



MAXFIX -E

EPOXY RESIN FOR FASTORING OF THREADED RODS AND REBARS IN CONCRETE AND MASONRY

DESCRIPTION

MAXFIX -E is a bicomponent system of pure epoxy resin packed in a cartridge for use by injection means. It can be used on concrete, solid brick and stone. Application of the resin is made in an easy and quick way by means a hand gun.

APPLICATIONS

- Fastening of anchor plates, angles and profiles of metal structures to concrete and masonry.
- Fastening of rebars for connections: retaining wall and forged.
- Fastening of rebars for end supports.
- Placing of heavy machinery, cranes and bridge cranes.
- Fastening of stud anchors for concrete slab and beam.
- Fastening of heavy facilities.
- Placing of supports, posts, and road signs.

ADVANTAGES

- Packed resin into injection cartridge for use directly with a hand gun.
- Easy and handy application, it does not need premixing.
- Holes can be drilled with a diamond core equipment or pneumatic hammer drill.
- Its good thixotropy allows the application on walls and ceilings.
- Short embedment withstands large loads.
- Long pot life for placing of rods with big sizes.
- It does not produce expansion tensile into base material.
- It allows short distances from edges and anchor spacing.
- Good adherence, even on wet supports.
- It withstands dynamic loads
- Suitable cartridge for many applications.

APPLICATION INSTRUCTIONS

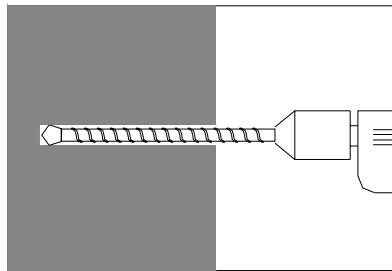
Surface preparation:

Make sure that material on which application is going to be done is sound and also is not deteriorated.

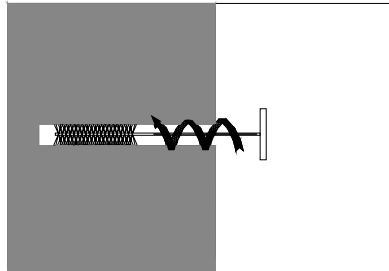
Solid materials

1. Drill a hole into base material with a rotary electric or pneumatic hammer drill. According to the object, which is being fastened, hole should have the suitable diameter and depth (see Table 1).
2. Clean the hole, just before setting the threaded rods and reinforcing bars, using brushes and blow out dust.
3. Make sure that both rods and rebars are free of any contaminants, oils, greases, dust, etc.

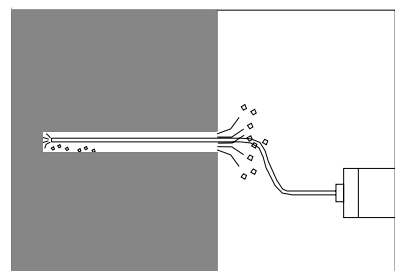
| Table1. Data for placing | | | | | | |
|--|-----------|------------|------------|------------|------------|------------|
| Threaded Rods | M8 | M10 | M12 | M16 | M20 | M24 |
| Rod size (mm) | 8 | 10 | 12 | 16 | 20 | 24 |
| Diameter of hole (mm) | 10 | 12 | 14 | 18 | 25 | 28 |
| Standard depth | 90 | 100 | 110 | 130 | 170 | 210 |
| Minimum base material thickness (mm) | 130 | 140 | 160 | 175 | 220 | 260 |
| Torque (Nm) | 15 | 30 | 50 | 90 | 110 | 190 |
| Rebars as anchor | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rebar size (mm) | 80 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Standard depth (mm) | 90 | 110 | 130 | 170 | 220 | 270 |
| Minimum base material thickness (mm) | 120 | 150 | 170 | 210 | 270 | 320 |
| Rebars for reinforced concrete B 500 | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rebar size (mm) | 80 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Anchoring length to develop yield of bar: 25φ (mm) | 200 | 250 | 300 | 400 | 500 | 600 |
| Minimum base material thickness (mm) | 230 | 290 | 340 | 440 | 550 | 650 |
| Rebars for reinforced concrete B 400 | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rebar size (mm) | 80 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Anchoring length to develop yield of bar: 20φ (mm) | 160 | 200 | 240 | 320 | 400 | 500 |
| Minimum base material thickness (mm) | 190 | 240 | 280 | 360 | 450 | 550 |



