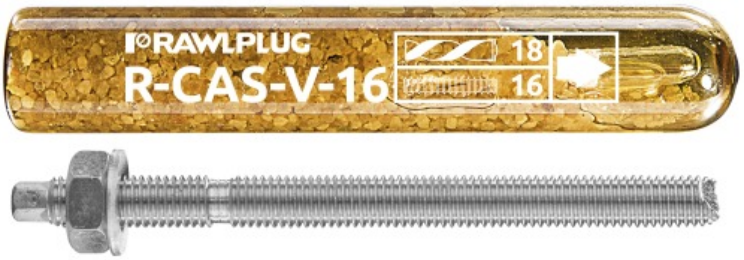
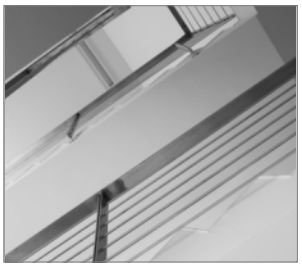
R-CAS-V Spin-In Capsule with Threaded Rods

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 making fixings underwater. Adhesive strength is not affected by unpolluted water
- 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

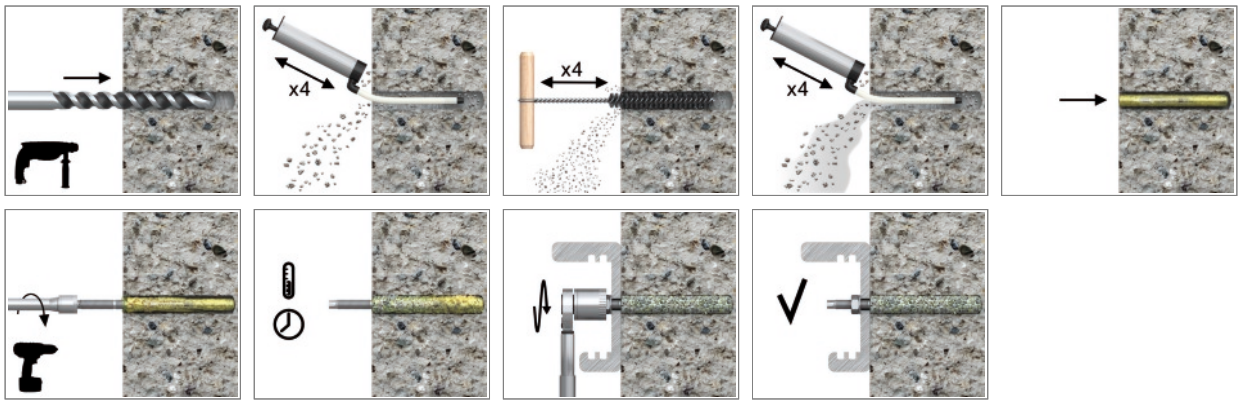
Approved for use in:

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

Also suitable for use in:

- Natural Stone

Installation guide



Product information

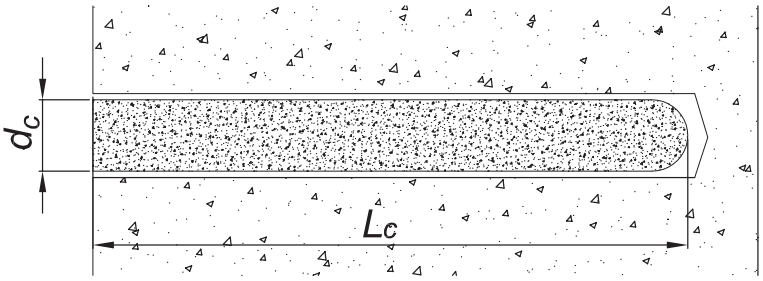
1. Drill hole to the required diameter and depth for socket size being used.
2. Clean the hole with brush and hand pump at least four times each. It is very important and necessary before installation.
3. Insert capsule into the hole. Connect stud to drilling machine using appropriate driver system.
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 unitl the curing time elapses.
6. Attach fixture and tighten the nut to the required torque.

