R-HAC-V

VINYLESTER ANCHOR IN AN AMPOULE - HAMMER-IN

Bonded hammer-in anchor based on vinylester resin in an ampoule for concrete, set

FEATURES AND BENEFITS

- Low cost tooling required for installation, quick and easy to install.
- Capsule contains precise amounts of ingredients making it a very consistent product.
- Styrene free - virtually odourless.
- Suitable for dry or wet non-cracked concrete.
- Approved for use with threaded rods in non-cracked concrete.
- Approved for use with rebar in non-cracked concrete (ETAG001 Option 7).
- Adhesive bond strength is not affected by unpolluted water.

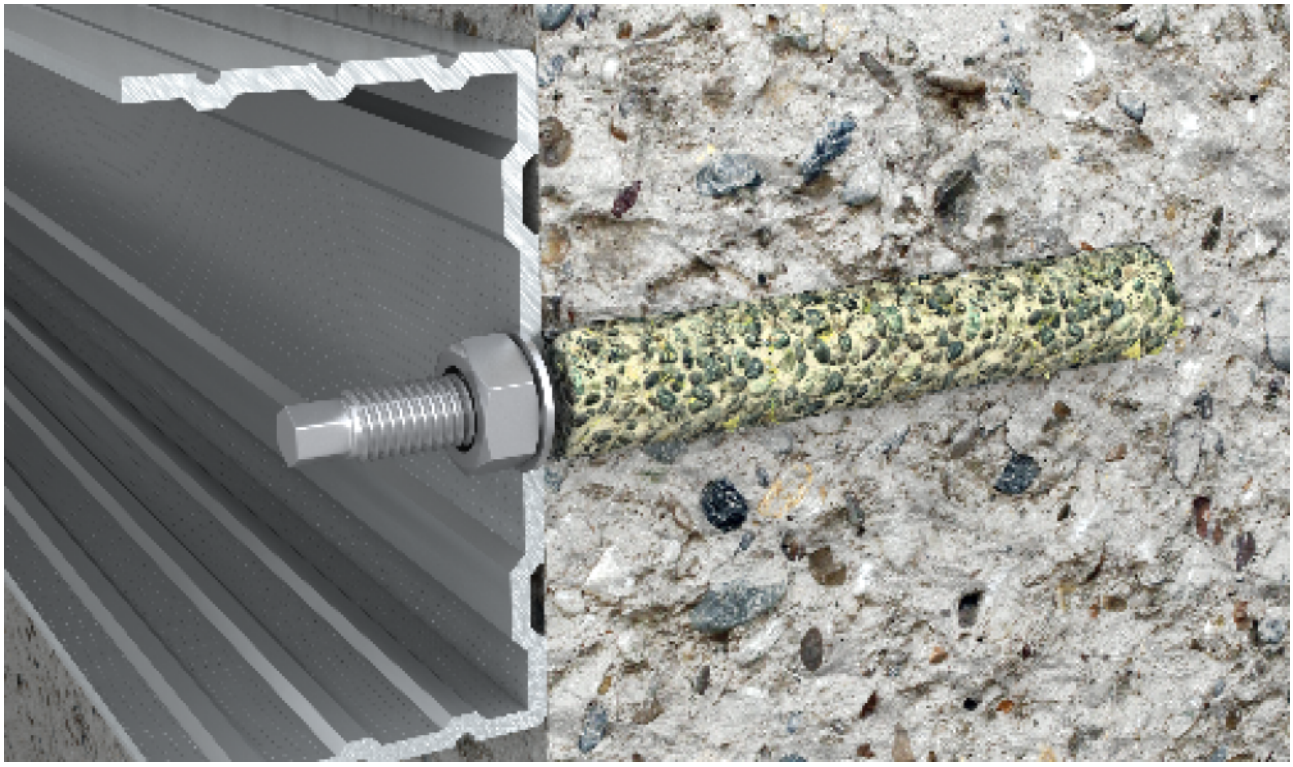
SUBSTRATES

- Non-cracked concrete C20/25-C50/60
- High-density natural stone



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APPLICATIONS

- Balustrades
- Barriers
- Steel structures
- Storage racks
- Ventilated facades







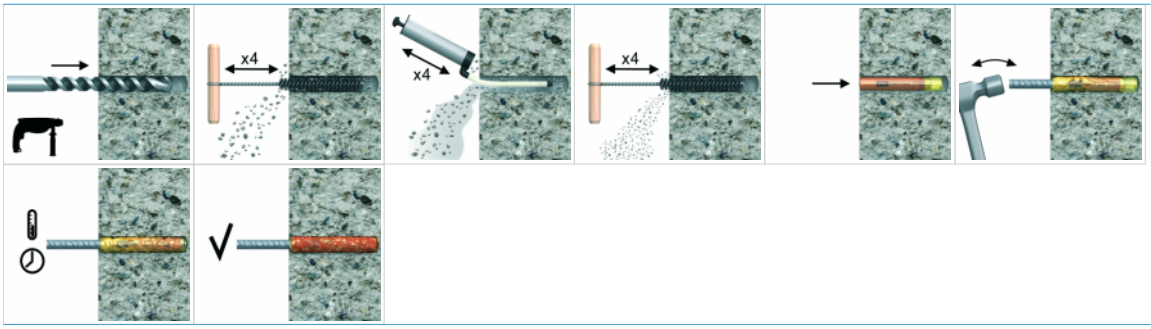





United Arab Emirates, Dubai
Burj Al-Arab Skytower

R-HAC-V VINYLESTER ANCHOR IN AN AMPOULE - HAMMER-IN

INSTALLATION GUIDE



1. Drill a hole of required diameter and depth.
2. Clean the drill 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.
6. Leave the fixing undisturbed until the curing time elapses.

INSTALLATION DATA

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
Capsule size		[mm]	8	10	12	16	20	24	30
Capsule diameter	d_c	[mm]	9.25	10.75	12.65	16.75	21.55	23.75	33.2
Installation torque	T_{inst}	[Nm]	10	20	40	80	120	180	300
Min. hole depth in substrate	h_0	[mm]	hnom + 5	hnom + 5	hnom + 5	hnom + 5	hnom + 5	hnom + 5	hnom + 5
Min. 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 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40
Min. edge distance	c_{min}	[mm]	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40	0.5 * hnom ≥ 40

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]	500	500	500	500	500	500	500
Nominal yield strength - tension	f_{yk}	[N/mm²]	400	400	400	400	400	400	400
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]	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
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	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
R-STUDS Metric Threaded Rods - 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]	450	450	450	450	450	450	450
Cross sectional area - tension	A_s	[mm²]	36.6	58	84.3	157	245	352.8	559.8

MECHANICAL PROPERTIES

Size			M8	M10	M12	M16	M20	M24	M30
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]	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

Size			M8	M10	M12	M16	M20	M24	M30
