

MasterInject 1360

Low viscosity epoxy resin for injection and gravity feeding of cracks in concrete

DESCRIPTION

MasterInject 1360 is a two component epoxy based low viscosity injection resin. It is used for low / high pressure injection and gravity feeding of concrete cracks to maintain the structural integrity of the cracked sections.

FIELD OF APPLICATION

- Cracks in concrete and masonry
- Interior and exterior
- Structural re-bonding of cracked concrete sections
- Re-bonding the delaminated concrete toppings
- Filling porous or honeycombed concrete or grout

FEATURES AND BENEFITS

- Low viscosity guarantees excellent penetration into fine fissures
- Long working time ensures excellent penetration into the substrate
- Excellent adhesion guarantees durable bond to substrates
- High strength material for good mechanical properties and durable repair
- CE-certified according to EN 1504-5 (System 2+)

APPLICATION 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.

(a) Surface Preparation

The cracks must be free of dirt and dust. The sides of the cracks may be damp (except for gravity feed application) 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.

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Master Builders Solutions Deutschland GmbH Donnerschwer Str. 372 D-26123 Oldenburg 14 DE0246/05	
MasterInject 1360 (DE0246/05) EN 1504-5:2004	
Concrete injection product EN 1504-5 Methods 1.5/4.5/4.6 U(F1) W(5) (1/2) (15/35) (0) U(F1) W(2) (1) (15/35) (0)	
Adhesion by tensile bond strength	Cohesive failure in the substrate
Glass transition temperature	> 40 °C
Workability	Crack width 0,2 mm dry Crack width 0,5 mm damp
Durability	Cohesive failure in the substrate
Corrosion behavior	Deemed to have no corrosive effect.
Dangerous substances	Comply with 5.4 (EN 1504-5)

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 Master Builder Solutions products by using a spatula or trowel to prevent the leakage of injection resin from the crack openings, fig.1.

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Figure 1. Socket type nipples placed around the crack and sealed with proper MasterBrace epoxy adhesive.

- MasterSeal 590 / MasterFlow 920 AN for crack injections after 30 to 60 minutes or damp surfaces,
- Proper MasterBrace epoxy-based mortar for crack injections under high pressure after approx. 24 hours. Consult to your local Master Builders Solutions 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 MasterBrace type epoxy-based mortar/paste 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 MasterBrace type epoxy-based mortar/paste or use MasterSeal 590 / MasterFlow 920 AN for quick injections (in a couple of hours crack after cap sealing). 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 MasterSeal 590.

Insufficient paste-over will result in leaks under the pressure of injection. Consult to your local Master Builder Solutions representative for selecting the cap seal material.

Gravity feed with resin - without entry ports / nipples

In case of horizontal cracks (e.g. on floors) gravity feed can be used as a practical repair solution. It should be considered that this method does not provide a durable structural repair in case of deteriorated concrete due to carbonation, corrosion and chemical attacks.

In case of low strength concrete / very weak substrate, saw cut the cracks to create V shaped groove in the crack opening, fig. 2.



Figure 2. V shaped groove opened on the crack.

All potential barriers to penetration must be removed. Remove all dirt, grease, oil, paints, curing compounds on the crack. Use a wire brush, handheld grinders or sand blasting method to remove the loose particles on the crack and use oil-free compressed air to remove the dust.

Allow the crack and surrounding area to dry for at least 24 hours before applying the resin. Moisture within the cracks and the concrete pores can prevent penetration because MasterInject 1360 is very low viscous and cannot displace the water by gravity feeding.

Gravity feed with resin – with screed ties

In case of wide (> 5 mm) cracks on concrete floors metal anchors/ties can be used to maintain the structural integrity of the concrete floor.

Saw cut the floor perpendicular to the crack line with 1 – 3 cm deep and 0.5 – 1 mm longer than the screed ties.

Vacuum clean cracks and the canals opened for screed ties to remove all potential barriers to penetration.

Use a wire brush, handheld grinders or sand blasting method to remove the loose particles on the crack and use oil-free compressed air to remove the dust. Then, place the screed ties into the canals carefully, fig.3.

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Figure 3. Placing the screed ties into the canals opened on the cracks.

