KingGrout® RE10-Extreme

Pure epoxy resin based high performance anchoring grout and adhesive

DESCRIPTION

KingGrout RE10-Extreme is a two-component pure epoxy resin based high performance anchoring grout and adhesive for use in cracked and uncracked concrete under normal as well as seismic conditions. Designed for post-installed rebar connection applications, **KingGrout RE10-Extreme** offers a very high load-bearing capacity. The system can be installed in percussive and diamond drilled dry, wet and flooded holes.

TYPICAL APPLICATIONS

- Structural applications in cracked and uncracked concrete applications in seismic zones.
- Post installed rebar connections
- Crash barriers
- Structural steel
- 100 year working Life
- Low Oduor
- Threaded Studs, Starter Bars, Threaded Inserts, Over-head installation, Steel Columns, Hand Rails & Road Stitching

APPROVALS & TESTS

- KingGrout RE10-Extreme has been evaluated as per to the requirements of TR023 for post-installed rebar connections
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005)
- Fire resistance F240 for reinforcing bars
- A+ as per French VOC Regulation
- KingGrout RE10-Extreme complies to the requirements of BS6920 – Suitable for use with potable water
- KingGrout RE10-Extreme complies with the requirements of ASTM C881 - Specification for Epoxy-Resin-Base Bonding Systems for Concrete

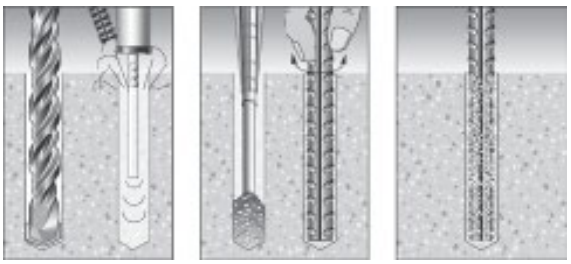
ADVANTAGES

- Fixings close to free edges
- Fire tested
- Versatile
- Anchoring without expansion pressure
- Ultra-High load capacities
- Available in side-by-side cartridges
- Component volume ratio of 1:1
- Extended gel/open time
- Suitable for diamond-drilled holes

PACKAGING

KingGrout RE10-Extreme is available in boxes of 12 side-by-side cartridges of 500 ml.

APPLICATION GUIDELINES



1. Drill recommended diameter and depth hole.
2. Important: Use rotary/ hammer Drilling System to ensure holes are clean. Alternatively, clean dust and debris from hole with stiff wire or nylon brush and blower in the following sequence: blow x 2, brush x 2, blow x 2, brush x 2, blow x 2.
3. Screw mixing nozzle onto cartridge and dispense adhesive until color is uniform red (2-3 trigger pulls). Insert mixing nozzle to bottom of hole. Fill hole to 3/4 the hole depth slowly, ensuring no air pockets form.
4. Insert Anchor Stud/rebar/ steel elements to bottom of hole while turning.
5. Allow KingGrout RE10-Extreme to cure as per setting times.

Please contact KingKrete's Technical Services department.

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WORKING & LOADING TIMES

Resin cartridge Temperature	T Work	Base Material	T Load
+10 to +15°C	40 mins	+10 to +15°C	18 hrs
+15 to +20°C	25 mins	+15 to +20°C	12 hrs
+20 to +25°C	18 mins	+20 to +25°C	8 hrs
+25 to +30°C	12 mins	+25 to +30°C	6 hrs
+30 to +35°C	8 mins	+30 to +35°C	4 hrs
+35 to +40°C	6 mins	+35 to +40°C	2 hrs
Ensure cartridge is >10°C			

Note: T Work is at the highest temperature in the range. T load is at the lowest temperature in the range

PHYSICAL PROPERTIES

Property		Unit	Value	Test Standard
Density		g/cm³	1.5	ASTM D 1875 @ +20°C / +72°F
Compressive Strength	24 hours	N/mm²	80	ASTM D 695 @ +20°C / +72°F
	7 days	N/mm²	95	
Tensile Strength	24 hours	N/mm²	20	ASTM D 638 @ +20°C / +72°F
	7 days	N/mm²	25	
Elongation at Break	24 hours	%	6.8	ASTM D 638 @ +20°C / +72°F
	7 days		6.0	
Tensile Modulus	24 hours	GN/m²	6.0	ASTM D 638 @ +20°C / +72°F
	7 days	GN/m²	5.8	
Flexural Strength	24 hours	N/mm²	45	ASTM D 790 @ +20°C / +72°F
HDT	7 days	°C	59	ASTM D 648 @ +20°C / +72°F
VOC		g/L	0	ASTM D 2369

THEORETICAL NUMBER OF FIXINGS PER CARTRIDGE

Applies to installations in solid substrates only

Cartridge Volume	h_{ef}	Ø8	Ø10	Ø12	Ø16	Ø20	Ø24	Ø27	Ø30
		Drilling Ø 10mm	Drilling Ø 12mm	Drilling Ø 14mm	Drilling Ø 18mm	Drilling Ø 22mm	Drilling Ø 26mm	Drilling Ø 30mm	Drilling Ø 35mm
500 ml side by side	8d	218	134	89	47	28	17	11	6
	10d	174	107	71	38	22	14	8	4
	12d	145	89	59	31	18	11	7	4
	20d	87	53	35	19	11	7	4	2

Note: Jobsite/contractor installations usually result in more resin being injected than the theoretical requirement resulting in lower number of fixings per cartridge. The reduction to the number of fixings per cartridge in practice is greater for smaller diameter holes and shallower embedment depths.

