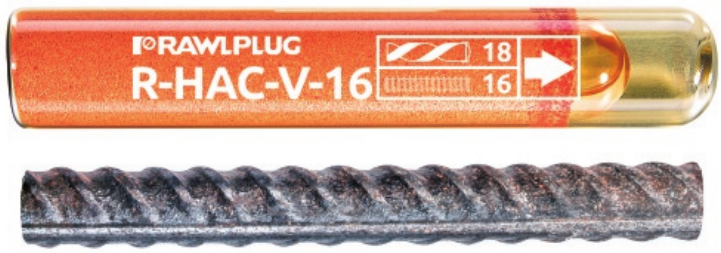
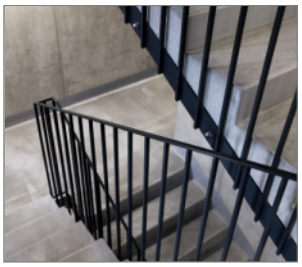
R-HAC-V Hammer-In with Rebar

Heavy duty anchor with small spacing and edge distances, simply installed by hammering the rebar





Approvals and Reports

- ETA-11/0002

Product information

Features and benefits

- Approved for use with rebar in non-cracked concrete (ETAG001 Option 7)
- High performance anchor, for use in safety critical applications
- The system relies on the adhesion between concrete and resin, which is free from expansion forces. This makes it an ideal choice where close edge and spacing distances are required
- Capsule contains precise amounts of ingredients making it a very consistent product
- Adhesive bond strength is not affected by unpolluted water
- Suitable for dry or wet non-cracked concrete
- Ideal for starter bar applications
- Low cost tooling required for installation, quick and easy to install
- Styrene free - virtually odourless

Applications

- Reinforcement bars
- Cable trays
- Heavy machinery
- Fencing & gates manufacturing and installation
- Formwork support systems

Base materials

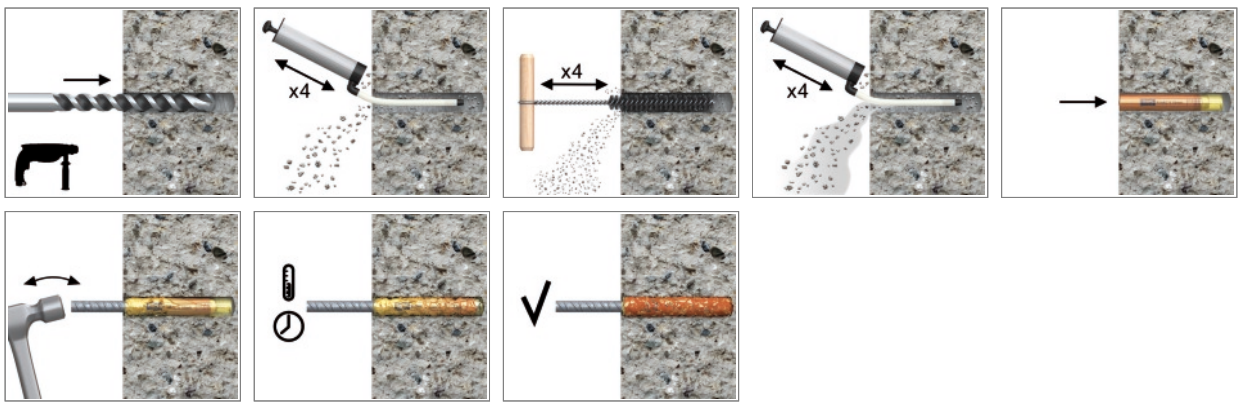
Approved for use in:

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

Also suitable for use in:

- Natural Stone (after site testing)

Installation guide

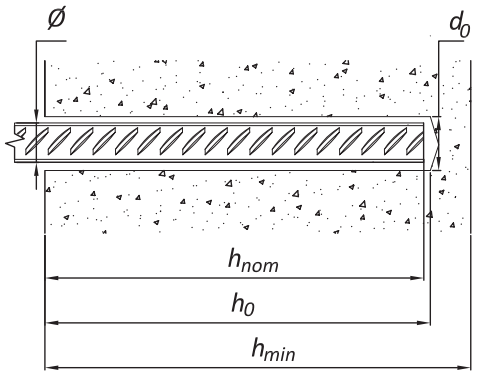


Product information

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 capsule into the hole.
4. The stud is simply hammered through the capsule using a manual or mechanical hammer (M16-M30).
5. Leave the anchor undisturbed unitl the curing time elapses.

