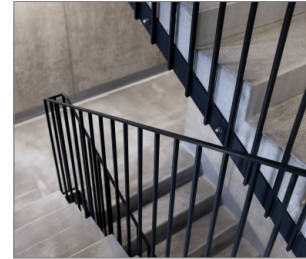


# R-CAS-V Spin-In Capsule with Threaded Rods

High-performance, quick-setting, styrene-free vinylester resin for concrete



## Approvals and Reports

- ETA-10-0108



## Product information

### Features and benefits

- Approved for use with threaded rods in non-cracked concrete (ETAG001 Option 7)
- High performance for use safety critical application - heavy-duty fastenings with small spacing and edge distances
- The system relies on the adhesion between the 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
- Suitable for dry or wet non-cracked concrete
- Styrene free - odourless

### Applications

- Threaded rods
- Balustrading
- Railings
- Heavy machinery
- Structural steel
- Steel columns
- Cladding restraints
- Curtain walling
- Fencing & gates manufacturing and installation
- Formwork support systems
- Garage doors
- Guard rails

### Base materials

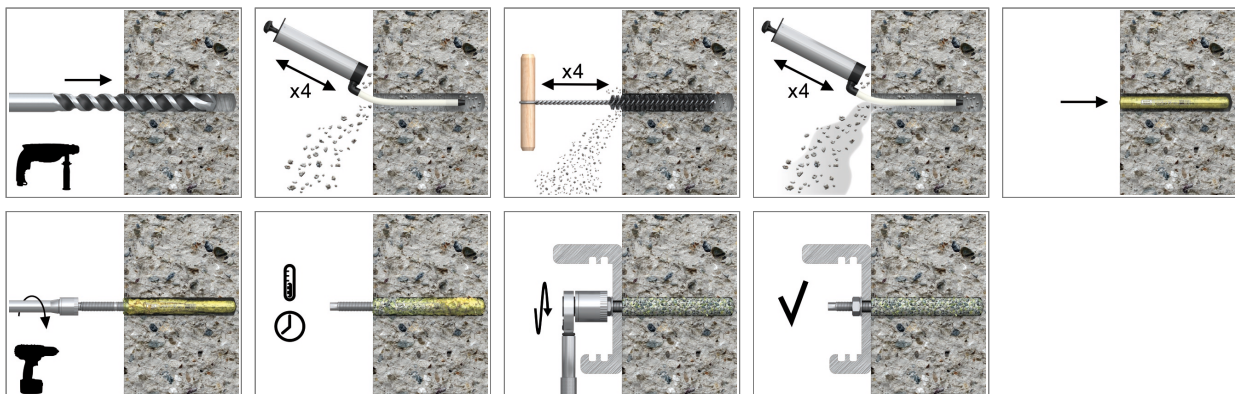
#### Approved for use in:

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

#### Also suitable for use in:

- Natural Stone (after site testing)

## Installation guide

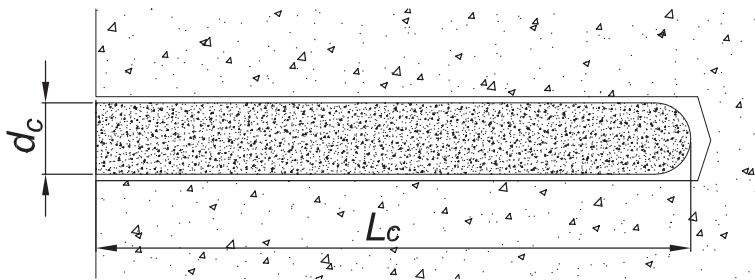


## Product information

1. Drill hole to the required diameter and depth for capsule 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. Connect stud to drilling machine using appropriate driver system.
4. Position the stud into the glass capsule then switch on the drilling machine and drive stud into the capsule. Switch off the drilling machine as soon as the bottom of hole is reached.
5. Leave the anchor undisturbed until the curing time elapses.
6. Attach fixture and tighten the nut to the required torque.

