



Barcelona (Spain) SteelMed warehouse

CREATING A HIGHLY RESISTANT SURFACE TO THE STRESSES OF HEAVY LOADS

Steelmed is part of the Spanish steelmaking Hiemesa which produces, commercializes and distributes sheet steel for industry. In 2020 the company decided to extend its storage facilities in the port of Barcelona. It was required to install a durable and strong pavement for the 900 m² indoor and 600 m² outside the warehouse, while ensuring a high aesthetic impact.

Before installing the floor, it was necessary to carry out the proper structural calculations and determine the most suitable type of concrete for this project. Designers opted for a fiber-reinforced concrete mix rather than a conventional solution using a double layer of steel mesh. After carrying out an on-site and detailed survey, Mapei Spain's technicians, the Spanish subsidiary of the Group, proposed adding structural polymer macro fibers, MAPEFIBRE ST 50 TWISTED, to the concrete mix design.

Structural polymer macro fibers for high performance concrete floors

Once the characteristics of the substrate and the loads that the concrete slab would have to withstand had been clarified and defined, the performance character-

istics of the materials required to create the substrate were also specified.

After careful consideration, it was decided that a C30/37 concrete - with a maximum aggregate size of 20 mm and a compressive strength, after 90 days, of more than 35 MPa - would be the most suitable solution for this project. The required concrete also needed to have a fluid consistency (S3), a water/cement ratio of less than 0.50 and a flexural strength around 4.0 MPa.

It was decided to install a slab with a thickness of at least 30 cm with contraction joints every 5 m. The concrete was reinforced by adding MAPEFIBRE ST 50 TWISTED fibers to the mix-design at rate of 4 kg/m³, the equivalent of more than 600,000 fibers per m³. The main aim was to achieve a resistance level close to or above 2 MPa in compliance with the European standard EN 14651.

MAPEFIBRE ST 50 TWISTED are class II structural polymer fibers complying with EN 14889-2:2006 standard. They have a length of 50 mm and are designed to improve the performance characteristics of conventional concrete, precast concrete and shotcrete. They are

an excellent alternative to traditional electro-welded mesh reinforcement used to distribute loads, limit crack phenomenon due to plastic shrinkage, and produce high-ductility concrete.

Surface treatment of the concrete floor

The concrete surface slabs were treated with MAPETOP S AR6 which is a ready-to-use industrial surface-hardener made from Portland cement, well-graded quartz and corundum aggregates and special admixtures.

MAPETOP S AR6 is highly recommended for creating wear-resistant surfaces on concrete floors subjected to heavy traffic in industrial and commercial environments. This product also has excellent resistance to atmospheric agents, freeze/thaw cycles and de-icing salts, making it ideal for outdoor floors.

Because of their stiffness, certain types of structural polymer fibers available on the market can create problems with the final surface finish, both when the concrete is being placed and over time. However, concrete floors reinforced with MAPEFIBRE ST 50 TWISTED fibers and finished with MAPETOP S AR6 do not have this issue.

In addition, tests carried out on the floor (compressive and flexural strength) returned excellent values (34 MPa and 3.9 MPa, respectively, after 28 days).

Therefore, the solution proposed fully complied with the client's requirements, guaranteeing concrete surfaces that are highly resistant to loads, stresses and wear and with an excellent finish from an aesthetic point of view.

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José Antonio Rodríguez, Technical Director, Admixtures for Concrete, Mapei Spain



Find out more
MAPEFIBRE ST50 TWISTED

PROJECT INFORMATION
SteelMed warehouse, Barcelona (Spain)
Period of the intervention: 2020-2021
Intervention by Mapei: Supplying products to build and finish the

industrial concrete floors
Design: Projectes y Construccions Domènech S.L.
Client: Steelmed
Flooring contractor: Ruica Pavimentos
Concrete suppliers: Beton

Floor and Promsa
Mapei coordinator: José Antonio Rodríguez, Mapei Spain

MAPEI PRODUCTS
Preparing concrete mix-design: Mapefibre ST50

Twisted
Finishing concrete surfaces: Mapeitop S AR6
For further information on products, please visit mapei.com, and mapei.es



IN THE FACING PAGE. A complete view of the concrete floor in the SteelMed warehouse completed using MAPEFIBRE ST50 TWISTED macro fibers and finished off with MAPETOP S AR6.

1. The concrete underwent numerous tests to calculate its abrasion resistance.

2. One of the installation phases of the concrete floor.