Effective embedment depth	h_{ef}	[mm]	80	90	110	125	170	210	270
MEAN ULTIMATE LOAD									
TENSION LOAD $N_{Ru,m}$									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	18.90	30.45	44.10	82.90	128.20	171.00	259.56
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	30.45	40.72	59.72	82.94	128.18	171.00	259.56
R-STUDS METRIC - A4		[kN]	27.30	40.72	59.72	82.94	128.18	171.00	259.56
SHEAR LOAD $V_{Ru,m}$									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	11.34	18.27	26.46	49.14	76.86	110.88	176.40
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	18.27	29.98	42.21	79.38	123.48	177.66	282.87
R-STUDS METRIC - A4		[kN]	16.38	25.83	37.17	69.30	107.73	155.61	247.59
CHARACTERISTIC LOAD									
TENSION LOAD N_{Rk}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	18.00	29.00	42.00	68.75	106.81	142.50	216.30
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	26.14	33.93	49.76	68.75	106.81	142.50	216.30
R-STUDS METRIC - A4		[kN]	26.00	33.93	49.76	68.75	106.81	142.50	216.30
SHEAR LOAD V_{Rk}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
R-STUDS METRIC - A4		[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
DESIGN LOAD									
TENSION LOAD N_{Rd}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	12.00	18.85	27.65	38.19	59.34	79.17	120.17
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	14.52	18.85	27.65	38.19	59.34	79.17	120.17
R-STUDS METRIC - A4		[kN]	13.90	18.85	27.65	38.19	59.34	79.17	120.17
SHEAR LOAD V_{Rd}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	7.20	11.20	16.80	31.20	48.80	70.40	112.00
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	12.00	18.40	27.20	50.40	78.40	112.80	179.20
R-STUDS METRIC - A4		[kN]	8.33	12.82	18.59	35.26	55.13	79.49	125.64
RECOMMENDED LOAD									
TENSION LOAD N_{rec}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	8.57	13.46	19.75	27.28	42.39	56.55	85.83
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	10.37	13.46	19.75	27.28	42.39	56.55	85.83
R-STUDS METRIC - A4		[kN]	9.93	13.46	19.75	27.28	42.39	56.55	85.83
SHEAR LOAD V_{rec}									
R-STUDS METRIC - STEEL CLASS 5.8		[kN]	5.14	8.00	12.00	22.29	34.86	50.29	80.00
R-STUDS METRIC - STEEL CLASS 8.8		[kN]	8.57	13.14	19.43	36.00	56.00	80.57	128.00
R-STUDS METRIC - A4		[kN]	5.95	9.16	13.28	25.18	39.38	56.78	89.74

DESIGN PERFORMANCE DATA

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	τ_{Rk}	[N/mm²]	11.00	11.00	10.00	10.00	9.00	9.00	7.00
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	τ_{Rk}	[N/mm²]	9.50	9.00	8.50	8.00	7.00	7.00	6.00
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									