1. Drilling the hole



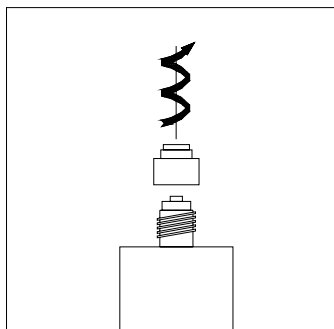
2a. Cleaning with brush



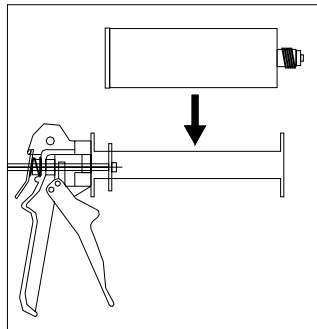
2b. Cleaning with air

Procedure for the injection system

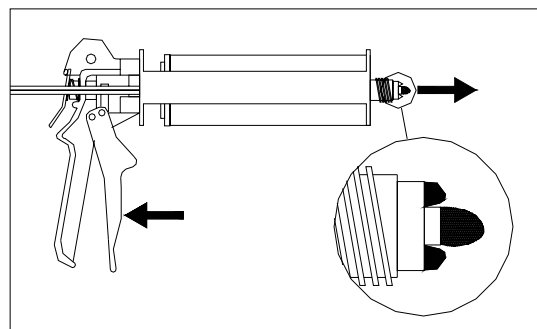
1. Pressing the release lever and pull back the piston of the hand gun.
2. Unscrew the protection top and insert the cartridge into the hand gun.
3. Before screwing the mixing nozzle, make sure that both component A and component B are coming out accurately from the cartridge.
4. Screw the mixing nozzle.
5. In order to get a suitable mixing, squeeze out resin until the product becomes uniform in colour (5 cm). A couple of trigger pulls could be necessary.
6. Once all these steps have been done, system is ready for use.
Proceed in the same way for each change in mixer



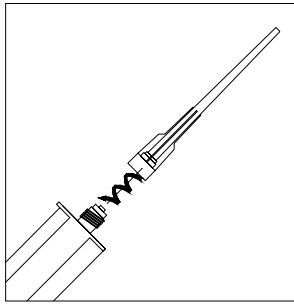
Unscrew the top



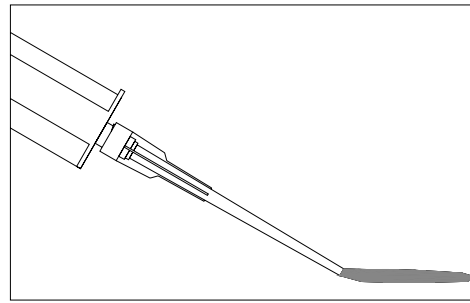
Put cartridge into hand gun



Make sure two components are coming out



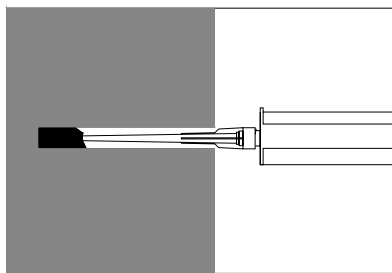
Screw mixing nozzle



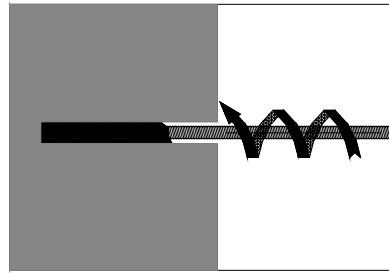
Throw away the first trigger pulls

Application

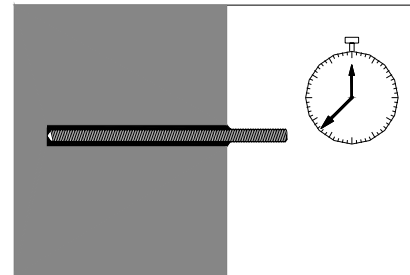
1. Insert the mixing nozzle at the end of the hole. As hole is full of resin the hand gun should be removed.
2. For placing threaded rods into the hole, a light twisting motion should be done. Make sure that metal objects are free of grease, rust and dust.
3. Before touching the threaded rods, wait the curing time.
4. Once resin has cured totally, object can be placed on the fastening and then if is necessary a torque tight can be applied.
5. Once the fastenings have been done, remove the mixing nozzle y screw the protection top. For new applications, a new mixing nozzle must be used.



Injection of **MAXFIX -E**



Insertion of the rod or rebar



Wait the setting time

Application Conditions

During application, the cartridge should be in the temperature range from +5 °C to +30 °C. Application temperature is in the range from 5 °C to 40 °C.

Curing

The curing time varies depending on temperature. High temperatures speed up the reaction while low temperatures slow down the reaction. Before applying the torque tight on the fastening the curing time must be observed. The pot life matches with the setting time in which the resin has not still begun to harden. In order to harden completely, resin employs the designated final setting time.

| Support temperature (°C) | Pot life | Setting time |
|--------------------------|----------|--------------|
| 5 | 150' | 36 h |
| 10 | 120' | 24 h |
| 20 | 30' | 6 h |
| 25 | 20' | 5 h |
| 30 | 12' | 4 h |

Cleaning Tools

Before pot life finishes tools and equipments should clean with a duster. Once **MAXFIX -E** hardens, it can only be removed by mechanical means.

