

# VT-HP® — High Performance Chemical Anchor

## Material

Vinylester

## Features & Benefits

- Suitable for use in cracked and non-cracked concrete M8 to M30 / rebar Ø8 to Ø32
- Qualified for use in seismic performance categories C1 and C2
- Low odour for safe use in confined spaces - VOC Compliant (A+ rating)
- Excellent for use in cold weather conditions or applications where fast cure is required
- Superior sustained load performance at elevated temperatures
- Can be used in dry and damp conditions, wet or flooded environments (not sea water)
- Fire rated to R120
- Fits 300ml standard caulking gun or DT300 by Simpson Strong-Tie, easy to dispense



## Applications

- Structural Steel
- Steel Columns and Beams, Post Bases, Concrete Columns
- Balcony Extensions
- Post-installed rebar applications
- Threaded Rod Anchoring
- Facades, Safety Barriers
- Fences, Gates, Industrial Garage and Warehouse applications

## Base Material

- Normal and Lightweight Concrete (cracked and non-cracked)
- Grout-filled and Hollow Concrete Block (when used with screen tubes)
- Certain un-reinforced masonry applications

## Approvals

CE 1404 Simpson Strong-Tie Int. Ltd. 2022	CE 1404 Simpson Strong-Tie Int. Ltd. 2022
	
DoP: www.strongtie.eu	DoP: www.strongtie.eu
VT-HP ETA-19/0419 EAD 330499-00-0601 M8-M30 8mm - 32mm <b>Seismic C2 M12,16,20</b> 1404-CPR-3179	VT-HP ETA-19/0765 EAD 330076-00-0604 M8-M16 Masonry use category b,c,d 1404-CPR-3272



## VT-HP Curing Schedule for Concrete and Masonry - Maximum working time and minimum curing time

Concrete Temperature	Gelling/Working Time	Minimum Curing Time in Dry Concrete	Minimum Curing Time in Wet Concrete
0°C to +4°C*	45 min	7 h	x2
+5°C to +9°C	25 min	2 h	x2
+10°C to +19°C	15 min	80 min	x2
+20°C to +29°C	6 min	45 min	x2
+30°C to +34°C	4 min	25 min	x2
+35°C to +40°C	2 min	20 min	x2
+40°C	1,5 min	15 min	x2

\* Cartridge temperature must be between +5°C and +40°C

\* In wet concrete the curing time must be doubled

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**VT-HP®** — High Performance Chemical Anchor**Specifications****Installation Data — Threaded Rod**

Description	Symbol	Units	Threaded Rod Size (mm)					
			M8	M10	M12	M16	M20	M24
Nominal Insert Diameter	d	mm	8	10	12	16	20	24
Drill Hole Diameter	d <sub>o</sub>		10	12	14	18	24	28
Minimum Embedment Depth	h <sub>ef,min</sub>		60	60	70	80	90	96
Maximum Embedment Depth	h <sub>ef,max</sub>		160	200	240	320	400	480
Clearance Hole Diameter in Fixture	d <sub>i</sub>		9	12	14	18	22	26
Minimum Edge Distance	c <sub>min</sub>		40	50	60	80	100	120
Minimum Spacing	s <sub>min</sub>		40	50	60	80	100	120
Maximum torque moment	T <sub>inst, max</sub>	Nm	10	20	40	80	120	160

**Concrete Thickness, Critical Edge Distance and Spacing — Threaded Rod**

Description	Symbol	Units	M8	M10	M12	M16	M20	M24
Embedment Depth $h_{ef} = 8d$								
Embedment Depth	$h_{ef}$	mm	64	80	96	128	160	192
Minimum Concrete Thickness	$h_{min}$		100	110	126	164	208	248
Critical Edge Distance	$c_{cr,N}$		96	120	144	192	240	288
Critical Spacing	$s_{cr,N}$		192	240	288	384	480	576
Embedment Depth $h_{ef} = 12d$								
Embedment Depth	$h_{ef}$	mm	96	120	144	192	240	288
Minimum Concrete Thickness	$h_{min}$		126	150	174	228	288	344
Critical Edge Distance	$c_{cr,N}$		144	180	216	288	360	432
Critical Spacing	$s_{cr,N}$		288	360	432	576	720	864

**Design Resistance — Single Anchor, No Concrete Edge or Spacing Influence — Threaded Rod**

Description	Symbol	Units	M8	M10	M12	M16	M20	M24
Uncracked Concrete - $h_{ef} = 8d$								
TENSION	$N_{Rd}$	kN	11.1	17.4	25.1	44.6	69	90.8
SHEAR	$V_{Rd}$		7.2	12	16.8	31.2	48.8	70.4
Cracked Concrete - $h_{ef} = 8d$								
TENSION	$N_{Rd}$	kN	4.5	7.3	11.5	20.4	31.9	46
SHEAR	$V_{Rd}$		7.2	12	16.8	31.2	48.8	70.4
Uncracked Concrete - $h_{ef} = 12d$								
TENSION	$N_{Rd}$	kN	12	19.3	28	52	81.3	117.3
SHEAR	$V_{Rd}$		7.2	12	16.8	31.2	48.8	70.4
Cracked Concrete - $h_{ef} = 12d$								
TENSION	$N_{Rd}$	kN	6.7	10.9	17.2	30.7	47.9	69
SHEAR	$V_{Rd}$		7.2	12	16.8	31.2	48.8	70.4

