R-KF2 with Threaded Rods

Economical polyester resin approved for use in non-cracked concrete

Approvals and Reports

- ETA-11/0141
- UKTA-22/6102

Product information

Features and benefits

- Economical resin for medium duty load applications
- Can be used in damp condition and underwater applications
- Wide range of steel studs with different lengths and diameters
- Small edge and space distances
- Suitable for repetitive use. Partly used product can be reused by fitting a new mixing nozzle

Applications

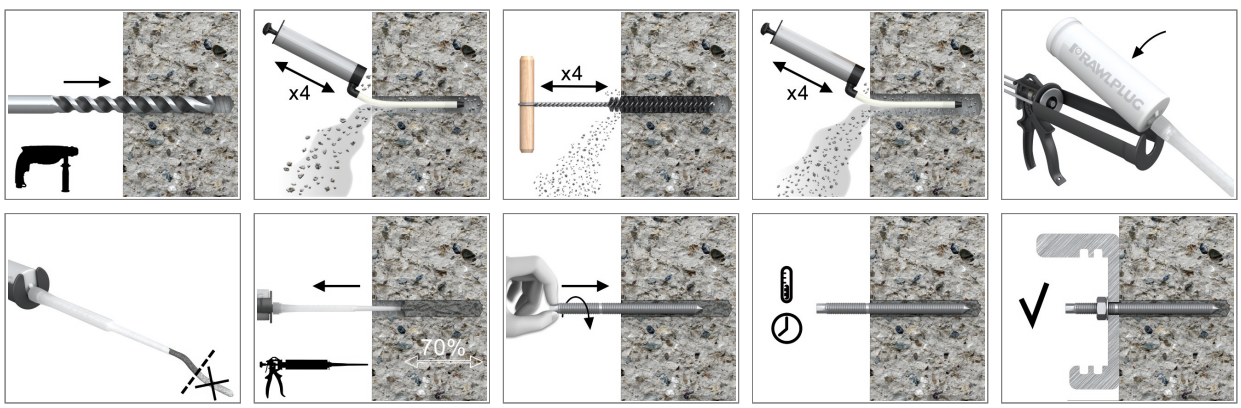
- Guard rails
- Handrails
- Canopies
- Masonry support
- Balustrading
- Cable trays
- Curtain walling
- Fencing & gates manufacturing and installation

Base materials

Approved for use in:

- Non-cracked concrete C20/25-C50/60

Installation guide



Product information

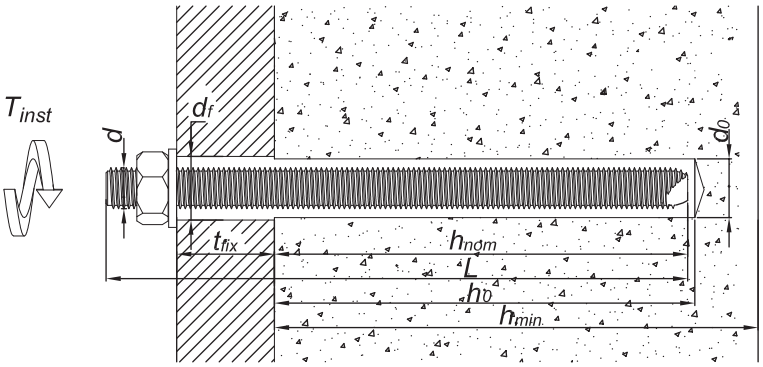
1. Drill hole to the required diameter and depth for stud size being used.
2. Clean the hole thoroughly with brush and hand pump at least four times before installation.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until even colour is obtained.
5. Insert the mixer nozzle to the bottom of the drill hole and inject resin, slowly withdrawing the nozzle as the hole is filled to 70% of its depth.
6. Immediately insert the stud, slowly and with slight twisting motion. Remove any excess resin around the hole before it sets and leave it undisturbed until the curing time elapses.
7. Attach fixture and tighten the nut to the required torque.