(b) Mixing

MasterInject 1360 is designed for the application with 2 component injection machines, where the mixing happens within the nozzle or pistol. It is supplied in two separate components, in the correct quantities, ready for use in a volume mixture of approx. 3:1 (A : B) and 100:29 by weight.

For hand mixtures up to 1000 ml, make sure that the material can be fully applied 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 Part B into Part A in the correct volume ratio of approx. 3:1 (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) Application

Socket type – surface mounted entry ports / nipples

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 MasterInject 1360 by means of suitable injection equipment under low pressure in case of using surface mounted entry ports / nipples. For socket type of entry ports / nipples, both low- and high-pressure injection techniques can be used.

In case of vertical cracks or cracks running diagonally upward, inject from bottom to top. Starting at the lowest nipple inject MasterInject 1360 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 MasterInject 1360 until the material emerges at the next nipple. Continue this procedure from nipple to nipple up to the other end of the crack.

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, and the holes can be filled with MasterSeal 590 or proper MasterEmaco repair mortar or MasterBrace / MasterEmaco type epoxy-based mortars.

Gravity feed with resin

Start the application as soon as the material is ready after a proper mixing. This is must for having a long working time to achieve a better penetration. Pour the mixed MasterInject 1360 over the top of the cracks, which opened in shape of V grooves. Allow the resin to penetrate into the crack and keep filling the cracks until they will no longer accept resin, fig.4.

After 24 hours, visually check the cracks for any possible deficiencies on the crack surface. In case of uneven crack surface occurred due to the different level of resin penetration, use proper epoxy adhesive from MasterBrace series to level the grooves and finish the surface.



Figure 4. Pouring MasterInject 1360 directly into the V shaped groove opened on the crack.

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In case of not having ready to use cap seal material on site, prepare mixture by using MasterInject 1360 and dry, clean quartz sand and fill the groove with this site mix mortar, fig.5.



Figure 5. Levelling the crack surface by using proper MasterBrace mortar.

Gravity feed with resin – with screed ties

Prepare a mixture by using MasterInject 1360 and dry clean quartz sand and obtain a fluid mortar, which can fill the screed tie canals. Then pour the mortar into the canal and fill it completely. After filling the canals start to pour the MasterInject 1360 itself over the top of the cracks. Allow the resin to penetrate into the crack and keep filling the cracks and the canals until they will no longer accept resin, fig.6.

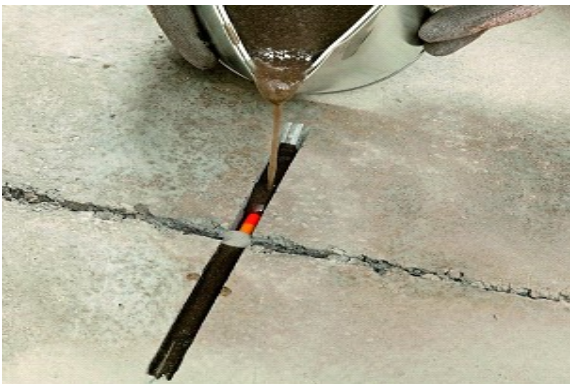


Figure 6. Filling the screed tie canals and crack with MasterInject 1360 mixture.

WORKING TIME

Approx. 120 minutes at 23 °C, (It is measured by using 100 ml of mixed resin. Higher volumes of mixed material shorten the pot life).

TOOLS:

Airless high-pressure machines:

J. Wagner GmbH
Otto-Lilienthal-Str. 18
88677 Markdorf.

Injection pumps:

Polyplan-Werkzeuge GmbH
Riekbornweg 20
22457 Hamburg

Krautzberger GmbH
Stockbornstraße 13
65343 Eltville

Hose pumps:

Braunschweiger Laborbedarf GmbH & Co. KG
Friedrich-Seele-Str. 3
38122 Braunschweig

Pressure vessel for MasterInject 1360 application

Desoi GmbH
Gewerbestraße 16
36148 Kalbach

FINISHING AND CLEANING

Tools and mixer must be cleaned immediately after use with suitable solvents. Cured material can only be removed mechanically.

