

(1) Specification points for Dramix® steel fibre reinforced floors

1. Fibres

- Fibres to comply with European Standard EN 14 889-1
- Fibres with CE-marking system 1
 - i. Fibres out of drawn wire, with a tensile strength of steel wire > 1000 Mpa min.
 - ii. Dimensional tolerances according to CE
- Minimum fibre length: 2 times the maximum coarse aggregate size

2. Performance

- Minimum total fibre length for crack control
In order to ensure the minimum network effect to provide a specific multicrack process and so a redistribution of the loads through the crack bridging steel, for saw cutted floors, a minimum total steel fibre length of 2750 meter/m³ concrete is required.
- Fibre dosage should not be lower than declared dosage mentioned in the fibre CE certificate
- Equivalent flexural strength in accordance with the design note, but as absolute minimum
- Concrete quality and additional reinforcement in accordance with design note

3. Steel Fibre concrete

- Glued fibres for improved and risk-free pumpability and mixing. Handling, dosing and mixing is in line with the recommendations of the steel fibre producer
- Loose fibres with a length/diameter ratio of more than 50, which can cause concrete balling, are forbidden to use

(2) Construction recommendations

1. Soil support system

Sub-base quality:

The quality of the sub-base is measured using a plate-bearing test (plate diameter = 760 mm) and expressed as a k-value (N/mm³). The plate-bearing test is carried out by a recognized company under contract to the flooring contractor or the general contractor. The plate-bearing test is carried out on the finished sub-base and not on the subgrade.

The results of these plate-bearing tests are interpreted by N.V. BEKAERT S.A. or a consultant appointed by BEKAERT.

Number

The number of plate-bearing tests is determined as follows:

- For floor areas less than 3,000 m² 1 plate-bearing test per 500 m² with a minimum of 3 plate tests.
- For floor areas greater than 3,000 m² 6 plate-bearing tests + one plate-bearing test for each area unit of 1,000 m² over 3,000 m² (e.g. 7,500 m² 6 + (7000 - 3000)/1000 = 10 plate tests).

If significant differences are found in the quality of the sub-base the total floor area is notionally subdivided into smaller partial areas for which a uniform sub-base quality is found. For the determination of the number of plate-bearing tests the above rules are then applied to the partial areas.

Assessment of the results of the plate-bearing tests:

- The sub-base constant k **must be a minimum of 0.03 N/mm³** over the whole area

Level and thickness:

In all locations the required level and thickness must be reached. The tolerance of the sub base should follow the local standards or jobsite specification with a maximum tolerances of +/- 10 mm.

2. Concrete quality

According to local standards and in line with the design, the concrete to be used is described as follows:

Strength class:
Consistency class (slump):
Maximum aggregate size:
Exposure class:

The maximum W/C ratio is 0.55. In the determination of the water content, then moisture present in the aggregates should be taken into account and any adjustments made.

3. Admixtures

Admixtures are commonly used with SFRC to improve workability and finishability. If more than one type of admixture is used, each should be batched separately. Admixtures should meet the requirements of local industry standards. Before using fibre concrete, a preliminary test should be done on:

- Workability
- Air content
- Separation of the fibre bundles when using glued fibres
- Homogeneous fibre distribution in the concrete

4. Sheets and Isolation joints

The aim of an isolation joint is to make the slab independent of and free from restraint by the rest of the construction. Free movement of the slab must be possible.

- Plastic sheeting of 0,2 mm minimum thickness (in line with design note) must be spread over the sub-base, with careful attention being given to keeping this flat during concrete pouring
- A compressible material should be incorporated around the edges, around columns and other solid objects, having a minimum thickness of at least 1 cm over the full depth of the concrete floor

5. Contraction joints

In order to avoid random cracking, joints are cut into the floor, to form contraction joints

- The bay size between 3 and 12 m and in line with the design note, depending on the column grid lay-out
Joints should be in line with column positions where possible
- The length/width ratio of the bays must be less than 1,5 and should be as close to square as possible
- The dept of shrinkage joint saw cuts should be a minimum of 1/3 of the concrete slab thickness
- A plan of the joint positions should be made in advance

6. Connections and auxiliary reinforcement

Auxiliary reinforcement and connections of the slab to the loading dock or others, must be defined and indicated on the drawing plans.

7. Curing

Wet burlap, plastic film and sprayed-applied membranes may be considered as conditions warrant. Industry standards are available for more comprehensive information on curing.

8. Quality examinations

Your Bekaert local specialist **can support you with a comprehensive quality control program.**

Generals:

- Check the level of the sub base, maximum tolerance of +/- 10 mm
- Check whether the plastic sheet is placed correctly, with enough overlap and fixed in such a way that the sheet will not curl up during the casting of the steel fibre concrete

Must be in line with the Bekaert detailed drawings:

- The extra reinforcement is placed. The top and bottom reinforcement need enough support to hold it in place during the concrete casting process
- The reinforcement concrete cover
- The joint profiles are positioned and oriented correctly

- The concrete mix needs to be designed and adapted in such a way that Dramix® fibres can be mixed easily and a good concrete workability is obtained. Moreover, the maximum water/cement ratio is 0,5. Contact your local Bekaert specialist for optimal steel fibre concrete recepies

Must be in line with the Bekaert design:

- The concrete thickness during casting
- The right fibre type is used
- The fibre dosage: check through several washing out tests (when an automatic dosing machine is not applied)

- If needed: start up a quality program with beam tests, produced in accordance with the EN 14 651 in order to control the performance. Our concrete lab is an open door for jobsite test programs. Contact your Bekaert specialist