Product Code	Resin	Description / Resin Type	Volume
			[ml]
R-KF2-300	R-KF2	Polyester Resin	300
R-KF2-380			380
R-KF2-380	Polyester resin		300

R-STUDS

Size	Product Code			Anchor		Fixture
	Steel class 5.8	Steel class 8.8	Steel grade A4	Diameter	Length	Hole diameter
				d	L	d_f
				[mm]	[mm]	[mm]
M8	R-STUDS-08110	R-STUDS-08110-88	R-STUDS-08110-A4	8	110	9
	R-STUDS-08160	-	R-STUDS-08160-A4	8	160	9
M10	R-STUDS-10130	R-STUDS-10130-88	R-STUDS-10130-A4	10	130	12
	R-STUDS-10170	-	-	10	170	12
	R-STUDS-10190	-	-	10	190	12
M12	R-STUDS-12160	R-STUDS-12160-88	R-STUDS-12160-A4	12	160	14
	R-STUDS-12190	-	R-STUDS-12190-A4	12	190	14
	R-STUDS-12220	-	-	12	220	14
	R-STUDS-12260	-	-	12	260	14
	R-STUDS-12300	R-STUDS-12300-88	R-STUDS-12300-A4	12	300	14
M16	R-STUDS-16190	R-STUDS-16190-88	R-STUDS-16190-A4	16	190	18
	R-STUDS-16220	R-STUDS-16220-88	-	16	220	18
	R-STUDS-16260	-	-	16	260	18
	R-STUDS-16300	-	-	16	300	18
	R-STUDS-16380	-	-	16	380	18
M20	R-STUDS-20260	R-STUDS-20260-88	R-STUDS-20260-A4	20	260	22
	R-STUDS-20300	R-STUDS-20300-88	-	20	300	22
	R-STUDS-20350	-	-	20	350	22
	-	R-STUDS-20220-88	-	20	220	22
M24	R-STUDS-24300	R-STUDS-24300-88	R-STUDS-24300-A4	24	300	26
M30	R-STUDS-30380	R-STUDS-30380-88	-	30	380	32

Installation data



R-STUDS

Size			M8	M10	M12	M16	M20	M24	M30
Thread diameter	d	[mm]	8	10	12	16	20	24	30
Hole diameter in substrate	d_0	[mm]	10	12	14	18	24	28	35
Hole diameter in fixture	d_f	[mm]	9	12	14	18	22	26	32
Min. hole depth in substrate	h_0	[mm]	h_{nom} + 5	h_{nom} + 5	h_{nom} + 5	h_{nom} + 5	h_{nom} + 5	h_{nom} + 5	h_{nom} + 5
Min. substrate thickness	h_{min}	[mm]	h_{nom} + 30 ≥ 100	h_{nom} + 30 ≥ 100	h_{nom} + 30 ≥ 100	h_{nom} + 30 ≥ 100	h_{nom} + $2d_0$	h_{nom} + $2d_0$	h_{nom} + $2d_0$
Installation torque	T_{inst}	[Nm]	10	20	40	80	120	180	300
Min. spacing	s_{min}	[mm]	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40
Min. edge distance	c_{min}	[mm]	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40	0.5 * h_{nom} ≥ 40
MINIMUM EMBEDMENT DEPTH									
Min. installation depth	$h_{nom,min}$	[mm]	60	70	80	100	120	140	165
MAXIMUM EMBEDMENT DEPTH									
Min. installation depth	$h_{nom, max}$	[mm]	100	120	145	190	240	290	360

Minimum working and curing time

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-5	360	60
5	0	180	40
5	5	120	20
10	10	80	12
15	15	60	8
20	20	45	5
25	30	20	2