Size	Product Code	Description / Resin Type
Ø8	R-CAS-V-08	Styrene Free Vinylester Resin
Ø_10	R-CAS-V-10	
Ø_12	R-CAS-V-12	
Ø_16	R-CAS-V-16	
Ø_20	R-CAS-V-20	
Ø_24	R-CAS-V-24	
Ø_30	R-CAS-V-30	

R-STUDS

Size	Product Code			Anchor		Fixture	
	Steel class 5.8	Steel class 8.8	Steel grade A4	Diameter	Length	Hole diameter	Max. thickness t_{fix} for:
				d	L	d_f	$h_{nom,std}$
				[mm]	[mm]	[mm]	[mm]
M8	R-STUDS-08110	R-STUDS-08110-88	R-STUDS-08110-A4	8	110	9	20
	R-STUDS-08160	-	R-STUDS-08160-A4	8	160	9	70
M10	R-STUDS-10130	R-STUDS-10130-88	R-STUDS-10130-A4	10	130	12	28
	R-STUDS-10170	-	R-STUDS-10170-A4	10	170	12	68
	R-STUDS-10190	-	R-STUDS-10190-A4	10	190	12	88
M12	R-STUDS-12160	R-STUDS-12160-88	R-STUDS-12160-A4	12	160	14	35
	R-STUDS-12190	-	R-STUDS-12190-A4	12	190	14	65
	R-STUDS-12220	-	R-STUDS-12220-A4	12	220	14	95
	R-STUDS-12260	-	R-STUDS-12260-A4	12	260	14	135
	R-STUDS-12300	-	R-STUDS-12300-A4	12	300	14	175
M16	R-STUDS-16190	R-STUDS-16190-88	R-STUDS-16190-A4	16	190	18	46
	R-STUDS-16220	-	R-STUDS-16220-A4	16	220	18	76
	R-STUDS-16260	-	R-STUDS-16260-A4	16	260	18	116
	R-STUDS-16300	-	R-STUDS-16300-A4	16	300	18	156
	R-STUDS-16380	-	R-STUDS-16380-A4	16	380	18	236
M20	R-STUDS-20260	R-STUDS-20260-88	R-STUDS-20260-A4	20	260	22	67
	R-STUDS-20300	-	R-STUDS-20300-A4	20	300	22	107
	R-STUDS-20350	-	R-STUDS-20350-A4	20	350	22	157
M24	R-STUDS-24300	R-STUDS-24300-88	R-STUDS-24300-A4	24	300	26	62
M30	R-STUDS-30380	R-STUDS-30380-88	R-STUDS-30380-A4	30	380	32	106

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
Installation torque	T_{inst}	[Nm]	10	20	40	80	120	180	300
Min. hole depth in substrate	h_0	[mm]	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5
Installation depth	h_{nom}	[mm]	80	90	110	125	170	210	270
Min. substrate thickness	h_{min}	[mm]	120	130	140	180	230	270	340
Min. spacing	s_{min}	[mm]	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}
Min. edge distance	c_{min}	[mm]	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}	0.5 * h_{ef}

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
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]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm³]	31.2	62.3	109.2	277.5	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
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]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm³]	31.2	62.3	109.2	277.5	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

Mechanical properties

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
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{Ru,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	22	35	50	76	119	158	240
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	29	36	56	76	119	158	240
R-STUDS METRIC THREADED RODS - A4	[kN]	29	36	56	76	119	158	240
SHEAR LOAD $V_{Ru,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18	29	42	79	123	177	281
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	29	46	67	126	196	282	449
R-STUDS METRIC THREADED RODS - A4	[kN]	26	41	59	110	172	247	393
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18	29	42	60	95	140	200
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	25	30	50	60	95	140	200
R-STUDS METRIC THREADED RODS - A4	[kN]	25	30	50	60	95	140	200
SHEAR LOAD V_{Rk}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	9	14	21	39	61	88	140
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	15	23	34	63	98	141	224
R-STUDS METRIC THREADED RODS - A4	[kN]	13	20	29	55	86	124	196
DESIGN LOAD								
TENSION LOAD N_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	12	17	28	33	53	78	111
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	14	17	28	33	53	78	111
R-STUDS METRIC THREADED RODS - A4	[kN]	14	17	28	33	53	78	111
SHEAR LOAD V_{Rd}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	7	11	17	31	49	70	112
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	12	18	27	50	78	113	179
R-STUDS METRIC THREADED RODS - A4	[kN]	8	13	19	35	55	79	126
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	9	12	20	24	38	56	79
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	10	12	20	24	38	56	79
R-STUDS METRIC THREADED RODS - A4	[kN]	10	12	20	24	38	56	79
SHEAR LOAD V_{rec}								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	5	8	12	22	35	50	80
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	9	13	19	36	56	81	128
R-STUDS METRIC THREADED RODS - A4	[kN]	6	9	13	25	39	57	90

