

IDEAL FIBRES

Polypropylene fibres

COMMON PROBLEMS ARISING OUT OF THE USE OF CONCRETE

Shrinkage is the main contributor to the decay of structures and artefacts due to the formation of macro and micro cracks, which provide an easy route for mechanical and chemical disruptive actions induced by meteoric waters. The phenomenon is caused by a reduction in volume due to water loss because of evaporation (plastic shrinkage) or due to chemical reactions of the cement (hydraulic withdrawal).

Plastic shrinkage occurs mainly in the first hours after casting and can be avoided by careful "curing" while the hydraulic shrinkage occurs for a period longer than six months, and it is difficult to control. Breakthrough occurs when the stresses due to plastic shrinkage exceed the tensile strength of the cement paste and favours a low-volume ratio, due to the increased surface area subject to evaporation. In general, the larger the structure, the lower the shrinkage that occurs: on the other hand, for the same volume, thin structures have greater withdrawal.

DESCRIPTION

IDEAL FIBRES, when added to the traditional components of mortar and concrete, is dispersed in the dough to create an evenly distributed, three-dimensional framework able to deal effectively with the stresses caused by shrinkage, sharing uniformity throughout the mass of the building and thereby inhibiting the formation of cracks. The distribution of the tension is due to the high specific surface of the fibre and its excellent adhesion to binders, obtained through special chemical-physical treatments.

Doses such as 0.6kg/m³ IDEAL FIBRES, under normal conditions, allow the elimination of cracks in concrete due to plastic shrinkage (as verified by tests performed in the laboratory ENCO), which results in a reduction in the ratio of permeability by 80% and a durability increase.

The Politecnico of Milan has certified very significant improvements for all quality parameters of cement pastes.

ADVANTAGES

- Easy to use, improves the plasticity of concrete.
- Uniform distribution of stress due to plastic shrinkage cracking and hydraulic withdrawal, reducing the plastic shrinkage cracking phenomena.
- Improves the mechanical compression; tensile and bending.
- Reduces macro and micro cracking, improving the water resistance of the cement.
- Allows the elimination of a non-structural mesh.
- Enhances the quality of the dough, preventing the segregation of various components.

The set of advantages makes the finished product more reliable, contributing to its longer life and reducing maintenance costs.

GENERAL FEATURES

Mechanical strength

The mechanical strength reduction of micro cracks due to shrinkage of the cement resulted in increases in the concrete's compressive strength value of up to 13%. The increases become far more significant with regards to bending strength, which may also improve by 30% (with 2kg/ m³ of fibre and an A / C ratio = 0.78; Data - Politecnico of Milan).

With high concentrations of fibre, the high residual tensile resistance offered by the bonds of data from the fibre reinforcement has also been measured. Such behaviour opens up opportunities for engineering for significant preventive and social needs, especially in areas of high seismicity.

Impact resistance and abrasion

The clumping action of IDEAL FIBRES improves impact and abrasion resistance and reduces the phenomena of disintegration.

Freeze -thaw

For the realisation of these tests, mortars were used with the addition of an air-entraining additive to make the cement matrix resistant to freeze-thaw cycles. Mortars with IDEAL FIBRES show a decrease in weight; as a result, the freeze-thaw cycles was very small (< 0.2%) in contrast to the mortars without fibres, which, despite possessing a cement matrix potentially resistant to thermal alternations of about 0°C, underwent weight losses that were not negligible (2.0 to 2.5% after 60 cycles).

The durability of mortar with IDEAL FIBRES is also confirmed by the values of elastic modules. In fact, the value of the modulus of the mortar-fibre undergoes a slight decrease of about 5% more than that without fibre, resulting in reductions of more than 90%.

Carbonation

The use of polypropylene fibres makes the effects of aging on the durability of the concrete almost irrelevant.

Reduction in the phenomena of cracking

IDEAL FIBRES eliminates plastic shrinkage cracks caused by the shuttering of concrete surfaces not properly sealed not wet. Experimental research conducted by Ideal Work for the concrete paving Enco has shown that the introduction of IDEAL FIBRES at an extent of 0.9kg/m³ completely eliminated the risk of plastic shrinkage cracks in the floors.

As a result of the extremely severe test conditions used (warm: T = 40°C, dry: RH = 50% and construction: 40km/ h), If the conditions of exposure to the floor are less demanding (e.g. indoor RH non-ventilated or environmental levels) it is not possible for a fibre dosage of 0.6kg to be used.

TECHNICAL SPECIFICATIONS

The IDEAL FIBRES polymer blend is based on polypropylene and is specially treated with additives.

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| ADHERENCE TO HYDRAULIC BINDERS: | EXCELLENT |
| ADHERENCE TO THE CHEMICAL BONDING, ENVIRONMENTAL AND ATMOSPHERIC CHEMICALS FOUND IN HYDRAULIC BINDERS: | HIGH |
| SPECIFIC GRAVITY: | 0.9G/cm ³ |

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| WETTABILITY: DIVE TIME | > 90'' |
| TENSILE STRENGTH: | 350-500 MPA |
| MODULUS: | 8-14 GPA |
| ACCESSION TO CEMENT MIXTURE: | HIGH |
| THICKNESS: | 20-35 micron |
| LENGTH: | 4-6-8-12-18-24mm |

PACKING

Soluble bags of 0,9 kg.

USES

IDEAL FIBRES are used for:

- Plaster
- Joints
- Restoration and building rehabilitation
- Thin slabs and infill
- Industrial and civil floors
- Stamped concrete floors
- Blocks for paving
- Precast
- Vessels, manholes, pipes, fences and road barriers
- Concrete, armed and unarmed
- Concrete facings

DOSAGE AND RULES OF USE

IDEAL FIBRES is normally added in the amount of 0.9kg/m³ to medium dosage cement pastes.

IMPORTANT:

All the information contained in this sheet is based on the best practical and laboratory applications. It is the customer's responsibility to check the product is suitable for the intended use. The manufacturer declines any responsibility for wrong application. It is recommended to carry out tests on small areas before application. This sheet replaces and cancels any previous one. The data contained can be changed at any time. Ideal Work products are for professional use and the company organises periodical training for its customers on demand. Anyone who uses these products without qualification takes all the associated risks.

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