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KINGGROUT RE10-EXTREME with REINFORCING BARS (ANCHOR THEORY)

INSTALLATION PARAMETERS

Diameter of rebar (mm)	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Drilled hole diameter (mm)	12	14	16	20	25	32	40

DESIGN RESISTANCE

Rebar size				**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Effective embedment depth h_{ef} [mm]				**80**	**90**	**110**	**125**	**170**	**210**	**300**
	non-cracked concrete									
tension	C20/25	$N_{Rd,p}$	[kN]	17.43	24.50	35.94	47.05	74.62	102.45	160.85
	C50/60	$N_{Rd,p}$	[kN]	18.99	26.71	39.17	54.79	93.14	143.82	175.33
shear	C20/25	$N_{Rd,s}$	[kN]	9.33	14.67	20.67	36.67	57.33	90.00	147.33
	cracked concrete									
tension	C20/25	$N_{Rd,p}$	[kN]	10.72	20.49	27.65	33.54	53.20	73.04	124.71
	C50/60	$N_{Rd,p}$	[kN]	11.69	22.60	30.13	45.66	77.62	101.87	142.45
shear	C20/25	$N_{Rd,s}$	[kN]	9.33	14.67	20.67	36.67	57.33	90.00	147.33

RECOMMENDED RESISTANCE

Rebar size				**Ø8**	**Ø10**	**Ø12**	**Ø16**	**Ø20**	**Ø25**	**Ø32**
Effective embedment depth h_{ef} [mm]				**80**	**90**	**110**	**125**	**170**	**210**	**300**
	non-cracked concrete									
tension	C20/25	$N_{Rec,p}$	[kN]	12.45	17.50	25.67	33.61	53.30	73.18	114.89
	C50/60	$N_{Rec,p}$	[kN]	13.57	19.08	27.98	39.14	66.53	102.73	125.23
shear	C20/25	$N_{Rec,s}$	[kN]	6.67	10.48	14.76	26.19	40.95	64.29	105.24
	cracked concrete									
tension	C20/25	$N_{Rec,p}$	[kN]	7.66	14.64	19.75	23.96	38.00	52.17	89.08
	C50/60	$N_{Rec,p}$	[kN]	8.35	16.14	21.52	32.61	55.44	72.77	101.75
shear	C20/25	$N_{Rec,s}$	[kN]	6.67	10.48	14.76	26.19	40.95	64.29	105.24

Steel strength must also be considered and the lowest value controls.
Partial safety factor γ1.4
For resistance values in higher temperatures, please contact KingKrete Inc. Technical Services.
All the above resistance values are considering combined pull out and concrete cone failure in tension and steel failure in shear.
The above load values are for long term temperature of -40°C to +50°C and short-term temperature of +70°C

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K INGGROUT RE10-EXTREME with THREADED RODS

INSTALLATION PARAMETERS

Diameter of threaded rod (mm)	M8	M10	M12	M16	M20	M24	M30
Drilled hole diameter (mm)	10	12	14	18	22	26	35

DESIGN RESISTANCE

Threaded Rod size				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
Effective embedment depth h_{ef}			**[mm]**	**80**	**90**	**110**	**128**	**170**	**210**	**270**
	non-cracked concrete									
tension	C20/25	$N_{Rd,p}$	[kN]	22.79	28.27	38.84	48.75	74.62	102.45	149.36
	C50/60	$N_{Rd,p}$	[kN]	24.84	30.82	45.20	56.10	93.14	138.07	175.67
shear	C20/25	$N_{Rd,s}$	[kN]	7.20	12.00	16.80	31.20	48.80	70.40	112.00
	cracked concrete									
tension	C20/25	$N_{Rd,p}$	[kN]	13.40	18.85	27.65	34.76	53.20	73.04	101.79
	C50/60	$N_{Rd,p}$	[kN]	14.61	20.55	30.13	44.42	69.86	103.55	110.95
shear	C20/25	$N_{Rd,s}$	[kN]	7.20	12.00	16.80	31.20	48.80	70.40	112.00

RECOMMENDED RESISTANCE

Threaded Rod size				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
Effective embedment depth h_{ef}			**[mm]**	**80**	**90**	**110**	**128**	**170**	**210**	**270**
	non-cracked concrete									
tension	C20/25	$N_{Rec,p}$	[kN]	16.28	20.20	27.74	34.82	53.30	73.18	106.69
	C50/60	$N_{Rec,p}$	[kN]	17.74	22.01	32.29	40.07	66.53	98.62	125.48
shear	C20/25	$N_{Rec,s}$	[kN]	5.14	8.57	12.00	22.29	34.86	50.29	80.00
	cracked concrete									
tension	C20/25	$N_{Rec,p}$	[kN]	9.57	13.46	19.75	24.83	38.00	52.17	72.71
	C50/60	$N_{Rec,p}$	[kN]	10.44	14.68	21.52	31.73	49.90	73.97	79.25
shear	C20/25	$N_{Rec,s}$	[kN]	5.14	8.57	12.00	22.29	34.86	50.29	80.00

Steel strength must also be considered and the lowest value controls. Partial safety factor γ1.4

Design resistance and recommended resistance in tension are only valid for single anchors without close edge considerations for combined pullout and concrete cone failure and concrete cone failure. Steel failure is not considered by these calculations.

Design resistance and recommended resistance in shear are only valid for single anchors for steel failure without lever arm. The above load values are for long term temperature of -40°C to +50°C and short-term temperature of +70°C

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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 Qatar facility are manufactured under a management system independently certified to conform to the requirements of the quality standard ISO 9001.

* Properties listed are based on laboratory-controlled tests.

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