Size			M8	M10	M12	M16	M20	M24	M30
Installation safety factor	γ_2	[-]	1.40	1.40	1.20	1.40	1.40	1.40	1.40
Installation safety factor	γ_{inst}	[-]	1.04	1.04	1.04	1.04	1.04	1.00	1.00
Increasing factors for NRd,p - C30/37	Ψ_c	[-]	01.07	01.07	01.07	01.07	01.07	01.07	01.07
Increasing factors for NRd,p - C40/50	Ψ_c	[-]	1.09	1.09	1.09	1.09	1.09	1.09	1.09
CONCRETE CONE FAILURE									
Installation safety factor	γ_2	[-]	1.40	1.40	1.20	1.40	1.40	1.40	1.40
Factor of the influence of sustained load	Ψ^0_{sus}	[-]	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Factor for non-cracked concrete	k	[-]	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Factor for cracked concrete	$k_{cr,N}$	[-]	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Edge distance	$c_{cr,N}$	[mm]	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Spacing	$s_{cr,N}$	[mm]	3.00	3.00	3.00	3.00	3.00	3.00	3.00
CONCRETE SPLITTING FAILURE									
Installation safety factor	γ_2	[-]	1.40	1.40	1.20	1.40	1.40	1.40	1.40
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_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	16.00	20.00	24.00	30.00
Effective length of anchor	ℓ_f	[mm]	80.00	90.00	110.00	125.00	170.00	210.00	270.00
Installation safety factor	γ_2	[-]	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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	τ_{Rk}	[N/mm²]	8.00	10.00	10.00	9.50	7.50	7.00	4.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)									
Characteristic bond resistance	τ_{Rk}	[N/mm²]	8.00	10.00	10.00	9.50	7.50	7.00	4.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (120°C/80°C)									
Characteristic bond resistance	τ_{Rk}	[N/mm²]	4.50	5.00	6.00	5.00	4.00	4.00	4.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE									
Installation safety factor	γ_{inst}	[-]	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SHEAR LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	6.30	10.10	14.70	27.30	42.70	61.60	98.00
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]	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]	10.20	16.10	23.50	44.10	68.60	98.70	156.80
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]	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]	9.10	14.40	20.70	38.50	59.90	86.50	137.40
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]	1.56	1.56	1.56	1.56	1.56	1.56	1.56

Size		
TENSION LOAD		
STEEL FAILURE; STEEL CLASS 5.8		
Characteristic resistance	$N_{Rk,s}$	[kN]
Partial safety factor	γ_{MS}	[-]

Size		
STEEL FAILURE; STEEL CLASS 8.8		
Characteristic resistance	$N_{Rk,s}$	[kN]
Partial safety factor	γ_{MS}	[-]
STEEL FAILURE; STEEL GRADE A4-70		
Characteristic resistance	$N_{Rk,s}$	[kN]
Partial safety factor	γ_{MS}	[-]
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C)		
Characteristic bond resistance	τ_{Rk}	[N/mm²]
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C)		
Characteristic bond resistance	τ_{Rk}	[N/mm²]
COMBINED PULL-OUT AND CONCRETE CONE FAILURE		
Installation safety factor	γ_{inst}	[-]
SHEAR LOAD		
STEEL FAILURE; STEEL CLASS 5.8		
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]
STEEL FAILURE; STEEL CLASS 8.8		
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]
STEEL FAILURE; STEEL GRADE A4-70		
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]
Partial safety factor	$\gamma_{MsN,seisC1}$	[-]

LOGISTICAL DATA

SKU	Base-sales unit	Unit pack	Bulk pack	Pallet	Single Package - Gross Weight	Bulk Package - Gross Weight	Palette - Gross Weight	Barcode
R-HAC-V-08	pcs.	10.0	480.0	5760.0	0.1	7.1	110.5	5906675377827
R-HAC-V-10	pcs.	10.0	480.0	5760.0	0.2	8.2	123.1	5906675379913
R-HAC-V-12	pcs.	10.0	480.0	5760.0	0.2	10.2	147.0	5906675379920
R-HAC-V-16	pcs.	10.0	480.0	5760.0	0.3	13.8	190.7	5906675379937
R-HAC-V-20	pcs.	6.0	108.0	1296.0	0.5	10.1	146.7	5906675379944
R-HAC-V-24	pcs.	6.0	108.0	1296.0	0.7	13.4	186.1	5906675379951
R-HAC-V-30	pcs.	4.0	32.0	384.0	1.1	9.6	139.7	5906675379968

RELATED PRODUCTS

SAFETY	Protective gloves for power tools **R-PGL** 			
DRILLING	Rotary Hammer Drill SDS plus; 850W; 26mm; 2.5J **R-PRH-26850** 	Cordless Hammer 18V SDS plus **R-PRH18** 	Drill bits Aggressor SDS plus **RT-SDSA** 	Drill bits Rebardrill SDS plus **RT-SDSR**
CLEANING	Blow Pump **R-BLOWPUMP** 			
ANCHORING	Hammer **RT-HAM-0500** 			