MasterFill® ER 1380

Epoxy Based, Low Viscosity, Fast Setting, Water Tolerant Injection Resin

Material Description

MasterFill® ER 1380 is a two-component low-viscosity liquid epoxy resin for injection, which is used for low and high pressure injection by using 2C injection machines for filling of cracks in concrete and masonry. It is suitable for the application in wet conditions as it has highly improved adhesion characteristics in contact with water.

Areas of Application

- Structural repair of cracks in interior / exterior concrete and masonry elements
- Structurally rebonding cracked concrete sections
- Rebonding delaminated concrete toppings
- Filling porous or honeycombed concrete or grout
- Structural repair of saturated cracks with water

Technical Properties

Structure of the Material **MasterFill® ER 1380** Part A **MasterFill® ER 1380** Part B	 Epoxy Resin Epoxy Hardener
Color	Black
Density (23 °C) (DIN 52713 / ISO 2811-1) Mixed Part A Part B	 1,13 g/cm^3 1,20 g/cm^3 1,00 g/cm^3
Viscosity (23 °C) (EN 3219)	625 mPa.s
Compressive Strength (7 days) (EN 12190)	100 N/mm^2
Tensile Strength (7 days) (EN ISO 527-1; -2)	56 N/mm^2
Tensile Strength development (> 3 N/mm^2) 21 °C 35 °C	 approx. 27.5 hours approx. 5.5 hours
Shore D (EN ISO 868) 23 °C 16 hours 10 °C 16 hours 2 °C 48 hours	 80 60 40
Application Temperature (ambient and substrate)	+8^{0}C +35^{0}C
Working time (100ml samples) (EN ISO 9514) 8 °C 21 °C 35 °C	 approx. 108 minutes approx. 24 minutes approx. 9 minutes
Elongation (7 days) (EN ISO 527-1; -2)	% 4,4
Elasticity modulus (7 days) (EN ISO 527-1; -2)	1870 N/mm^2
Adhesion to Concrete1 (7 days) EN 12618-2 (EN 13687-3) wet concrete[2] dry concrete	 Concrete Failure Concrete Failure

Note: 1 Concrete type is MC (0.40) according to EN 1766 and crack width is 0.3 mm. Injections were done and tests were made under 8°C and 35 °C. Results were obtained after both normal curing conditions and thermal and wet –drying cycles. 2 Cracks are fully saturated with water and the water pushed away by MasterFill® ER 1380 during the injection.

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Characteristics and Benefits

- Low viscosity guarantees excellent penetration into fine fissures
- Excellent adhesion guarantees durable bond to substrates
- High strength material for good mechanical properties and durable repair
- Water tolerant therefore allowing a larger application spectrum
- Extremely fast curing, enables fast repairs and short downtimes

Processing Method

Application of low viscosity injection resins is a skilled operation requiring trained operatives. As site conditions and application requirements differ markedly from site to site these should be agreed between the applicator and the supervising engineer/client. **MasterFill® ER 1380** is a very rapid curing product and is only suitable for the application with 2C machines. In exceptions, it is possible to use hand mixtures up to 200 ml in one batch, if the material can be applied fully within 10 minutes.

(A) Preparation of Substrate

The cracks must be free of dirt and dust. The sides of the cracks may be damp/wet but it has to be clean and without mud. Before the injection application, plan the position of the entry ports/nipples.

Socket Type Entry Ports / Nipples

Depending on the crack width the holes should be drilled in both two sides of the crack line with an angle of 45° to the surface. The holes should be 5-10 cm away from the crack line and deep enough for passing across the crack plane and reach opposite side. The distance between holes should not exceed half the thickness of the component and 60 cm respectively, fig.1. Suck off dust developed during the drilling process and clean the holes. Insert entry ports/nipples into the prepared holes, screw and fix tightly. All the cracks and nipple sides should be sealed with the following **MBT Tech** products by using a spatula or trowel to prevent the leakage of injection resin from the crack openings, fig.1.

Figure 1. Socket type nipples placed around the crack and sealed with proper epoxy adhesive from **MasterStrength®** series.

- **MasterJoint® 596** / **MasterFlux® ANC 920 SF** for crack injections after 30 to 60 minutes or damp surfaces,
- Proper **MasterStrength™**/ **MasterCrete®** type epoxy based mortars/pastes for crack injections under high pressure after approx. 24 hours. Consult to your local **MBT Tech** representative for selecting the cap seal material.

Surface Mounted Entry Ports / Nipples

Location of the entry ports/nipples should be identified before the installation. Depending on the crack size and the element size, the injection nipples should be placed 15 – 50 cm apart along the length of the crack. For fixing the port to the concrete, apply a small amount of proper **MasterStrength™**/ **MasterCrete®** type epoxy based mortars/ pastes around the bottom of the port base. Place the nipple at one end of the crack and repeat until the entire crack is ported. Take care to mound the epoxy around the base of ports and to work out any holes in the material. Seal all the nipples and crack opening by using a proper **MasterStrength®** / **MasterCrete®** type epoxy based mortars/ pastes or use **MasterJoint® 596** / **MasterFlux® ANC 920 SF** for quick injections (in a couple of hours crack after cap sealing), fig. 2.