CONSUMPTION

Many fastenings can be done with a cartridge of **MAXFIX -E** of 385 ml. Numbers of fastenings depends on both the metrics and depth (see, Table 2).

| Table 2. N° of anchors per cartridge | | | | | | |
|--|-----------|------------|------------|------------|------------|------------|
| Threaded rods | M8 | M10 | M12 | M16 | M20 | M24 |
| Rod size (mm) | 8 | 10 | 12 | 16 | 20 | 24 |
| Diameter of hole (mm) | 10 | 12 | 14 | 18 | 25 | 28 |
| Standard depth (mm) | 90 | 100 | 110 | 130 | 170 | 210 |
| N° of anchors per cartridge for 100 mm | ±65 | ±45 | ±33 | ±20 | ±10 | ±8 |
| N° of anchors for standard depth | ±69 | ±45 | ±30 | ±15 | ±6 | ±4 |
| Rebars as anchor | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rebar size (mm) | 8 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Profundidad estándar (mm) | 90 | 110 | 130 | 170 | 220 | 270 |
| N° of anchors per cartridge for 100 mm | ±65 | ±45 | ±29 | ±16 | ±11 | ±7 |
| N° of anchors for standard depth | ±69 | ±41 | ±22 | ±10 | ±5 | ±2,5 |
| Rebars for reinforced concrete B 500 S | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rebar size (mm) | 8 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Anchoring length to develop yield of bar 25φ (mm) | 200 | 250 | 300 | 400 | 500 | 600 |
| N° of anchors per cartridge for 100 mm | ±65 | ±45 | ±29 | ±16 | ±11 | ±7 |
| N° of anchors for standard depth | ±33 | ±18 | ±10 | ±4 | ±2,2 | ±1,1 |
| Rebars for reinforced concrete B 400 S | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rod size (mm) | 8 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Anchoring length to develop yield of bar: 20φ (mm) | 160 | 200 | 240 | 320 | 400 | 500 |
| N° of anchors per cartridge for 100 mm | ±65 | ±45 | ±29 | ±16 | ±11 | ±7 |
| N° of anchors for standard depth | ±41 | ±23 | ±13 | ±5,4 | ±2,8 | ±1,4 |

PACKAGING

Two-component cartridge of 380 ml.

STORAGE

Twelve months in its original unopened packaging. It should be stored in a dry, fresh and covered place, protected from sun light and temperatures between 5 °C and 30 °C.

IMPORTANT INDICATIONS

- When resin has reacted into the mixing nozzle, a new one must be used for more applications.
- Technical data are from numerous laboratory tests on common materials. If in doubt about material on which metal anchors is going to be applied, some tests should be done. These tests will indicate if the system is suitable.
- Fastenings can be done on damp surfaces, but running water is not allowed.
- Follow the instructions given herein. If in doubt or any other further information, consult Technical Department

SAFETY AND HEALTH

Epoxy resin can irritate to skin, so that protective rubber gloves and goggles must be used to handle and apply the resin. In case of skin contact, wash affected areas with soap and water, but do not rub. If irritation continues, seek medical attention. In case of eye contact, rinse thoroughly with clean

water for at least 15 min, but do not rub and seek medical attention. In case of inhalation, supply fresh air.

For further information, Safety Data Sheet of **MAXFIX -E** is available by request.

Disposal of the product and its empty containers must be made according to official regulations. This disposal must be made by the final use.

TECHNICAL DATA

| Tabla 4. Recommended loads as anchoring | | | | | | | | | | | | | |
|---|-----|-----|------|------|------|------|-----------------------|-----|-----|------|------|------|------|
| Base material: Uncracked concrete HM20 | | | | | | | | | | | | | |
| Threaded rod Quality 5.8 | M8 | M10 | M12 | M16 | M20 | M24 | Rebars B 500 | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Rod size (mm) | 8 | 10 | 12 | 16 | 20 | 24 | Rebar size (mm) | 8 | 10 | 12 | 16 | 20 | 25 |
| Diameter of hole (mm) | 10 | 12 | 14 | 18 | 25 | 28 | Diameter of hole (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Standard depth (mm) | 90 | 100 | 110 | 130 | 170 | 210 | Standard depth (mm) | 90 | 110 | 130 | 170 | 220 | 270 |
| Recommended load* | | | | | | | Recommended load* | | | | | | |
| Nrec: Tensile (kN) | 6,2 | 8,3 | 10,6 | 16,1 | 29,3 | 40,5 | Nrec: Tensile (kN) | 6,2 | 9,0 | 13,4 | 23,4 | 37,8 | 59,5 |
| Vrec: Share (kN) | 5,6 | 9,0 | 13,1 | 24,7 | 38,6 | 55,6 | Vrec: Share (kN) | 5,6 | 9,0 | 13,1 | 24,7 | 38,6 | 55,6 |

* For tensile load and shear load the total safety coefficient are $\gamma = 4$ and $\gamma = 3$ respectively. In presence of water, loads have to be cut by 20%. Data for a fastening in the centre of a base material without influence factors such as edges and the distance between anchors.