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

## 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 <sub>0</sub>	[mm]	10	12	14	18	24	28	35
Capsule size		[mm]	8	10	12	16	20	24	30
Capsule diameter	d <sub>c</sub>	[mm]	9.25	10.75	12.65	16.75	21.55	23.75	33.2
Installation torque	T <sub>inst</sub>	[Nm]	10	20	40	80	120	180	300
Min. hole depth in substrate	h <sub>0</sub>	[mm]	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5	h <sub>nom</sub> + 5
Min. installation depth	h <sub>nom</sub>	[mm]	80	90	110	125	170	210	270
Min. substrate thickness	h <sub>min</sub>	[mm]	120	130	140	180	230	270	340
Min. spacing	s <sub>min</sub>	[mm]	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40
Min. edge distance	c <sub>min</sub>	[mm]	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40	0.5 * h <sub>nom</sub> ≥ 40

### Minimum working and curing time

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-5	480	-
5	0	240	-
5	5	150	-
10	10	120	-
15	15	90	-
20	20	45	-
25	30	20	-
25	40	10	-

## Mechanical properties

Size			M8	M10	M12	M16	M20	M24	M30
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	500	500	500	500	500	500	500
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	400	400	400	400	400	400	400
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	37	58	84	157	245	353	560
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	19	37	65	166	324	561	1124
Design bending resistance	M	[Nm]	15	30	52	133	259	449	899
Allowable bending resistance	$M_{rec}$	[Nm]	11	21	37	95	185	321	642
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	800	800	800	800	800	800	800
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	640	640	640	640	640	640	640
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	37	58	84	157	245	353	560
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	30	60	105	266	519	898	1799
Design bending resistance	M	[Nm]	24	48	84	213	416	718	1439
Allowable bending resistance	$M_{rec}$	[Nm]	17	34	60	152	297	513	1028
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	700	700	700	700	700	700	700
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	450	450	450	450	450	450	450
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	37	58	84	157	245	353	560
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	31	62	109	278	541	935	1868
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	26	52	92	233	454	786	1574
Design bending resistance	M	[Nm]	17	34	59	149	291	504	1009
Allowable bending resistance	$M_{rec}$	[Nm]	12	24	42	107	208	360	721

## Basic performance data

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

Size		M8	M10	M12	M16	M20	M24	M30
Substrate		Non-cracked concrete						
Effective embedment depth $h_{ef}$	[mm]	80.0	90.0	110.0	125.0	170.0	210.0	270.0
<b>MEAN ULTIMATE LOAD</b>								
<b>TENSION LOAD <math>N_{Ru,m}</math></b>								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18.9	30.5	44.1	82.9	128.2	171.0	259.6
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	30.5	40.7	59.7	82.9	128.2	171.0	259.6
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	27.3	40.7	59.7	82.9	128.2	171.0	259.6
<b>SHEAR LOAD <math>V_{Ru,m}</math></b>								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	11.3	18.3	26.5	49.1	76.9	110.9	176.4
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	18.3	30.0	42.2	79.4	123.5	177.7	282.9
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[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
<b>CHARACTERISTIC LOAD</b>								
TENSION LOAD $N_{Rk}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18.0	29.0	42.0	68.8	106.8	142.5	216.3
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	26.1	33.9	49.8	68.8	106.8	142.5	216.3
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	26.0	33.9	49.8	68.8	106.8	142.5	216.3
SHEAR LOAD $V_{Rk}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	224.0
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	196.0
<b>DESIGN LOAD</b>								
TENSION LOAD $N_{Rd}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	12.0	18.9	27.7	38.2	59.3	79.2	120.2
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	14.5	18.9	27.7	38.2	59.3	79.2	120.2
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	13.9	18.9	27.7	38.2	59.3	79.2	120.2
SHEAR LOAD $V_{Rd}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	112.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	12.0	18.4	27.2	50.4	78.4	112.8	179.2
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	125.6
<b>RECOMMENDED LOAD</b>								
TENSION LOAD $N_{rec}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	8.57	13.5	19.8	27.3	42.4	56.6	85.8
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	10.4	13.5	19.8	27.3	42.4	56.6	85.8
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[kN]	9.93	13.5	19.8	27.3	42.4	56.6	85.8
SHEAR LOAD $V_{rec}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	80.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	8.57	13.1	19.4	36.0	56.0	80.6	128.0
R-STUDS METRIC THREADED RODS - STEEL CLASS A4	[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
Effective embedment depth	$h_{ef}$	[mm]	80.00	90.00	110.00	125.00	170.00	210.00	270.00
<b>TENSION LOAD</b>									
<b>STEEL FAILURE; STEEL CLASS 5.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Partial safety factor	$\gamma_{Ms}$	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
<b>STEEL FAILURE; STEEL CLASS 8.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	448.00
Partial safety factor	$\gamma_{Ms}$	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50
<b>STEEL FAILURE; STEEL GRADE A4-70</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	392.00
Partial safety factor	$\gamma_{Ms}$	-	1.87	1.87	1.87	1.87	1.87	1.87	1.87
<b>COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C)</b>									
Characteristic bond resistance	$T_{Rk}$	[N/mm <sup>2</sup> ]	13.00	12.00	12.00	11.00	10.00	9.00	8.50
Sustained load factor	$\psi_{sus}^0$	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60
<b>COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)</b>									
Characteristic bond resistance	$T_{Rk}$	[N/mm <sup>2</sup> ]	13.00	12.00	12.00	11.00	10.00	9.00	8.50
Sustained load factor	$\psi_{sus}^0$	-	0.60	0.60	0.60	0.60	0.60	0.60	0.60
<b>COMBINED PULL-OUT AND CONCRETE CONE FAILURE</b>									
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Increasing factors for $N_{Rd,p}$ - C30/37	$\psi_c$	-	1.04	1.04	1.04	1.04	1.04	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	$\psi_c$	-	1.07	1.07	1.07	1.07	1.07	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	$\psi_c$	-	1.09	1.09	1.09	1.09	1.09	1.00	1.00
<b>CONCRETE CONE FAILURE</b>									
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20
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]	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$	$1.5 \cdot h_{ef}$
Spacing	$s_{cr,N}$	[mm]	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$	$3.0 \cdot h_{ef}$
<b>CONCRETE SPLITTING FAILURE</b>									
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.20	1.20	1.20	1.20