Design performance data

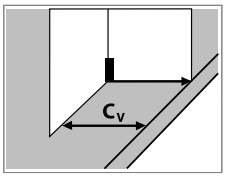
R-STUDS Standard embedment depth

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
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
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	12.00	19.33	28.00	52.00	81.33	117.33	186.67
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	449.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	19.33	30.67	44.67	84.00	130.67	188.00	299.33
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	393.00
Design resistance γ_{Ms}= 1.87	$N_{Rd,s}$	[kN]	13.90	21.93	31.55	58.82	91.44	132.09	210.16
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	25.00	30.00	50.00	60.00	95.00	140.00	200.00
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	13.89	16.67	27.78	33.33	52.78	77.78	111.11
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	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.09	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	240.00	270.00	330.00	375.00	510.00	630.00	675.00
Edge distance	$c_{cr,N}$	[mm]	120.00	135.00	165.00	190.00	255.00	315.00	340.00
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	40.00	45.00	55.00	63.00	85.00	105.00	135.00
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	5.60	7.00	9.84	12.80	21.10	30.13	46.08
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	[kN]	3.73	4.67	6.56	8.53	14.07	20.09	30.72
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
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	7.20	11.20	16.80	31.20	48.80	70.40	112.00
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
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	12.00	18.40	27.20	50.40	78.40	112.80	179.20
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
Design resistance γ_{Ms}= 1.56	$V_{Rd,s}$	[kN]	8.33	12.82	18.59	35.26	55.13	79.49	125.64

Design performance data

Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



Tables only valid for one edge $>c_{min}$ and $s \geq 3c_V$ For other cases use the Rawlplug Anchor Calculator

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for non-cracked concrete from Design Performance table

C_V [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
40	1,00	1,00												
45	1,19	1,19	1,00	1,00										
55	1,61	1,61	1,35	1,35	1,00	1,00								
63	1,98	1,98	1,66	1,66	1,23	1,23	1,00	1,00						
85	3,10	2,88	2,60	2,52	1,92	1,92	1,57	1,57	1,00	1,00				
105	4,25	3,55	3,56	3,11	2,64	2,49	2,15	2,13	1,37	1,37	1,00	1,00		
120		4,06	4,35	3,56	3,22	2,84	2,63	2,44	1,68	1,68	1,22	1,22		
135			5,20	4,00	3,85	3,20	3,14	2,74	2,00	2,00	1,46	1,46	1,00	1,00
150				4,44	4,50	3,55	3,67	3,05	2,34	2,31	1,71	1,71	1,17	1,17
180					5,92	4,26	4,83	3,66	3,08	2,77	2,24	2,23	1,54	1,54
225						5,33	6,75	4,57	4,31	3,46	3,14	2,78	2,15	2,15
250							7,90	5,08	5,04	3,85	3,67	3,09	2,52	2,40
300								6,10		4,62	4,83	3,71	3,31	2,88
350								7,12				4,33	4,17	3,36
400												4,95	5,10	3,84
450														4,32
500														4,80
550														5,28

Design performance data

Edge distance (tension)

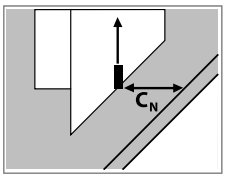


Table only valid for one edge $<C_{cr,N}$ and $S \geq S_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for edge distance $<C_{cr,N}$ applicable to N_{Rd} or N_{rec} for cracked and non-cracked concrete from 'Basic Performance' table