Reduced loads

For anchors design, the reduced load, F_{red} , is equal to the recommended load, F_{rec} , multiplied by the following load correction factors; distance between anchor centres, edge distance, concrete and anchoring depth.

$$F_{red} = F_{rec} * f_a * f_b * f_c * f_d$$

Correction factor of anchor spacing f_a

$$f_a = 0,5 * \frac{S_{red}}{S_{cr}} + 0,5 \leq 1$$

Standard centre spacing : $S_{cr} = 20 * d$

d : Anchor size.

S_{red} : Reduced centre spacing (mm)

Correction factors of distance from an edge f_b

| Tensile Loads | Shear Loads |
|---|---|
| $f_{b,N} = 0,75 * \frac{C_{red}}{C_{cr}} + 0,25 \leq 1$ | $f_{b,V} = \frac{C_{red}}{C_{cr}} \leq 1$ |

Standard edge distance : $C_{cr} = 10 * d$

d : Anchor size.

C_{red} : Reduced edge distance

Minimum edge distance : $C_{min} = 0,5 * h_{st}$

h_{st} = Anchoring depth

Correction factor of concrete compressive strength f_c

Strength data for anchors on concrete C20/25. For higher concrete strengths the suitable correction

factor must be applied.

| Concrete | | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/55 |
|----------|-----------------------|--------|--------|--------|--------|--------|--------|--------|
| f_c | Shear loads | 1,00 | 1,10 | 1,22 | 1,34 | 1,41 | 1,48 | 1,55 |
| | Tensile loads: rebars | 1,00 | 1,02 | 1,06 | 1,09 | 1,12 | 1,14 | 1,16 |
| | Tensile loads: rods | 1,00 | 1,05 | 1,12 | 1,20 | 1,25 | 1,30 | 1,35 |

Correction factors of anchoring depth f_d

The tensile strength of anchors is directly proportional to anchoring depth. The shear strength does not vary if an anchoring depth longer than standard anchoring depth, h_{st} , is used.

Tensile Loads

$$f_{d,N} = \frac{h}{h_{st}}$$

$$h_{st} \leq h \leq 2h_{st}$$

Shear Loads

$$f_{d,V} = 1$$

Basic length of anchor according to method of calculation for rebars

| Table 5. Lengths of anchors for reinforced concrete. Concrete C25/30 | | | | | | |
|--|------|------|------|------|-------|-------|
| Base material: Uncracked concrete HA25 | | | | | | |
| Rebars for reinforced concrete B 500 S | | | | | | |
| Rebar size (mm) | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Diameter of hole (mm) | 80 | 10 | 12 | 16 | 20 | 25 |
| Anchoring length to develop yield of bar: 25φ (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Design strength (kN) | 200 | 250 | 300 | 400 | 500 | 600 |
| Design strength (kN) | 21,8 | 34,2 | 49,2 | 87,4 | 136,6 | 213,4 |
| Rebars for reinforced concrete B 400 S | | | | | | |
| Rods size (mm) | φ8 | φ10 | φ12 | φ16 | φ20 | φ25 |
| Diameter of hole (mm) | 80 | 10 | 12 | 16 | 20 | 25 |
| Anchoring length to develop yield of bar: 20φ (mm) | 10 | 12 | 15 | 20 | 25 | 32 |
| Design strength (kN) | 160 | 200 | 240 | 320 | 400 | 500 |
| Design strength (kN) | 17,5 | 27,3 | 39,3 | 69,9 | 109,3 | 170,7 |

* For tensile load the safety coefficient is $\gamma = 4$. In presence of water, loads have to be cut by 20%. Data for a fastening in the centre of a base material without influence factors such as edges and the distance between anchors.

If an anchor is placed close to others anchors and/or edges of concrete, the anchoring depth must be increases according to criteria for rods and rebars as anchoring.

If a concrete better than C25/30 is used, the anchoring depth decreases. In this case, the minimum anchoring depth for a rebar with a tensile load shown in the EC-2 must be taken into account.

GUARANTEE

The information contained in this leaflet is based on our experience and technical knowledge, obtained through laboratory testing and from bibliographic material. DRIZORO reserves the right to introduce changes without prior notice. Any use of this data beyond the purposes expressly specified in the leaflet will not be the Company's responsibility unless authorised by us. We shall not accept responsibility exceeding the value of the purchased product.



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