Mechanical properties

Size			M8	M10	M12	M16	M20	M24	M30
R-STUDS Metric Threaded Rods - Steel Class 5.8									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	520	520	520	520	520	520	520
Nominal yield strength - tension	f_{yk}	[N/mm²]	420	420	420	420	420	420	420
Cross sectional area - tension	A_s	[mm²]	37	58	84	157	245	353	560
Elastic section modulus	W_{el}	[mm³]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	20	39	68	173	338	583	1166
Design bending resistance	M	[Nm]	11	22	39	99	193	333	666

Mechanical properties

Size			M8	M10	M12	M16	M20	M24	M30
R-STUDS Metric Threaded Rods - Steel Class 8.8									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	800	800	800	800	800	800	800
Nominal yield strength - tension	f_{yk}	[N/mm²]	640	640	640	640	640	640	640
Cross sectional area - tension	A_s	[mm²]	37	58	84	157	245	353	560
Elastic section modulus	W_{el}	[mm³]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898	1793
Design bending resistance	M	[Nm]	17	34	60	152	297	513	1025
R-STUDS Metric Threaded Rods - Steel Class A4									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	700	700	700	700	700	700	700
Nominal yield strength - tension	f_{yk}	[N/mm²]	350	350	350	350	350	350	350
Cross sectional area - tension	A_s	[mm²]	37	58	84	157	245	353	560
Elastic section modulus	W_{el}	[mm³]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	233	454	785	1569
Design bending resistance	M	[Nm]	12	24	42	107	208	360	719

Basic performance data

R-STUDS

Performance data for single anchor without influence of edge distance and spacing

Size		M8	M10	M12	M16	M20	M24	M30
Substrate		Non-cracked concrete						
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{Ru,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	18.9	30.5	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	18.9	30.5	44.1	81.9	128.1	184.8	294.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	21.1	31.9	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	30.5	48.3	70.4	124.2	196.0	251.5	339.3
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	21.1	31.9	42.2	65.4	88.7	111.8	143.1
Maximum embedment depth	[kN]	27.3	43.1	62.0	115.5	179.6	251.5	339.3
SHEAR LOAD $V_{Ru,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	11.3	18.3	26.5	49.1	76.9	110.9	176.4
Maximum embedment depth	[kN]	11.3	18.3	26.5	49.2	76.9	110.9	176.4
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	18.3	30.0	42.2	79.4	123.5	177.7	282.9
Maximum embedment depth	[kN]	18.3	30.0	42.2	79.4	123.5	177.7	282.9
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	16.4	25.8	37.2	69.3	107.7	155.6	247.6
Maximum embedment depth	[kN]	16.4	25.8	37.2	69.3	107.7	155.6	247.6

Basic performance data

Size		M8	M10	M12	M16	M20	M24	M30
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	18.0	29.0	42.0	78.0	122.0	153.1	169.7
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	23.9	37.7	51.9	86.0	128.2	153.1	169.7
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	14.3	22.0	28.7	45.2	64.1	73.9	77.8
Maximum embedment depth	[kN]	23.9	37.7	51.9	86.0	128.2	153.1	169.7
SHEAR LOAD V_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0
Maximum embedment depth	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	155.5
Maximum embedment depth	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	224.0
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	155.5
Maximum embedment depth	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	196.0
DESIGN LOAD								
TENSION LOAD N_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	12.0	19.3	28.0	47.8	71.2	72.9	80.8
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	13.3	20.9	28.9	47.8	71.2	72.9	80.8
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	7.96	12.2	15.9	25.1	35.6	35.2	37.0
Maximum embedment depth	[kN]	13.3	20.9	28.9	47.8	71.2	72.9	80.8
SHEAR LOAD V_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	103.7
Maximum embedment depth	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	112.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	12.0	18.4	27.2	50.4	78.4	98.5	103.7
Maximum embedment depth	[kN]	12.0	18.4	27.2	50.4	78.4	112.8	179.2
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	103.7
Maximum embedment depth	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	125.6

