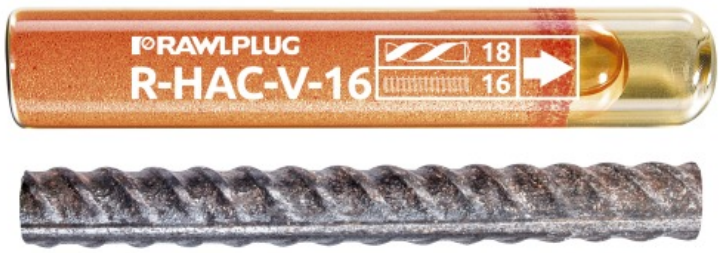
R-HAC-V Hammer-In with Rebar

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

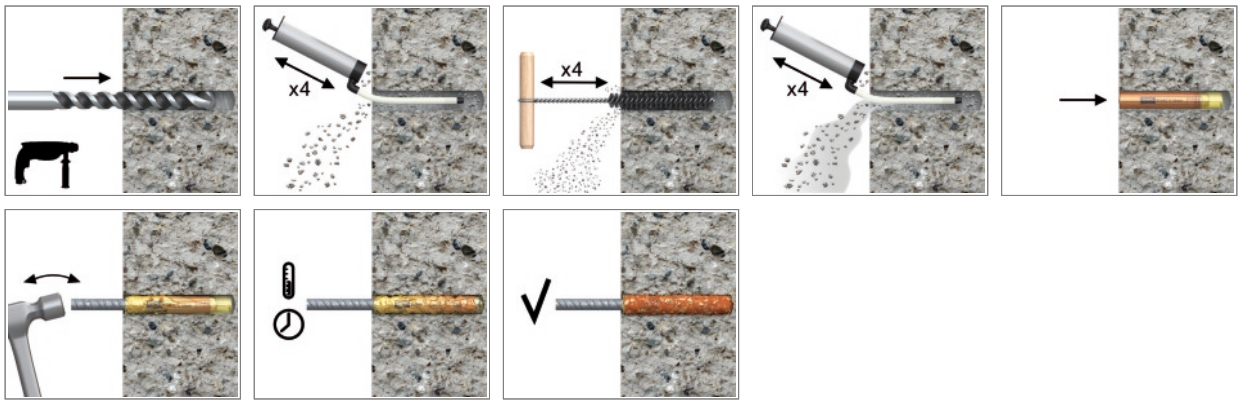
Approved for use in:

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

Also suitable for use in:

- Natural Stone

Installation guide

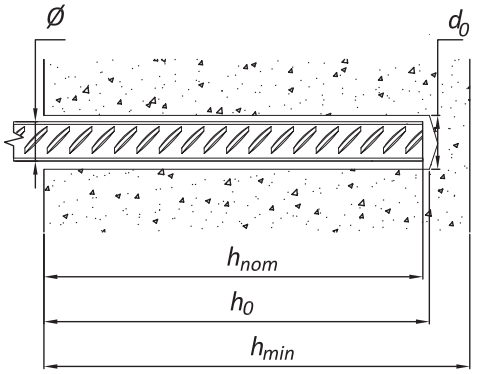


Product information

1. Drill hole to the required diameter and depth for stud size being used.
2. Clean the hole with brush and hand pump at least four times each. It is very important and necessary 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.
6. Attach fixture and tighten the nut to the required torque.

Size	Product Code	Description / Resin Type
M8	R-HAC-V-08	Styrene Free Vinylester Resin
M10	R-HAC-V-10	
M12	R-HAC-V-12	
M16	R-HAC-V-16	
M20	R-HAC-V-20	
M24	R-HAC-V-24	
M_30	R-HAC-V-30	

Installation data



REBARS

Size			Ø08	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	16	18	22	26	35
Min. hole depth in substrate	h_0	[mm]	85	95	115	130	175	215	275
Embedment depth	l_v	[mm]	80	90	110	125	170	210	270
Min. spacing	s_{min}	[mm]	40	45	55	62	85	105	135
Min. edge distance	c_{min}	[mm]	40	45	55	62	85	105	135

Minimum working and curing time

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-5	1440	-
5	0	840	-
5	5	240	-
10	10	180	-
15	15	90	-
20	20	45	-
25	30	20	-
25	40	10	-