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Figure 2. Sealing the surface mounted nipples by using **MasterFlux® ANC 920 SF**

It is recommended that the cap seal should be a minimum of 1 mm thick and 6-8 cm wide in case of epoxy based materials and must be even thicker for **MasterJoint® 596**. Insufficient paste-over will result in leaks under the pressure of injection. Consult to your local **MBT Tech** representative for selecting the cap seal material.

(B) Mixing

MasterFill® ER 1380 is designed for the application with 2 component injection machines, where the mixing happens within the nozzle or pistol. Therefore it is supplied in two separate components, in the correct quantities, ready for use in a volume mixture of 2:1 (A:B) and 100:40 by weight. For hand mixtures up to 200 ml, make sure that the material can be fully applied in 10 minutes before it starts to set. If the material mixed and stored in a steel can/drum, after a while, it starts to harden very fast and develop heat. Consider this property and avoid keeping mixed resin as a bulk in steel cans/drums. Add component B into component A in the correct volume ratio of 2:1 (A:B), and mix intensively for about 1 minute with a suitable mixing tool. A homogeneous mixture must be obtained, no streaks must be visible.

(C) Processing

The tightness of the fit and seal and the permeability of the nipples must be checked (with compressed air) prior to the injection. The equipment and containers must be dry. Inject the mixed **MasterFill® ER 1380** by means of suitable injection equipment under low or high pressure. In case of vertical cracks or cracks running diagonally upward, inject from bottom to top. Starting at the lowest nipple inject **MasterFill® ER 1380** as long until the filling emerges at the next nipple. Continue this procedure in sections from nipple to nipple up to the nipple positioned at the top. In case of horizontal cracks or cracks in horizontal floor surfaces, inject in one direction from one end of the crack to the other. Inject **MasterFill® ER 1380** until the material emerges at the next nipple. Continue this procedure in sections from nipple to nipple up to the other end of the crack, fig. 3. In order to assure the desired structural integrity / monolithic structure of the cracked element, be sure to fill the crack completely without any voids / gaps. After the injection application finishes, the nipples can be removed a nd the holes can be filled with **MasterJoint® 596** or with an **MasterCrete®** repair mortar.

Figure 3. Injecting **MasterFill® ER 1380** by using a 2C pump to repair a concrete floor.

Consumption

1.13 kg/liters

Point to Consider

- Design and application should be carried out by appropriately qualified and competent person(s).
- Do not apply at temperatures below +8 °C nor above +35 °C. Be sure about the mixing ratios while making partial mixtures for low amount of use. Do not add any other substance that could affect the properties of the

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product. In case of hot weather, the product should be stored in fresh site and should be protected from sunlight.
- Protection clothing and equipment are mandatory for the application of this product. See Material Safety Data Sheet for details.
- Do not add any other substance that could affect the properties of the product.

Curing

Full cure is reached in 3 days after the application at a constant temperature of 23 °C. At constant 8 °C, **MasterFill® ER 1380** cures in 10 days.

Working Time

Approx. 108 minutes at 8 °C, 24 minutes at 21°C and 9 minutes at 35 °C. These values are measured by using 100 ml of mixed resin. Higher volumes of mixed material shorten the pot life).

Cleaning of Tools

All the tools and equipments must be cleaned by solvent after the application. After **MasterFill® ER 1380** is hardened, it can only be removed from the surface mechanically.

Packaging

MasterFill® ER 1380 is available in 18 kg set
Part A : 12.5 kg
Part B : 5.5 kg

Shelf Life

24 months after the production date under appropriate storing conditions.Opened packages have to be stored by tightly sealing the bag/cover and must be used in one week.

Storage

Must be stored in its original unopened packaging, out of direct sunlight, in a dry and closed environment between +10°C - +25°C. For short-term storage, maximum 3 pallets should be stacked on top of each other and shipment should be made on a first-in, first-out system. For long term storage, pallets should not be stacked on top of each other.

Health and Safety

It is dangerous to approach the application sites. During the application, a protective apparel, protective gloves, goggles and masks which comply with the Occupational Health and Safety Rules should be used. Due to the irritation effect of the uncured materials, the mixture should not come into contact with skin and eyes; in case of a contact, the affected area should be washed with plenty of water and soap; in case of swallowing, a physician should be consulted immediately. No food or beverages should be brought to the application area. The product should be stored and kept out of reach of children. For detailed information please consult the Material Safety Data Sheet.

Disclaimer

The technical information given in this publication is based on the present state of our best scientific and practical knowledge. **MBT Teknik Yapı Kimyasalları Sanayi ve Ticaret A.Ş.** is only responsible for the quality of the product **MBT Teknik Yapı Kimyasalları Sanayi ve Ticaret A.Ş.** is not responsible for results that may occur because the product is used other than advised and/or out of instructions regarding the place and the method of use. This technical form is valid only till a new version is implemented and nullifies the old ones.

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