Product Code	Description / Resin Type
R-HAC-V-08	Styrene Free Vinylester Resin
R-HAC-V-10	
R-HAC-V-12	
R-HAC-V-16	
R-HAC-V-20	
R-HAC-V-24	
R-HAC-V-30	

Installation data



REBARS AS ANCHORS

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Rebar diameter	d_s	[mm]	8	10	12	14	16	20	25
Hole diameter in substrate	d_0	[mm]	12	14	18	18	22	26	35
Capsule size	-	[mm]	10	12	16	16	20	24	30
Capsule diameter	d_c	[mm]	10.75	12.65	16.75	16.75	21.55	23.75	33.2
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. installation depth	h_{nom}	[mm]	80	90	110	110	125	170	210
Min. substrate thickness	h_{min}	[mm]	120	130	140	140	180	230	270
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

Mechanical properties

REBARS AS ANCHORS

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	540	540	540	540	540	540	540
Nominal yield strength - tension	f_{yk}	[N/mm²]	500	500	500	500	500	500	500
Cross sectional area - tension	A_s	[mm²]	50	79	113	154	201	314	491
Elastic section modulus	W_{el}	[mm³]	50	98	170	269	402	785	1534

Mechanical properties

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
f_uk = 575 (e.g. B 500 SP acc. to EC2)									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	575	575	575	575	575	575	575
Nominal yield strength - tension	f_{yk}	[N/mm²]	500	500	500	500	500	500	500
Cross sectional area - tension	A_s	[mm²]	50	79	113	154	201	314	491
Elastic section modulus	W_{el}	[mm³]	50	98	170	269	402	785	1534
f_uk = 620 (e.g. G-60 acc. to ASTM 615)									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	620	620	620	620	620	620	620
Nominal yield strength - tension	f_{yk}	[N/mm²]	420	420	420	420	420	420	420
Cross sectional area - tension	A_s	[mm²]	50	79	113	154	201	314	491
Elastic section modulus	W_{el}	[mm³]	50	98	170	269	402	785	1534

Basic performance data

REBARS AS ANCHORS

Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Substrate		Non-cracked concrete						
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{Ru,m}$								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	19.3	27.1	39.8	49.4	67.9	89.7	128.7
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	19.3	27.1	39.8	49.4	67.9	89.7	128.7
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	19.3	27.1	39.8	49.4	67.9	89.7	128.7
SHEAR LOAD $V_{Ru,m}$								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	17.1	26.7	38.5	52.4	68.4	106.9	167.0
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	18.2	28.5	41.0	55.8	72.8	113.8	177.8
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	19.6	30.7	44.2	60.1	78.5	122.7	191.7
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	16.1	22.6	33.2	41.1	56.6	74.8	107.2
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	16.1	22.6	33.2	41.1	56.6	74.8	107.2
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	16.1	22.6	33.2	41.1	56.6	74.8	107.2
SHEAR LOAD V_{Rk}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	13.6	21.2	30.5	41.6	54.3	84.8	132.5
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	14.5	22.6	32.5	44.3	57.8	90.3	141.1
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	15.6	24.4	35.1	47.7	62.3	97.4	152.2
DESIGN LOAD								
TENSION LOAD N_{Rd}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	8.94	12.6	18.4	22.9	31.4	41.5	59.6
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	8.94	12.6	18.4	22.9	31.4	41.5	59.6
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	8.94	12.6	18.4	22.9	31.4	41.5	59.6
SHEAR LOAD V_{Rd}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	9.05	14.1	20.4	27.7	36.2	56.6	88.4
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	9.63	15.1	21.7	29.5	38.5	60.2	94.1
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	10.4	16.2	23.4	31.8	41.6	64.9	101.5

Basic performance data

Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	6.38	8.98	13.2	16.3	22.4	29.7	42.5
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	6.38	8.98	13.2	16.3	22.4	29.7	42.5
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	6.38	8.98	13.2	16.3	22.4	29.7	42.5
SHEAR LOAD V_{rec}								
f_uk = 540 (e.g. 500 B acc. to BS 4449; B 500 B acc. to SS 560)	[kN]	6.46	10.1	14.5	19.8	25.9	40.4	63.1
f_uk = 575 (e.g. B 500 SP acc. to EC2)	[kN]	6.88	10.8	15.5	21.1	27.4	43.0	67.2
f_uk = 620 (e.g. G-60 acc. to ASTM 615)	[kN]	7.42	11.6	16.7	22.7	29.7	46.4	72.5