- Concrete strength is 30 MPa (cylinder) unreinforced, hole condition is "dry", and temperature range 24°C long-term/43°C short-term.
- Tabulated loads are valid at critical spacing and critical edge distance only. For spacing and edge distance influence, use Simpson's Anchor Designer™ Software for analysis.
- N<sub>Rd</sub> and V<sub>Rd</sub> is based on use of a Grade 5.8 threaded insert. Verify capacity if using a different steel grade.
- All design resistances are derived from the product's ETA (European Technical Assessment).

**VT-HP® — High Performance Chemical Anchor****Design Resistance — Single Anchor, No Concrete Edge or Spacing Influence — Threaded Rod**

Description	Symbol	Units	M8	M10	M12	M16	M20	M24
Category C1 - $h_{ef} = 8d$								
TENSION	$N_{Rd}$	kN	2.7	4.3	7.4	13.2	20.7	30.5
SHEAR	$V_{Rd}$		2.3	4.2	5.9	10.9	17.1	24.6
Category C2 - $h_{ef} = 8d$								
TENSION	$N_{Rd}$	kN	-	-	4	7.1	11.2	-
SHEAR	$V_{Rd}$		-	-	4.1	7.3	11.4	-
Category C1 - $h_{ef} = 12d$								
TENSION	$N_{Rd}$	kN	4	6.5	11.2	19.8	31	45.8
SHEAR	$V_{Rd}$		2.5	4.2	5.9	10.9	17.1	24.6
Category C2 - $h_{ef} = 12d$								
TENSION	$N_{Rd}$	kN	-	-	6	10.7	16.7	-
SHEAR	$V_{Rd}$		-	-	5	10.9	17.1	-

1. Concrete strength is 20 MPa (cylinder) unreinforced, hole condition is "dry", and temperature range 24°C long-term/43°C short-term.

2. Tabulated loads are valid at critical spacing and critical edge distance only. For spacing and edge distance influence, use Simpson's Anchor Designer™ Software for analysis.

3.  $N_{Rd}$  and  $V_{Rd}$  is based on use of a Grade 5.8 threaded insert. Verify capacity if using a different steel grade.

4. All design resistances are derived from the product's ETA (European Technical Assessment).

**Steel Design Resistance (Tension) — Threaded Rod**

Description	Symbol	Units	M8	M10	M12	M16	M20	M24
Steel Grade 5.8	$N_{Rd,s}$	kN	12.2	19.3	28	52.7	82	118
Stainless Steel A4			13.7	21.7	31.6	58.8	92	132

**Steel Design Resistance (Shear) — Threaded Rod**

Description	Symbol	Units	M8	M10	M12	M16	M20	M24
Steel Grade 5.8	$V_{Rd,s}$	kN	7.4	11.6	16.8	31.2	48.8	70.4
Stainless Steel A4			8.2	13	19.2	35.3	55.1	79.5

**Installation Data — Rebar**

Description	Symbol	Units	Rebar Size (mm)								
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Nominal Insert Diameter	d	mm	8	10	12	14	16	20	25	28	32
Drill Hole Diameter	d <sub>o</sub>		12	14	16	18	20	24	32	35	40
Minimum Embedment Depth	h <sub>ef,min</sub>		60	60	70	75	80	90	100	112	128
Maximum Embedment Depth	h <sub>ef,max</sub>		160	200	240	280	320	400	500	580	640
Minimum Edge Distance	c <sub>min</sub>		40	50	60	70	80	100	125	140	160
Minimum Spacing	s <sub>min</sub>		40	50	60	70	80	100	125	140	160

**Concrete Thickness, Critical Edge Distance and Spacing — Rebar**

Description	Symbol	Units	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Embedment Depth $h_{ef} = 8d$											
Embedment Depth	$h_{ef}$	mm	64	80	96	112	128	160	200	224	256
Minimum Concrete Thickness	$h_{min}$		100	110	128	148	168	208	264	294	336
Critical Edge Distance	$c_{cr,N}$		96	120	144	168	192	240	300	335	384
Critical Spacing	$s_{cr,N}$		192	240	288	336	384	480	600	672	768
Embedment Depth $h_{ef} = 12d$											
Embedment Depth	$h_{ef}$	mm	96	120	144	168	192	240	300	336	384
Minimum Concrete Thickness	$h_{min}$		126	150	176	204	232	288	364	406	464
Critical Edge Distance	$c_{cr,N}$		144	180	216	252	288	360	450	504	576
Critical Spacing	$s_{cr,N}$		288	360	432	504	576	720	900	1008	1152

