KINGKRETE®
We Create Future

Kinggrout® AE10

Epoxy acrylate resin cartridge system for anchoring.

DESCRIPTION

KingGrout AE10 is a 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 types of substrates such as concrete, hard natural stone, solid rock and solid masonry.

APPLICATIONS

KingGrout AE10 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, rail way tracks and ground anchors.
- Bonding concrete reinforcing bars and securing profiled sections and bars.

ADVANTAGES

- 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.
- Applicable at low temperature from -5°C.
- Low waste, reusable and easily recycled cartridge.

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.

Resin Cartridge Temperature	Working time	Base material temperature	Loading time
Min 5°C	12 min	-5 to 0°C	24 hr
Min 5°C	12 min	0 to 5°C	180 min
5 to 10°C	8 min	5 to 10°C	100 min
10 to 20°C	4 min	10 to 20°C	70 min
20 to 25°C	3 min	20 to 25°C	40 min
25 to 30°C	2 min	25 to 30°C	40 min
+30°C	1 min	+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. May be used at low temperatures (minimum application of -5°C) if the cartridge/resin temperature is kept above 5°C.

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.

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TECHNICAL PROPERTIES

TABLE I												
FY (N/mm²)	FC (N/mm²)	ΦB (mm)	ΦH (mm)	Calculated Pullout Force F(KN) in tension with 40% safety margin at a certain hole depth (HD)	Ultimate Pullout Force in tension							
For steel bar	For concrete	Bar diameter	Hole diameter	100	120	160	200	250	300	350	Hole Depth (mm)	F (KN)
420	2.5	8	12	16	19	25		134	21			
420	2.5	10	14	18	22	29	37		180	33		
420	2.5	12	16	21	25	33	42	52		227	47	
420	2.5	14	18	24	28	38	47	59		275	65	
420	2.5	16	20	26	31	42	52	65	78		323	84
420	2.5	18	22	29	35	46	58	72	86	101	371	107
420	2.5	20	24	31	38	50	63	78	94	110	420	132
420	2.5	22	26	34	41	54	68	85	102	119	469	160
420	2.5	25	30	39	47	63	78	98	118	137	525	206
420	2.5	32	36	47	56	75	94	118	141	165	717	338

TABLE II			
Dar Diameter ΦB mm	Bar Area mm	FY N/ mm²	Ultimate Pullout Force (F) KN
8	50.24	420	21
10	78.5	420	33
12	113.04	420	47
14	153.86	420	65
16	200.96	420	84
18	254.34	420	107
20	314	420	132
22	379.94	420	160
25	490.625	420	206
32	803.84	420	338

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TECHNICAL PROPERTIES

TABLE III									
Volume of KINGGROUT REQUIRED (ML) Hole Depth (mm)									
Bar Dia mm	Hole Dia mm	100	140	160	200	250	300	350	400
8	12	6	9	10	13	16	19	22	25
10	14	8	11	12	15	19	23	26	30
12	16	9	12	14	18	22	26	31	35
16	20	11	16	18	23	28	34	40	45
20	25	18	25	28	35	44	53	62	71
25	32	31	44	50	63	78	94	110	125
32	40	45	63	72	90	113	136	158	181
40	50	71	99	113	141	177	212	247	283

Table III shows an estimate of materials required for each bar for a given hole depth and diameter.

DESIGN CONSIDERATION

A)Minimum Hole Depth HD

As per BS8110, minimum Hole Depth HD (or length of embedment) is shown below, allowing for 40% factor of safety.

$HD = 0.6\ FY \cdot \pi\ \Phi B^2\ FC$

$\pi\ \Phi H\ 4$

$HD = 0.6.\ FY.\ \Phi B^2$

$4\ FC\ \Phi H$

Noting that:

FY: Yield strength of the steel (N/mm^2)

FC: Concrete bond stress (N/mm^2)

ΦB: Bar Diameter (mm)

ΦH: Hole Diameter (mm)

HD: Minimum Hole Depth (length of Embedment) (mm)

π: 3.14

B)Calculation of the Pullout Force (F) in tension using the minimum hole depth (HD) shown in A is as follows:

$HD = 0.6 \cdot FY.\ \Phi B^2$

$4\ FC\ \Phi H$

$FC\ \pi\ \Phi H\ HD = 0.6\ FY \cdot \pi\ \Phi B^2$

4

The Pullout Force (F) is equal to FY * Steel Bar Area. The Steel Bar Area is equal to:

$\pi\ \Phi B^2$

4

then:

$FC\ \pi\ \Phi H\ HD = 0.6\ F$

$F\ (N) = \pi \cdot FC \cdot \Phi H \cdot HD$

0.6

$F\ (KN) = (5.23 \cdot FC \cdot \Phi H \cdot HD^1) \div 1000$

Table I is a summary of the forces (F) that each steel reinforcement bar can take for a certain hole depth (HD).

Calculations are based on steel grade 60 and 25 N/mm^2 concrete compressive strength with FC at 2.5 N/mm^2.

C)Table II shown below shows the Ultimate Pullout Force that each steel reinforcement bar grade 60 can take

D)To calculate volume of KingGrout AE10 required in mL: $Volume\ (mL) = \pi \cdot (\Phi H^2 - \Phi B^2) \cdot HD$

4000

CLEANING

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

ESTIMATING

The required quantity of grout needed is dependent on hole diameter, bar diameter and hole depth. This can be estimated by using the following formula:

$Volume\ (ML) = \pi \cdot (\Phi H^2 - \Phi B^2) \cdot HD$

4000

Where:

ΦH is hole diameter in mm.

ΦB is bar diameter in mm. H is hole depth in mm.

PACKAGING

KingGrout AE10 is available in 300 ml.

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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.

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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STATEMENT OF RESPONSIBILITY

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NOTE

Field service where provided does not constitute supervisory responsibility. Suggestions made by KingKrete Inc. either orally or in writing may be followed, modified or rejected by the owner, engineer or contractor since they, and not KingKrete Inc. are responsible for carrying out procedures appropriate to a specific application.

KingKrete Middle East
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