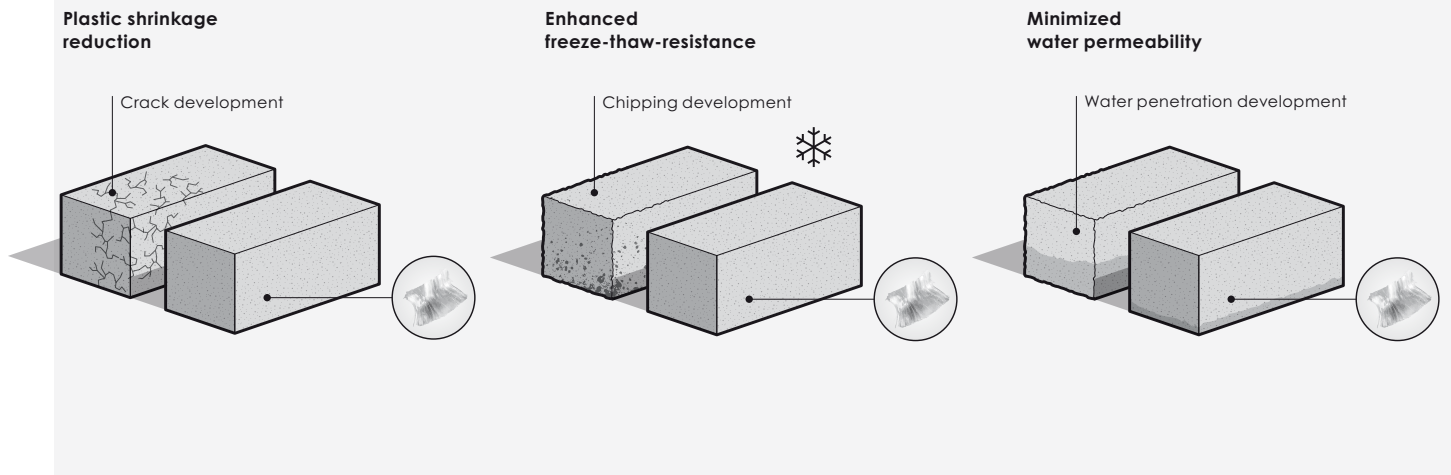
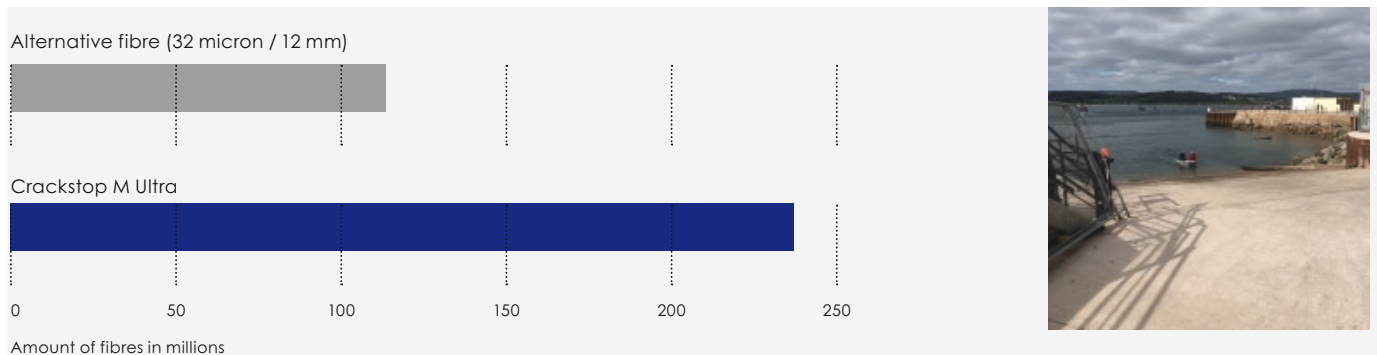


Fig. 2 / More fibres per unit mass thanks to fibre diameter of only 22µ





Other product features

- Enhanced impact resistance
- Improved abrasion properties
- Reduced bleeding
- Ideal for application in combination with Durus® macro fibres

Examples typical applications

- Indoor floors
- Pavements
- Agricultural areas
- Hardstands
- Track slabs
- Ports & docks
- Extruded concrete
- Precast concrete



Fig. 3 / **Enhanced freeze-thaw resistance**

Left without Crackstop M, right with Crackstop M



Fig. 4 / **Reduced plastic shrinkage**

Left without Crackstop M, right with Crackstop M



Fig. 5 / **Minimized water permeability**

Left without Crackstop M, right with Crackstop M



Case studies



DPD distribution centre Hinckley (United Kingdom)

At Hinckley Commercial Park, a new DPD parcel distribution centre was constructed and 17,000m³ external concrete paving enhanced with Crackstop M. The high volume of vehicle movements that was to be expected meant that the concrete had to be very wear-resistant. Furthermore, the concrete slab had to be able to withstand freeze/thaw cycles and de-icing salts dropping onto the paved area from the trucks. All these requirements were met with the application of Crackstop M dispersed throughout the whole concrete matrix (900 g/m³). Air entraining agents were no longer required. Both the contractor and the project owner were satisfied with the resulting more durable long-term serviceable concrete hard standing.



Light Rail Project Aarhus (Denmark)

As part of the Aarhus Light Rail project, 2km of double-tracks were built to connect the city of Aarhus with Nørreport. All tracks were to be embedded in 150mm thick concrete. Corrosion-free reinforcement was required so that the concrete structure would withstand the harsh marine environment in the vicinity of the harbour. A professional indemnity insured synthetic fibre reinforced concrete design was chosen. Based on the Concrete Society's Technical Report 34, edition 4, it involved the use of 3kg/m³ of Durus EasyFinish macro fibres as a primary reinforcement. 600g of Crackstop M per m³ were added to reduce plastic shrinkage cracking and maximize the service life of the finished structure.



M3 Motorway Hampshire (United Kingdom)

The slot drain construction applied on the M3 motorway incorporated a defined void in the extruded concrete to collect surface water. To prevent drag and subsequent damage as well as support the weight of the fresh concrete, the mix needed to allow smooth movement of the drain profile during extrusion. Inclusion of Crackstop M enhanced the mechanical interlock and cohesion of the concrete mix and so improved its rheology. The tensile strain capacity of the fresh concrete forming the slot drain was increased with a durable high quality surface as the result



Unicomer (Courts) distribution complex, Freeport (Republic of Trinidad)

Built in 2017, this large complex encompasses warehousing areas, an external container hardstand as well as a car parking and retail areas. The concrete slabs were built with 4 kg/m³ of Durus synthetic macro fibres as an alternative to steel bar and mesh reinforcement. In order to increase the impact and abrasion resistance of the finished structure and extend the durability of the slab surface, Crackstop M micro fibres were included. Thanks to this design, the project was completed and delivered ahead of schedule. This allowed the facility to be opened and in use before the scheduled date, which gave the owner a substantial financial benefit.



Belgium T +32 52 240000
United Kingdom T +44 1482 863777

www.adfil.com / info@adfil.com

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