KingGrout® AE5

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

DESCRIPTION

KingGrout AE5 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 hol- low masonry, hard natural stone, solid rock, voided stone or rock.

KingGrout AE5 is available in three different grades depend- ing on the installation environment:

- KingGrout AE5: Standard grade
- KingGrout AE5 -T: for high-temperature environments
- KingGrout AE5 -W: for cold-temperature environments

APPLICATIONS

KingGrout AE5 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.

STANDARDS

KingGrout AE5 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

TECHNICAL PROPERTIES

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

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.

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.
- Usally 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

KingGrout AE5 Standard Grade

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

KingGrout AE5-T

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

KingGrout AE5-W

Resin Cartridge Temperature	Working time	Base material temperature	Loading time
Min 0oC	50 min	-10 to -5oC	12 hours
Min 0oC	15 min	-5 to 0oC	100 min
0 to 5oC	10 min	0 to 5oC	75 min
5 to 20oC	5 min	5 to 20oC	50 min
+20oC	100 sec	+20oC	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.

CLEANING

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

ESTIMATING

The required quantity of KingGrout AE5 depends on the hole diameter and depth. Normally, it is enough to fill the hole two-third full. The estimated volume of KingGrout AE5 can be calculated using the following equation:

Volume (ml) = $(\pi/6000).\Phi h^2.HD$

Where:

Φh: Hole diameter (mm).

HD: 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 1

Bar diam-eter (mm)	Hole diam-eter (mm)	Embe-dded length (mm)	Bar area (mm2)	Maxi-mum pull out force (kN)*	Needed quantity of KingGrout AE5 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

KingGrout AE5 is available in 300 ml.

COVERAGE

Bonding agent: 16 m² when diluted 1 to 1. Sealer coat: 25m² when diluted 1 to 4.

Admixture: 20 - 25 litre/100 kg Cement depending on use.

Note: The coverage rate differs from surface to another depending on the porosity of the surface.

STORAGE

Shelf life is 1 year when stored under cover, out of direct sunlight and protected from extremes of temperature.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult KingKrete's Technical Services Department.

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HEALTH AND SAFETY

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs. Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Reseal containers after use. Use in well ventilated areas and avoid inhalation.

NOTE

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local KingKrete representative. KingKrete Inc. reserves the right to have the true cause of any difficulty determined by accepted test methods.

QUALITY AND CARE

All products originating from KingKrete's Middle East facility are manufactured under a management system independently certified to conform to the requirements of the quality standards ISO 9001, ISO 14001 and ISO 45001.

* Properties listed are based on laboratory-controlled tests.
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Ref: KK-04002-MEA-R01 | Issue: 01.2026

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