Mechanical properties

REBARS

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
18G2									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	480	480	480	480	480	480	480
Nominal yield strength - tension	f_{yk}	[N/mm²]	355	355	355	355	355	355	355
Cross sectional area - tension	A_s	[mm²]	50.3	78.5	113.1	153.9	201.1	314.2	490.9
Elastic section modulus	W_{el}	[mm³]	50.3	98.2	169.6	269.4	402.1	785.4	1534
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	29	57	98	155	232	452	884
Design bending resistance	M	[Nm]	17	32	56	89	132	259	505
34GS									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	500	500	500	500	500	500	500
Nominal yield strength - tension	f_{yk}	[N/mm²]	410	410	410	410	410	410	410
Cross sectional area - tension	A_s	[mm²]	50.3	78.5	113.1	153.9	201.1	314.2	490.9
Elastic section modulus	W_{el}	[mm³]	50.3	98.2	169.6	269.4	402.1	785.4	1534
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	30	59	102	162	241	471	920
Design bending resistance	M	[Nm]	17	34	58	92	138	269	526
B500SP									
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]	50.3	78.5	113.1	153.9	201.1	314.2	490.9
Elastic section modulus	W_{el}	[mm³]	50.3	98.2	169.6	269.4	402.1	785.4	1534
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	35	68	117	186	277	542	1059
Design bending resistance	M	[Nm]	20	39	67	106	159	310	605
RB500/BSt500S									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	550	550	550	550	550	550	550
Nominal yield strength - tension	f_{yk}	[N/mm²]	500	500	500	500	500	500	500
Cross sectional area - tension	A_s	[mm²]	50.3	78.5	113.1	153.9	201.1	314.2	490.9
Elastic section modulus	W_{el}	[mm³]	50.3	98.2	169.6	269.4	402.1	785.4	1534
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	33	65	112	178	265	518	1012
Design bending resistance	M	[Nm]	19	37	64	102	152	296	579

Design performance data

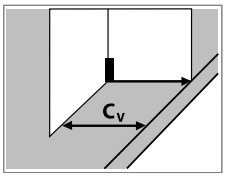
REBARS

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Anchorage length	l_v	[mm]	80.00	90.00	110.00	125.00	170.00	210.00	270.00
TENSION LOAD									
STEEL FAILURE; A-II (E.G. 18G2)									
Characteristic resistance	$N_{Rk,s}$	[kN]	24.10	37.70	54.30	73.90	96.50	150.80	235.60
Design resistance γ_{Ms}= 1.4	$N_{Rd,s}$	[kN]	17.21	26.93	38.79	52.79	68.93	107.71	168.29
STEEL FAILURE; A-III (E.G. 34GS)									
Characteristic resistance	$N_{Rk,s}$	[kN]	25.20	39.60	56.60	77.00	100.60	157.10	245.50
Design resistance γ_{Ms}= 1.4	$N_{Rd,s}$	[kN]	18.00	28.29	40.43	55.00	71.86	112.21	175.36
STEEL FAILURE; A-III-N (E.G. RB500, BST500S, B500SP)									
Characteristic resistance	$N_{Rk,s}$	[kN]	27.60	43.20	62.20	84.70	110.60	172.80	270.00
Design resistance γ_{Ms}= 1.4	$N_{Rd,s}$	[kN]	19.71	30.86	44.43	60.50	79.00	123.43	192.86
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	16.00	20.00	30.00	40.00	50.00	60.00	95.00
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	8.89	11.11	16.67	22.22	27.78	33.33	52.78
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	12.00	16.00	20.00	30.00	40.00	50.00	75.00
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	6.67	8.89	11.11	16.67	22.22	27.78	41.67
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.04	1.04	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Spacing	$s_{cr,N}$	[mm]	240.00	270.00	330.00	330.00	375.00	510.00	630.00
Edge distance	$c_{cr,N}$	[mm]	120.00	135.00	165.00	165.00	190.00	255.00	315.00
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	C_{min}	[mm]	40.00	45.00	55.00	63.00	85.00	105.00	135.00
Characteristic resistance for C_{min}	$V_{Rk,c}$	[kN]	4.10	5.30	7.70	10.00	17.80	26.80	44.90
Design resistance γ_{Mc}= 1.8	$V_{Rd,c}$	[kN]	2.73	3.53	5.13	6.67	11.87	17.87	29.93
STEEL FAILURE; A-II (E.G. 18G2)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.10	18.90	27.20	37.00	48.30	75.40	117.80
Design resistance γ_{Ms}= 1.5	$V_{Rd,s}$	[kN]	8.07	12.60	18.13	24.67	32.20	50.27	78.53
Edge distance	$C_{cr,V}$	[mm]	82.00	105.00	127.00	150.00	165.00	209.00	257.00
STEEL FAILURE; A-III (E.G. 34GS)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.60	19.80	28.30	38.50	50.30	78.60	122.80
Design resistance γ_{Ms}= 1.5	$V_{Rd,s}$	[kN]	8.40	13.20	18.87	25.67	33.53	52.40	81.87
Edge distance	$C_{cr,V}$	[mm]	84.00	109.00	131.00	154.00	170.00	215.00	264.00
STEEL FAILURE; A-III-N (E.G. RB500, BST500S, B500SP)									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.80	21.60	31.10	42.40	55.30	86.40	135.00
Design resistance γ_{Ms}= 1.5	$V_{Rd,s}$	[kN]	9.20	14.40	20.70	28.30	36.90	57.60	90.00
Edge distance	$C_{cr,V}$	[mm]	90.00	115.00	139.00	164.00	181.00	229.00	281.00