Design performance data

REBARS AS ANCHORS

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Effective embedment depth	h_{ef}	[mm]	80.00	90.00	110.00	110.00	125.00	170.00	210.00
TENSION LOAD									
STEEL FAILURE; F_UK = 540 (E.G. 500 B ACC. TO BS 4449; B 500 B ACC. TO SS 560)									
Characteristic resistance	$N_{Rk,s}$	[kN]	27.14	42.41	61.07	83.13	108.57	169.65	265.07
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40
STEEL FAILURE; F_UK = 575 (E.G. B 500 SP ACC. TO EC2)									
Characteristic resistance	$N_{Rk,s}$	[kN]	28.90	45.16	65.03	88.51	115.61	180.64	282.25
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40
STEEL FAILURE; F_UK = 620 (E.G. G-60 ACC. TO ASTM 615)									
Characteristic resistance	$N_{Rk,s}$	[kN]	31.16	48.69	70.12	95.44	124.66	194.78	304.34
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C)									
Characteristic bond resistance	T_{Rk}	[N/mm²]	8.00	8.00	8.00	8.50	9.00	7.00	6.50
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)									
Characteristic bond resistance	T_{Rk}	[N/mm²]	7.00	7.00	7.00	7.00	7.50	6.00	5.50
COMBINED PULL-OUT AND CONCRETE CONE FAILURE									
Installation safety factor	γ_2	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.04	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.07	1.00	1.07
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.09	1.00	1.09
CONCRETE CONE FAILURE									
Installation safety factor	γ_2	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Factor for non-cracked concrete	k	-	10.10	10.10	10.10	10.10	10.10	10.10	10.10
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_2	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20

Design performance data

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
SHEAR LOAD									
STEEL FAILURE; F_UK = 540 (E.G. 500 B ACC. TO BS 4449; B 500 B ACC. TO SS 560)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.57	21.21	30.54	41.56	54.29	84.82	132.54
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]	32.57	63.62	109.93	174.57	260.58	508.94	994.02
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; F_UK = 575 (E.G. B 500 SP ACC. TO EC2)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	14.45	22.59	32.52	44.26	57.81	90.32	141.13
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]	34.68	67.74	117.06	185.88	277.47	541.92	1058.45
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
STEEL FAILURE; F_UK = 620 (E.G. G-60 ACC. TO ASTM 615)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.58	24.35	35.06	47.72	62.33	97.39	152.17
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]	37.40	73.04	126.22	200.43	299.18	584.34	1141.28
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
CONCRETE PRY-OUT FAILURE									
Factor	k	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Installation safety factor	γ_2	-	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	14.00	16.00	20.00	25.00
Effective length of anchor	ℓ_f	[mm]	80.00	90.00	110.00	110.00	125.00	170.00	210.00
Installation safety factor	γ_2	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Combined pull-out and concrete cone failure (TR 029, p.5.2.2.3. acc. to formula 5.2a - $N^0_{Rk,p}=\pi*d*h_{ef}*\tau_{Rk}$).
Concrete cone failure (TR 029, p.5.2.2.4. acc. to formula 5.3a - $N^0_{Rk,c}=k_1*f_{ck,cube}{}^{0,5}*h_{ef}{}^{1,5}$).
$h_{ef} = h_{nom}$

Product commercial data

Product Code	Quantity [pcs]			Weight [kg]			Bar Codes
	Box	Outer	Pallet	Box	Outer	Pallet	
R-HAC-V-08 [1]	10	480	5760	0.15	7.1	115.5	5906675377827
R-HAC-V-10 [1]	10	480	5760	0.17	8.2	128.1	5906675379913
R-HAC-V-12 [1]	10	480	5760	0.21	10.2	152.0	5906675379920
R-HAC-V-16 [1]	10	480	5760	0.29	13.8	195.7	5906675379937
R-HAC-V-20 [1]	6	108	1296	0.56	10.1	151.7	5906675379944
R-HAC-V-24 [1]	6	108	1296	0.75	13.4	191.1	5906675379951
R-HAC-V-30 [1]	4	32	384	1.19	9.6	144.7	5906675379968

1) ETA-11/0002