

APPLICATIONS TEXZEM

PRINCIPLES OF THE FIBRE CONCRETE DESIGN

The plain concrete is improved on by addition of small dose polypropylene (PP) fibres to reduce creation of cracks during the concrete hardening. For the common applications the dose of PP fibres varies from 0,5 kg to 2kg per 1 m³ of concrete.

When a higher dose of PP fibres is necessary dosing the granularity of aggregates must be modified. The design of fibre concrete has to be verified with laboratory tests.

Proper length of PP fibres for fibre concrete is from 30 to 60 mm for production of fibrous concrete. The length of PP fibres depends on the maximum grain-size of concrete. It holds generally, that for concrete granularity with maximum grain from 4 to 6 mm, suitable length of fibres is from 30 to 40 mm. For granularity from 16 to 32 mm suitable length of fibres is from 50 to 60 mm.

THE FIBRE CONCRETE CAN BE PRODUCED INSIDE THE CONCRETE MIXING PLANT OR DIRECTLY AT THE JOB SITE.

PRODUCTION INSIDE THE CONCRETE MIXING PLANTS

There is a few ways how to add PP fibres into concrete:

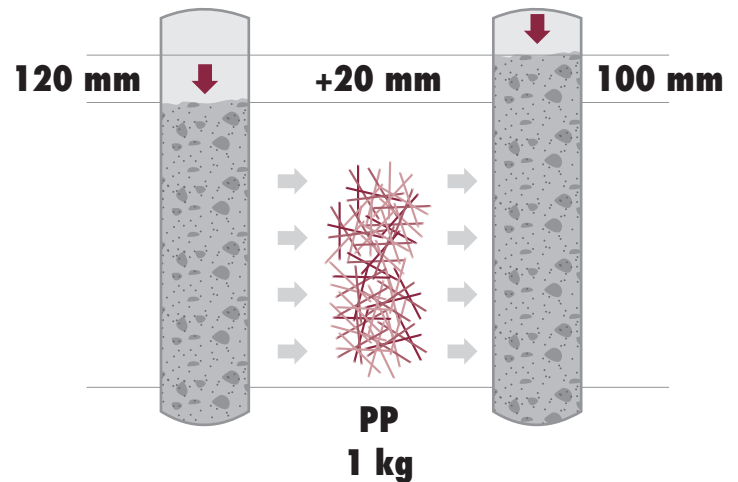
- addition fibres into the cement mixer (machine dose or beforehand weighted manual dose); mixing time is necessary to prolong over 5 – 10 minutes (it is concerned most of cement mixers with compulsory rotation)
- addition fibres into the basket with aggregates or into the aggregate conveyor
- addition fibres into the mobile final mixer during concrete loading or after loading

Above mentioned methods of production require low technical arrangements of the work organisation. It is necessary to give them sufficient attention because the methods of production are important for future concrete properties.

Production at the construction site

- addition fibres into the concrete agitator at the construction site. Beforehand weighted fibres dose is necessary to sprinkle into the drum of concrete agitator gradually to reach the best dispersal in concrete during the shortest time.
- mixing time in the common concrete agitator is from 5 to 15 minutes (it depends from the type of PP fibres)
- for mixing in portable concrete-mixer – the same principles are valid as for production inside concrete mixing plants. But the mixing time is necessary to prolong over 1 – 5 minutes.
- at production at the construction site it is necessary to take into account that fibres addition decrease consistency and increase viscosity of fresh concrete (e.g. cone subsidence 120 mm is reduced after adding 1 kg of PP fibres about 20 mm)

The fibre concrete is characterized by high resistance to creation of micro-cracks and micro-cracks contraction cracks increase and propagation. Typical fibre concrete properties are higher resistance to dynamic load and to temperature changes.



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