CURING

Full cure is reached in 7 days after the application at a constant temperature of 23 °C. At constant 8 °C, MasterInject 1360 cures in 28 days.

PACKAGING

MasterInject 1360 is available in 15 kg units consisting of 11.63 kg Part A and 3.37 kg Part B.

STORAGE

Store at ambient temperatures, out of direct sunlight, in cool, dry warehouse conditions and clear of the ground on pallets protected from rainfall prior to application.

SHELF LIFE

18 months if stored at above mentioned storage conditions.

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WATCH POINTS

- 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 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.

HANDLING AND TRANSPORT

Usual preventive measures for the handling of chemical products should be observed when using this product, for example do not eat, smoke or drink while working and wash hands when taking a break or when the job is completed. Specific safety information referring the handling and transport of this product can be found in the Material Safety Data Sheet. For full information on Health and Safety matters regarding this product the relevant Health and Safety Data Sheet should be consulted. Disposal of product and its container should be carried out according to the local legislation in force. Responsibility for this lies with the final owner of the product.

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Product Data				
Property		Standard	Data	Unit
Chemical Base		-	Epoxy	-
Colour (mixed)		-	Clear	-
Density (23 °C)	Mixed Part A Part B	DIN 52713 / ISO 2811-1	1.10 1.10 0.90	g/cm ³
Viscosity (21 °C)	Mixed	EN 3219	190	mPa·s
Shore D (23 °C) (10 °C)	5 days 2 days	EN ISO 868	74 30	-
Compressive Strength	7 days	EN 196-1	52	N/mm ²
Flexural Strength	7 days	EN 196-1	23	N/mm ²
Tensile Strength	7 days	EN ISO 527-1; -2	13	N/mm ²
Elongation	7 days	EN ISO 527-1; -2	3.5	%
Elastic modulus	7 days	EN ISO 527-1; -2	417	N/mm ²
Adhesion to Concrete ¹ (7 days) dry crack moist crack		EN 12618-2 (EN 13687-3)	Concrete Failure Concrete Failure	-
Application Temperature (ambient and substrate)		-	+8 - +35	°C
Pot life ²	15 °C 21 °C 35 °C	EN ISO 9514	approx. 120 approx. 70 approx. 47	minutes
Tensile strength development ³	15 °C 21 °C 35 °C	EN 1543	approx. 68 approx. 41 approx. 18	hours
Injectability in dry media (D) @ 0.2mm crack width ⁴	15 °C 35 °C	EN 1771	passed	-
Injectability in dry and moist media @ 0.5mm crack width ⁵	15 °C 35 °C	EN 12618-2	passed	-

Note: ¹ Concrete type is MC (0.40) according to EN 1766, tensile strength of the concrete (f_{ct}) is lower than 3.5 N/mm² and crack width is 0.5mm. Results were obtained after both normal curing conditions and thermal and wet/drying cycles.

² It is measured by using 100 ml of mixed resin. Higher volumes of mixed material shorten the pot life.

³ Time to reach < 3 N/mm² (minimum requirement < 72 h at lowest application temperature).

⁴ Determination by injectability class and splitting strength

⁵ Determination by tensile adhesion strength.

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DISCLAIMER

In view of widely varying site conditions and fields of application of our products, this technical data sheet is meant to provide general application guidelines only. This information is based on our present knowledge and experience. The customer is not released from the obligation to conduct careful testing of suitability and possible application for the intended use. The customer is obliged to contact the technical help-line for fields of application not expressly stated in the technical data sheet under "Fields of Application". Use of the product beyond the fields of application as stated in the technical data sheet without previous consultation with Master Builders Solutions and possible resulting damages are in the sole responsibility of the customer. All descriptions, drawings, photographs, data, ratios, weights i.e. stated herein can be changed without advance notice and do not represent the condition of the product as stipulated by contract. It is the sole responsibility of the recipient of our products to observe possible proprietary rights as well as existing laws and provisions. The reference of trade names of other companies is no recommendation and does not exclude the use of products of similar type. Our information only describes the quality of our products and services and is no warranty. Liability is accepted for incomplete or incorrect particulars in our data sheets only in the event of intent or gross negligence, without prejudice to claims under product liability laws.

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