## Design performance data

Size			M8	M10	M12	M16	M20	M24	M30
<b>SHEAR LOAD</b>									
<b>STEEL FAILURE; STEEL CLASS 5.8</b>									
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	$\gamma_{Ms}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
<b>STEEL FAILURE; STEEL CLASS 8.8</b>									
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	$\gamma_{Ms}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25
<b>STEEL FAILURE; STEEL GRADE A4-70</b>									
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	$\gamma_{Ms}$	-	1.56	1.56	1.56	1.56	1.56	1.56	1.56
<b>CONCRETE PRY-OUT FAILURE</b>									
Factor	$k$	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Installation safety factor	$\gamma_{inst}$	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>CONCRETE EDGE FAILURE</b>									
Anchor diameter	$d_{nom}$	[mm]	8.00	10.00	12.00	16.00	20.00	24.00	30.00
Effective length of anchor	$\ell_f$	[mm]	80.00	90.00	110.00	125.00	170.00	210.00	270.00
Installation safety factor	$\gamma_{inst}$	-	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 -  $N_{Rk,p}^0 = \psi_{sus}^0 * \tau_{Rk} * n * d * h_{ef}$ ).  
 $h_{ef} = h_{nom}$

## Product commercial data

Product Code	Quantity [pcs]			Weight [kg]			Bar Codes
	Box	Outer	Pallet	Box	Outer	Pallet	
R-CAS-V-08 <sup>1)</sup>	10	480	5760	0.16	7.7	121.9	5906675280189
R-CAS-V-10 <sup>1)</sup>	10	480	5760	0.21	10.0	150.2	5906675280196
R-CAS-V-12 <sup>1)</sup>	10	480	5760	0.26	12.7	182.3	5906675280202
R-CAS-V-16 <sup>1)</sup>	10	480	5760	0.38	18.0	246.1	5906675280219
R-CAS-V-20 <sup>1)</sup>	6	108	1296	0.90	16.2	223.8	5906675280226
R-CAS-V-24 <sup>1)</sup>	6	108	1296	1.04	18.8	255.3	5906675280233
R-CAS-V-30 <sup>1)</sup>	4	32	384	1.75	14.0	197.8	5906675280240

1) ETA-10-0108