

Keyfix AE15

Epoxy acrylate anchoring system in cracked and uncracked concrete under seismic conditions (C1)



Description

Keyfix AE15 is high strength, fast cure, styrene free, epoxy acrylate resin anchoring grout supplied in a pre-packed cartridge system.

It is suitable for use with different type of substrates such as cracked concrete, uncracked concrete, solid and hollow masonry, hard natural stone, solid rock, voided stone or rock.

Keyfix AE15 is available in three different grades depending on the installation environment:

- ▲ Keyfix AE15: Standard grade
- ▲ Keyfix AE15-T: for high-temperature environments
- ▲ Keyfix AE15-W: for cold-temperature environments

Applications

Keyfix AE15 is ideally designed for use in the following applications:

- ▲ Structural applications in cracked and non cracked concrete.
- ▲ Permanent installation of reinforcing and starter bars.
- ▲ Suspended ventilation systems.
- ▲ Safety barriers.
- ▲ Machinery and heavy machinery.
- ▲ Racking.
- ▲ Rolling cranes.

Advantages

- ▲ Suitable for dry, wet and flooded holes.
- ▲ Use standard sealant application gun.
- ▲ Exceptional rapid strength development.
- ▲ Styrene free.
- ▲ Resistant to dynamic loading.
- ▲ Exceptional bond to concrete and steel surfaces.
- ▲ High ultimate and early strengths
- ▲ Low waste, reusable and easily recycled cartridge.

Technical Properties @ 20°C:

Compressive strength: ASTM D695	≥ 75 MPa @ 7 days
Flexural strength: ASTM D790	≥ 25 MPa @ 7 days
Tensile strength: ASTM D638	≥ 12 MPa @ 7 days
Tensile modulus: ASTM D638	≥ 3500 MPa
Elongation at break: ASTM D638	≥ 5% @ 7 days

Standards

Keyfix AE15 complies with the following standards:

- ▲ ETA according ETAG 001, Part 5, Option 1 for anchoring of threaded bars into cracked and uncracked concrete, and under seismic conditions (C1).
- ▲ EOTA according to TR023 for post-installed rebar connections.
- ▲ ETA according to ETAG029 for masonry installations.
- ▲ WRAS - Approved Material.
- ▲ Fire resistance F120

Method of Use

Substrate Preparation

Substrate should be sound, clean and free from grease or any contaminants. 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.

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.

Keyfix AE15

Application

- ▲ Unscrew the protective cap, cut the film to remove the metal clip 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 half to two thirds 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.

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 Loading Times

Keyfix AE15 Standard Grade

Resin Cartridge Temperature	Working Time	Base material temperature	Loading time
5 to 10°C	10 min	5 to 10°C	145 min
10 to 15°C	8 min	10 to 15°C	85 min
15 to 20°C	6 min	15 to 20°C	75 min
20 to 25°C	5 min	20 to 25°C	50 min
25 to 30°C	4 min	25 to 30°C	40 min

*Notes: Working time is set at the highest base material temperature in the range.
Loading time is set at the lowest base material temperature in the range.*

Keyfix AE15-T

Resin Cartridge Temperature	Working Time	Base material temperature	Loading time
15 to 20°C	15 min	15 to 20°C	5 hours
20 to 25°C	10 min	20 to 25°C	145 min
25 to 30°C	7.5 min	25 to 30°C	85 min
30 to 35°C	5 min	30 to 35°C	50 min
35 to 40°C	3.5 min	35 to 40°C	40 min

*Notes: Working time is set at the highest base material temperature in the range.
Loading time is set at the lowest base material temperature in the range.*

Cleaning

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

Estimating

The required quantity of Keyfix AE15 depends on the hole diameter and depth. Normally, it is enough to fill the hole two-third full. The estimated volume of Keyfix AE15 can be calculated using the following equation:

$$\text{Volume (ml)} = (\pi/6000) \cdot \Phi h^2 \cdot HD$$

Where:

Φh : Hole diameter (mm).

HD: Hole depth (mm).

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Keyfix AE15-W

Resin Cartridge Temperature	Working Time	Base material temperature	Loading time
Min 0°C	50 min	-10 to -5°C	12 hours
	15 min	-5 to 0°C	100 min
0 to 5°C	10 min	0 to 5°C	75 min
5 to 20°C	5 min	5 to 20°C	50 min
+20°C	100 seconds	+20°C	20 min

Notes: Working time is set at the highest base material temperature in the range.

Loading time is set at the lowest base material temperature in the range.

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 ²)	Maximum pull out force (kN)*	Needed quantity of Keyfix AE15 per hole (ml)
10	12	110	79	36	8.3
12	14	130	113	51	13.3
14	16	160	154	69	21.4
16	20	190	201	94	39.8
20	26	240	314	140	84.9
25	31	290	491	204	145.9

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

Packaging

Keyfix AE15 is available in 300 ml.

Storage

Keyfix AE15 has a shelf life of 12 months from date of manufacture if stored at temperature of 20°C.

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

Cautions

Health and Safety

Keyfix AE15 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 AE15 is flammable, and should be kept in a cool place.

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- ▲ Adhesives.
- ▲ Tile adhesives and grouts.
- ▲ Building products.
- ▲ Structural strengthening.


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