Design performance data

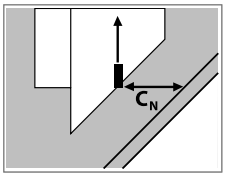
Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



C_v [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	1,00	-	-	-	-	-	-
45	1,13	1,00	-	-	-	-	-
55	1,38	1,22	1,00	-	-	-	-
65	1,63	1,44	1,18	1,03	-	-	-
85	-	1,89	1,55	1,35	1,00	-	-
105	-	2,33	1,91	1,67	1,24	1,00	-
125	-	-	2,27	1,98	1,47	1,19	-
135	-	-	-	2,14	1,59	1,29	1,00
150	-	-	-	2,38	1,76	1,43	1,11
165	-	-	-	-	1,94	1,57	1,22
185	-	-	-	-	-	1,76	1,37
205	-	-	-	-	-	1,95	1,52
225	-	-	-	-	-	-	1,67
255	-	-	-	-	-	-	1,89

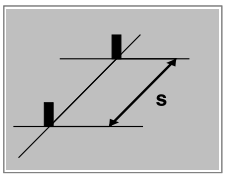
Edge distance (tension)



C_N [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	0,53	-	-	-	-	-	-
45	0,56	0,53	-	-	-	-	-
55	0,61	0,58	0,53	-	-	-	-
65	0,66	0,63	0,57	0,57	-	-	-
85	0,78	0,72	0,65	0,65	0,60	-	-
105	0,90	0,83	0,73	0,73	0,67	0,58	-
120	1,00	0,91	0,79	0,79	0,73	0,62	-
135	-	1,00	0,86	0,86	0,78	0,66	0,59
165	-	-	1,00	1,00	0,90	0,74	0,65
190	-	-	-	-	1,00	0,81	0,71
220	-	-	-	-	-	0,89	0,77
255	-	-	-	-	-	1,00	0,85
280	-	-	-	-	-	1,00	0,91
315	-	-	-	-	-	-	1,00

Design performance data

Spacing



s [mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
40	0,58	-	-	-	-	-	-
45	0,59	0,58	-	-	-	-	-
55	0,61	0,60	0,58	-	-	-	-
65	0,64	0,62	0,60	0,60	-	-	-
85	0,68	0,66	0,63	0,63	0,61	-	-
105	0,72	0,69	0,66	0,66	0,64	0,60	-
135	0,78	0,75	0,70	0,70	0,68	0,63	0,61
160	0,83	0,80	0,74	0,74	0,71	0,66	0,63
200	0,92	0,87	0,80	0,80	0,77	0,70	0,66
240	1,00	0,94	0,86	0,86	0,82	0,74	0,69
270	-	1,00	0,91	0,91	0,86	0,76	0,71
300	-	-	0,95	0,95	0,90	0,79	0,74
330	-	-	1,00	1,00	0,94	0,82	0,76
375	-	-	-	-	1,00	0,87	0,80
420	-	-	-	-	-	0,91	0,83
460	-	-	-	-	-	0,95	0,87
510	-	-	-	-	-	1,00	0,90
570	-	-	-	-	-	-	0,95
630	-	-	-	-	-	-	1,00

Product commercial data

Size	Product Code	Quantity [pcs]			Weight [kg]			Bar Codes
		Box	Outer	Pallet	Box	Outer	Pallet	
Ø5	R-HAC-V-08[1)]	10	480	5760	0.15	7.1	115.5	5906675377827
Ø8	R-HAC-V-10[1)]	10	480	5760	0.17	8.2	128.1	5906675379913
Ø10	R-HAC-V-12[1)]	10	480	5760	0.21	10.2	152.0	5906675379920
Ø12	R-HAC-V-16[1)]	10	480	5760	0.29	13.8	195.7	5906675379937
Ø16	R-HAC-V-20[1)]	6	108	1296	0.56	10.1	151.7	5906675379944
Ø20	R-HAC-V-24[1)]	6	108	1296	0.75	13.4	191.1	5906675379951
Ø25	R-HAC-V-30[1)]	4	32	384	1.19	9.6	144.7	5906675379968

[1)] ETA-11/0002