c_N [mm]	M8		M10		M12		M16		M20	M24	M30	
	$h \geq 1.28h_{min}$	h_{min}	$h \geq 1.31h_{min}$	h_{min}	$h \geq 1.35h_{min}$	h_{min}	$h \geq 1.38h_{min}$	h_{min}	$\geq h_{min}$		$h \geq 1.36h_{min}$	h_{min}
40	0,53	0,48										
45	0,56	0,50	0,53	0,48								
55	0,61	0,53	0,58	0,51	0,53	0,50						
63	0,65	0,56	0,62	0,54	0,56	0,52	0,53	0,50				
85	0,78	0,65	0,72	0,61	0,65	0,59	0,61	0,56	0,53			
105	0,90	0,73	0,83	0,68	0,73	0,66	0,68	0,62	0,58	0,53		
120	1,00	0,80	0,91	0,74	0,79	0,71	0,73	0,66	0,62	0,56		
135		0,84	1,00	0,80	0,86	0,76	0,79	0,71	0,66	0,59	0,57	0,55
165		0,91		0,87	1,00	0,88	0,91	0,80	0,74	0,65	0,63	0,60
190		0,98		0,92		0,93	1,00	0,88	0,81	0,71	0,68	0,64
200		1,00		0,94		0,95	1,00	0,90	0,83	0,73	0,70	0,66
225				1,00		1,00		0,95	0,91	0,78	0,75	0,70
255								1,00	1,00	0,85	0,81	0,75
315										1,00	0,95	0,87
340											1,00	0,92
405												1,00

Design performance data

Spacing

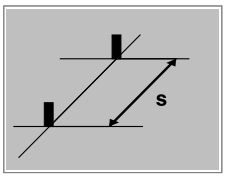


Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete from 'Basic Performance' table

s [mm]	M8		M10		M12		M16		M20	M24	M30	
	h≥ 1.28h_{min}	h_{min}	h≥ 1.31h_{min}	h_{min}	h≥ 1.35h_{min}	h_{min}	h≥ 1.38h_{min}	h_{min}	≥h_{min}		h≥ 1.36h_{min}	h_{min}
40	0,58	0,55										
45	0,59	0,56	0,58	0,55								
55	0,61	0,57	0,60	0,56	0,58	0,56						
63	0,63	0,58	0,62	0,57	0,60	0,57	0,58	0,56				
85	0,68	0,61	0,66	0,59	0,63	0,60	0,61	0,59	0,58			
105	0,72	0,63	0,69	0,62	0,66	0,62	0,64	0,61	0,60	0,58		
135	0,78	0,67	0,75	0,65	0,70	0,65	0,68	0,64	0,63	0,61	0,60	0,58
150	0,81	0,69	0,78	0,67	0,73	0,67	0,70	0,65	0,65	0,62	0,61	0,59
200	0,92	0,75	0,87	0,72	0,80	0,73	0,77	0,70	0,70	0,66	0,65	0,62
250	1,00	0,81	0,96	0,78	0,88	0,78	0,83	0,75	0,75	0,70	0,69	0,65
300		0,88	1,00	0,83	0,95	0,84	0,90	0,80	0,79	0,74	0,72	0,69
350		0,94		0,89	1,00	0,90	0,97	0,85	0,84	0,78	0,76	0,72
400		1,00		0,94		0,95	1,00	0,90	0,89	0,82	0,80	0,75
450				1,00		1,00		0,95	0,94	0,86	0,83	0,78
510								1,00	1,00	0,90	0,88	0,81
550										0,94	0,91	0,84
600										0,98	0,94	0,87
680										1,00	1,00	0,92
810												1,00

Product commercial data

Size	Product Code	Quantity [pcs]			Weight [kg]			Bar Codes
		Box	Outer	Pallet	Box	Outer	Pallet	
Ø8	R-CAS-V-08[1)]	10	480	5760	0.16	7.7	121.9	5906675280189
Ø_10	R-CAS-V-10[1)]	10	480	5760	0.21	10.0	150.2	5906675280196
Ø_12	R-CAS-V-12[1)]	10	480	5760	0.26	12.7	182.3	5906675280202
Ø_16	R-CAS-V-16[1)]	10	480	5760	0.38	18.0	246.1	5906675280219
Ø_20	R-CAS-V-20[1)]	6	108	1296	0.78	14.1	199.0	5906675280226
Ø_24	R-CAS-V-24[1)]	6	108	1296	1.04	18.8	255.3	5906675280233
Ø_30	R-CAS-V-30[1)]	4	32	384	1.75	14.0	197.8	5906675280240

[1)] ETA-10-0108