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## Design Resistance — Single Anchor, No Concrete Edge or Spacing Influence — Rebar

Description	Symbol	Units	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Uncracked Concrete - $h_{ef} = 8d$											
TENSION	$N_{Rd}$	kN	11.1	17.4	25.1	34.1	44.6	69	96.5	113.8	126.3
SHEAR	$V_{Rd}$		9.3	14.7	20.7	28	36	56.7	88.7	110.7	144.7
Cracked Concrete - $h_{ef} = 8d$											
TENSION	$N_{Rd}$	kN	4.5	7.3	11.5	15.6	20.4	31.9	49.9	74	96.6
SHEAR	$V_{Rd}$		8.9	14.7	20.7	28	36	56.7	88.7	110.7	144.7
Uncracked Concrete - $h_{ef} = 12d$											
TENSION	$N_{Rd}$	kN	16.7	26.1	37.6	51.2	66.9	104.5	149.7	170.7	189.5
SHEAR	$V_{Rd}$		9.3	14.7	20.7	28	36	56.7	88.7	110.7	144.7
Cracked Concrete - $h_{ef} = 12d$											
TENSION	$N_{Rd}$	kN	6.7	10.9	17.2	23.5	30.7	47.9	74.8	110.9	144.9
SHEAR	$V_{Rd}$		9.3	14.7	20.7	28	36	56.7	88.7	110.7	144.7

- Concrete strength is 30 MPa (cylinder) unreinforced, hole condition is "dry", and temperature range 24°C long-term/43°C short-term.
- Tabulated loads are valid at critical spacing and critical edge distance only. For spacing and edge distance influence, use Simpson's Anchor Designer™ Software for analysis.
- All design resistances are derived from the product's ETA (European Technical Assessment).

## Design Resistance — Single Anchor, No Concrete Edge or Spacing Influence — Seismic Performance C1 — Rebar

Description	Symbol	Units	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
h <sub>ef</sub> = 8d											
TENSION	N <sub>Rd</sub>	kN	2.7	4.3	7.4	10.1	13.2	20.7	33.1	49.2	64.3
SHEAR	V <sub>Rd</sub>		4.6	8.8	14.2	19.4	25.3	39.6	61.9	77.6	101.3
h <sub>ef</sub> = 12d											
TENSION	N <sub>Rd</sub>	kN	4	6.5	11.2	15.2	19.8	31	49.7	73.9	96.5
SHEAR	V <sub>Rd</sub>		6.3	10	14.2	19.4	25.3	39.6	61.9	77.6	101.3

- Concrete strength is 20 MPa (cylinder) unreinforced, hole condition is "dry", and temperature range 24°C long-term/43°C short-term.
- Tabulated loads are valid at critical spacing and critical edge distance only. For spacing and edge distance influence, use Simpson's Anchor Designer™ Software for analysis.
- All design resistances are derived from the product's ETA (European Technical Assessment).

## Rebar Strength — Tension

Description	Symbol	Units	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Design Resistance	$N_{Rd,s}$	kN	19.3	30.5	43.6	59.4	77.5	121.1	189.4	237.6	310.1

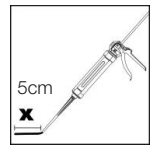
## Rebar Strength — Shear

Description	Symbol	Units	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Design Resistance	$V_{Rd,s}$	kN	9	14.2	20.3	27.7	36.2	56.5	88.4	110.9	144.7

## INSTALLATION



**Cartridge Preparation:** Open cartridge, pull bag firmly upwards and cut. Attach supplied Simpson Strong-Tie nozzle to cartridge (Do not modify or use alternative nozzles), and insert cartridge into Simpson Strong-Tie dispensing tool. Dispense and discard the first 5cm of mixed product until uniform colour appear.



Using a hammer drill, drill hole to specified diameter and depth.



Clean hole by brushing and blowing alternately:

- Manual Air Cleaning: 4x blow / 4x brush / 4x blow for  $d_0 \leq 20$  mm &  $h_{ef} \leq 10d$
- Compressed Air Cleaning: 4x blow / 4x brush / 4x blow for all drill hole diameters and depths (min. 6 bar compressed air).



Inject resin using a Simpson Strong-Tie® dispensing tool. Fill hole two-thirds full, starting from bottom of hole, withdraw the nozzle after each trigger to prevent air pockets.



Insert clean, oil-free threaded rod/rebar, turning slowly until anchor/threaded rod reaches bottom of hole. The anchor can be loaded after the required curing time. Applied torque shall not exceed the values  $T_{max}$ .

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