Basic performance data

Size		M8	M10	M12	M16	M20	M24	M30
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	8.57	13.8	20.0	34.1	50.9	52.1	57.7
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	9.47	15.0	20.6	34.1	50.9	52.1	57.7
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	5.68	8.73	11.4	18.0	25.4	25.1	26.5
Maximum embedment depth	[kN]	9.47	15.0	20.6	34.1	50.9	52.1	57.7
SHEAR LOAD V_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	74.1
Maximum embedment depth	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	80.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	8.57	13.1	19.4	36.0	56.0	70.4	74.1
Maximum embedment depth	[kN]	8.57	13.1	19.4	36.0	56.0	80.6	128.0
R-STUDS METRIC THREADED RODS - STEEL CLASS A4								
Minimum embedment depth	[kN]	5.95	9.16	13.3	25.2	39.4	56.8	74.1
Maximum embedment depth	[kN]	5.95	9.16	13.3	25.2	39.4	56.8	89.7

Design performance data

R-STUDS

Size			M8	M10	M12	M16	M20	M24	M30
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	448.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	392.00
Partial safety factor	γ_{Ms}	-	1.87	1.87	1.87	1.87	1.87	1.87	1.87
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C)									
Characteristic bond resistance	T_{Rk}	[N/mm²]	9.50	10.00	9.50	9.00	8.50	7.00	5.00
Sustained load factor	Ψ^0_{sus}	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)									
Characteristic bond resistance	T_{Rk}	[N/mm²]	8.50	9.00	8.50	8.00	7.50	6.00	4.50
Sustained load factor	Ψ^0_{sus}	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60
COMBINED PULL-OUT AND CONCRETE CONE FAILURE									
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.11	1.08	1.08	1.08	1.08	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.00	1.00
CONCRETE CONE FAILURE									
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Edge distance	$c_{cr,N}$	[mm]	$1.5*h_{ef}$	$1.5*h_{ef}$	$1.5*h_{ef}$	$1.5*h_{ef}$	$1.5*h_{ef}$	$1.5*h_{ef}$	$1.5*h_{ef}$
Spacing	$s_{cr,N}$	[mm]	$3.0*h_{ef}$	$3.0*h_{ef}$	$3.0*h_{ef}$	$3.0*h_{ef}$	$3.0*h_{ef}$	$3.0*h_{ef}$	$3.0*h_{ef}$
CONCRETE SPLITTING FAILURE									
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20	1.20	1.40	1.40

Design performance data

Size			M8	M10	M12	M16	M20	M24	M30
SHEAR LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
Ductility factor	k_7	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	37.00	65.00	166.00	324.00	561.00	1124.00
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
Ductility factor	k_7	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	30.00	60.00	105.00	266.00	519.00	898.00	1799.00
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
Ductility factor	k_7	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	26.00	52.00	92.00	233.00	454.00	786.00	1574.00
Partial safety factor	γ_{Ms}	-	1.56	1.56	1.56	1.56	1.56	1.56	1.56
CONCRETE PRY-OUT FAILURE									
Factor	k	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE									
Anchor diameter	d_{nom}	[mm]	8.00	10.00	12.00	16.00	20.00	24.00	30.00
Effective length of anchor	ℓ_f	[mm]	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})	min (h_{ef};8d_{nom})
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Combined pull-out and concrete cone failure (EN 1992-4:2018, p.7.2.1.6., 7.14 - $N^0_{Rk,p}=\psi^0_{sus}*\tau_{Rk}*\pi*d*h_{ef}$).
$h_{ef} = h_{nom}$

Product commercial data

Product Code	Volume [ml]	Quantity [pcs]			Weight [kg]			Bar Codes
		Box	Outer	Pallet	Box	Outer	Pallet	
R-KF2-300 [1)]	300	10	10	840	5.9	5.9	529.0	5906675431017
R-KF2-380 [1)]	380	10	10	560	8.2	8.2	486.1	5010445602009
R-KF2-380 [1)]	300	10	10	560	8.2	8.2	486.1	5010445602009

1) ETA-11/0141