

# Keyfix E

Epoxy resin cartridge system for anchoring



## DESCRIPTION

Keyfix E is a two component high strength pure epoxy resin anchoring grout pre-packed in dual cartridge system with fast curing rate.

Keyfix E is formulated for permanent installation of steel reinforcement bars and threaded rods into concrete substrates in structural applications.

## APPLICATIONS

Keyfix E is ideally designed for use in the following applications:

- » Permanent installation of reinforcement starter bars and dowel bars.
- » Permanent installation of hand rails, safety fence, wall ties, railway tracks and ground anchors.

## ADVANTAGES

- » Exceptional rapid strength development.
- » Resistant to dynamic loading.
- » Exceptional high compressive.
- » Extremely dense.
- » Exceptional bond to concrete and steel surfaces.
- » Suitable for dry and damp concrete holes.
- » Good chemical resistance.
- » High ultimate and early strengths.
- » Non-sag consistency suitable for overhead applications.

## STANDARDS

- » Keyfix E evaluated in accordance with the EOTA TR023 "Assessment of post-installed rebars connections".
- » Keyfix E when tested at normal temperature complies with the requirements of ASTM C881, Types I, II\*, IV and V\*, Grade 3, Class C.

\*Except for gel time.

## METHOD OF USE

### SUBSTRATE PREPARATION

Substrate should be sound, clean and free from grease or any contamination. Bars should be free from any loose rust deposits. Holes can be drilled using a hammer drill to produce a rough surface or by coring to produce a smooth surface. Keyfix E bond strength will be the same in both cases.

## TECHNICAL PROPERTIES:

Colour:	Red
Bond strength: ASTM C882-99	$\geq 10$ MPa @ 2 days $\geq 13.5$ MPa @ 14 days
Compressive yield strength: ASTM D695-02a	$\geq 70$ MPa @ 7 days
Linear coefficient of shrinkage on cure: ASTM D2566-86	$< 0.005$ @ 7 days
Compressive modulus: ASTM D695	$\geq 1400$ MPa @ 7 days
Elongation at break: ASTM D638-03	$> 1.5\%$ @ 7 days
Water absorption: ASTM D570-98	$< 1\%$

Deformed or ribbed bars will give a higher performance than smooth or other bar types. After drilling, holes should be brushed and blown out twice, to remove all drilling debris.

## APPLICATION

- » Unscrew the protective cap, remove the insert plug and attach the static mixing nozzle.
- » Insert the cartridge into the cartridge gun and dispense sufficient material until an even colour is achieved.
- » Usually 10 ml of extruded material should be adequate.
- » Insert the nozzle into the base of the hole, apply pressure to the gun and slowly withdraw the nozzle as the hole fills.
- » Normally, it is enough to fill the hole approximately two-third full.
- » Insert the stud/steel bar into the hole with a twisting action, ensuring that is fully embedded.
- » Allow the resin to cure fully before loading.

*When filling holes overhead or in porous block work, the use of plastic sleeves is recommended in order to hold the reinforcing bar in place and ensure proper embedded length.*

Partly used cartridge are reusable, Remove the static mixer and surplus base and catalyst components from the cartridge nozzle, insert the plug and screw on the protective cap.

## WORKING AND CURING TIMES

Resin Cartridge Temperature	Base Material Temperature	Working Time	Curing time
35 to 40°C	35 to 40°C	8 min	4 hr
25 to 30°C	25 to 30°C	13 min	10 hr
20 to 25°C	20 to 25°C	25 min	12 hr
10 to 15°C	10 to 15°C	100 min	24 hr
10 to 15°C	5 to 10°C	120 min	45 hr

*Always ensure that the cartridge temperature is > 10°C prior to using it .*

## CLEANING

All tools should be cleaned immediately after finishing by DCP Solvent. Hardened materials can be cleaned mechanically.

## ESTIMATING

The required quantity of Keyfix E depends on the hole diameter and depth. Normally, it is enough to fill the hole two-third full. The estimated volume of Keyfix E can be calculated using the following equation:

$$\text{Volume (ml)} = (\pi/6000) \cdot \Phi_h^2 \cdot H_D$$

Where:

$\Phi_h$ : Hole diameter (mm).

$H_D$ : Hole depth (mm).

## DESIGN CONSIDERATION

Table I summarizes the forces that each deformed steel reinforcement bar can withstand at each specified holes depth.

These forces were calculated in accordance with EOTA TR023 "Assessment of post-installed rebars connection", considering that the yield strength of the steel is 420 MPa and the compressive strength of concrete is 25 MPa cube.

**TABLE I**

Bar diameter (mm)	Hole diameter (mm)	Embedded length (mm)	Bar area (mm <sup>2</sup> )	Maximum pull out force (kN)*	Needed quantity of Keyfix E per hole (ml)
10	12	110	79	36	8.3
12	14	130	113	51	13.3
14	16	150	154	69	20.1
16	20	180	201	94	37.7
18	24	200	254	117	60.3
20	26	230	314	150	81.4
25	31	280	491	228	140.9
32	40	360	804	376	301.6

*\* Maximum pull-out force that yield a concrete splitting failure pattern.*

## **PACKAGING**

Keyfix E is available in 400 ml or 380 ml twin cartridge system.

## **STORAGE**

Keyfix E has a shelf life of 12 months from the date of manufacture if stored in its original packaging at temperatures above 8°C and away from direct sunlight.

If crystallization has occurred due to low temperature storage conditions (typically below 5°C), condition the product at temperatures around 30°C for several days before application.

If these conditions are exceeded, DCP Technical Department should be contacted for advise.

## **CAUTIONS**

### **HEALTH AND SAFETY**

Keyfix E is irritant to eyes, skin and respiratory system. Wear suitable gloves and eye protection.

For further information refer to the Material Safety Data Sheet.

### **FIRE**

Keyfix E is nonflammable.

DCP Solvent is flammable, do not use near a naked flame and do not smoke during use.



# Keyfix E

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**Note:**

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