

HP HAMMER GLASS CAPSULES



FEATURES

- Totally encapsulated system, excellent for "one-hole to one-capsule" application.
- Stress-free anchoring, suitable for close edge and tight spacing applications.
- No special tool needed for installation except a hammer.
- Speedy installation for rebar and threaded stud.
- Suitable for high dynamic loading in solid substrate.
- High efficiency in series installation, highly recommended for floor and wall fixings.

APPLICATIONS

- High strength anchoring where vibration is a consideration.
- All types of façade and curtain wall installations.
- Hold down anchoring for machineries, fans and motors.
- Anchoring for steel structures and gondolas.
- Balustrades, handrails, safety barriers installations.
- Recommended for architectural or GFRC panel fixings.
- Shear connectors for reinforced concrete structure.

SHelf LIFE

- Shelf life is 12 months with the capsules kept in cool dry conditions (+5°C to +25°C) out of direct sunlight.

RANGE OF CONCRETE QUALITY

C20/25 ~ C50/60

RANGE OF LOADING

5.1 kN ~ 128.0 kN (SWL)



Medium loads

HOLE ORIENTATION



BASE MATERIALS



Concrete



Concrete block
solid stone



VA RODS AVAILABILITY




APPROVAL GOVERNING BODIES

TNO
innovation
for life

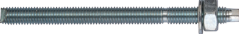

► ORDERING DETAILS

PRODUCT DESCRIPTION	PACKING CONTENT (PCs.)	PRODUCT PART NO.	
Hole Blower	1	HCP	
Hole Cleaning Brush			
Cleaning Brush - 10mm	1	CB10	
Cleaning Brush - 12mm	1	CB12	
Cleaning Brush - 18mm	1	CB18	
Cleaning Brush - 28mm	1	CB28	



HP HAMMER GLASS CAPSULE

PRODUCT DESCRIPTION	CAPSULE DIAMETER (mm)	CAPSULE VOLUME (ml)	PACKING CONTENT (PCs.)	PRODUCT PART NO.	
M8 x 80mm	9	4.0	10	HP8	
M10 x 90mm	11	6.4	10	HP10	
M12 x 110mm	13	11.3	10	HP12	
M16 x 125mm	17	23.1	10	HP16	
M20 x 175mm	22	53.0	6	HP20	
M24 x 210mm	24	76.0	6	HP24	
M30 x 265mm	33	191.0	6	HP30	

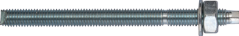

VA CHEMICAL STUD RODS - STEEL CLASS 5.8 ZINC GALVANISED

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.	
M8 x 110mm	9	15	10	VA8110	 
M10 x 130mm	12	20	10	VA10130	
M12 x 160mm	14	30	10	VA12160	
M16 x 190mm	18	40	10	VA16190	
M20 x 260mm	22	50	6	VA20260	
M24 x 300mm	28	55	6	VA24300	
M30 x 380mm	33	70	6	VA30380	

VA CHEMICAL STUD RODS - STEEL CLASS 5.8 HOT-DIPPED GALVANISED

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.	
M8 x 110mm	9	15	10	VA8110GH	 
M10 x 130mm	12	20	10	VA10130GH	
M12 x 160mm	14	30	10	VA12160GH	
M16 x 190mm	18	40	10	VA16190GH	
M20 x 260mm	22	50	6	VA20260GH	
M24 x 300mm	28	55	6	VA24300GH	
M30 x 380mm	33	70	6	VA30380GH	

VAH CHEMICAL STUD RODS - STEEL CLASS 8.8 ZINC GALVANISED

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.	
M8 x 110mm	9	15	10	VAH8110	 
M10 x 130mm	12	20	10	VAH10130	
M12 x 160mm	14	30	10	VAH12160	
M16 x 190mm	18	40	10	VAH16190	
M20 x 260mm	22	50	6	VAH20260	
M24 x 300mm	28	55	6	VAH24300	
M30 x 380mm	33	70	6	VAH30380	

VAH CHEMICAL STUD RODS - STEEL CLASS 8.8 HOT-DIPPED GALVANISED

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.
M8 x 110mm	9	15	10	VAH8110GH
M10 x 130mm	12	20	10	VAH10130GH
M12 x 160mm	14	30	10	VAH12160GH
M16 x 190mm	18	40	10	VAH16190GH
M20 x 260mm	22	50	6	VAH20260GH
M24 x 300mm	28	55	6	VAH24300GH
M30 x 380mm	33	70	6	VAH30380GH



G

VAR CHEMICAL STUD RODS - STAINLESS STEEL CLASS 304 (A2)

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.
M8 x 110mm	9	15	10	VAR8110
M10 x 130mm	12	20	10	VAR10130
M12 x 160mm	14	30	10	VAR12160
M16 x 190mm	18	40	10	VAR16190
M20 x 260mm	22	50	6	VAR20260
M24 x 300mm	28	55	6	VAR24300
M30 x 380mm	33	70	6	VAR30380



A2
INOX

VAS CHEMICAL STUD RODS - STAINLESS STEEL CLASS 316 (A4)

PRODUCT DESCRIPTION	FIXTURE HOLE DIAMETER (mm)	MAX. FIXTURE THICKNESS (mm)	PACKING CONTENT (PCs.)	PRODUCT PART NO.
M8 x 110mm	9	15	10	VAS8110
M10 x 130mm	12	20	10	VAS10130
M12 x 160mm	14	30	10	VAS12160
M16 x 190mm	18	40	10	VAS16190
M20 x 260mm	22	50	6	VAS20260
M24 x 300mm	28	55	6	VAS24300
M30 x 380mm	33	70	6	VAS30380



A4
INOX

* Stud rod diameter larger than M27 and above are made-to-order or on indent basis.

► INSTALLATION PERIMETER & LOADING DATA

HP WITH VA (STEEL CLASS 5.8) RODS - ZINC GALVANISED & HOT DIPPED GALVANISED

ANCHOR SIZE	HOLE DIAMETER (mm)	ANCHORAGE DEPTH (mm)	MINIMUM CONCRETE THICKNESS (mm)	TIGHTENING TORQUE (Nm)	RECOMMENDED SPACING & EDGE DISTANCE TO FULL LOAD (mm)		ABSOLUTE MINIMUM SPACING & EDGE DISTANCE (mm)		RECOMMENDED LOAD ¹ (kN)	
					TENSION	SHEAR	TENSION	SHEAR	TENSION	SHEAR
M8	10	80	110	10	160	80	40	40	6.6	5.1
M10	12	90	120	20	180	90	45	45	10.0	8.0
M12	14	110	140	40	220	110	55	55	14.0	12.0
M16	18	125	160	80	250	125	65	65	24.0	22.3
M20	24	175	220	120	350	175	85	85	41.6	34.9
M24	28	210	265	180	420	210	105	105	56.0	50.3
M30	35	270	350	300	540	270	135	135	87.5	80.0

¹ Loading based on non-cracked concrete, $f_{ck,cube} = 25 \text{ N/mm}^2$ (C20/25).

HP WITH VAH (STEEL CLASS 8.8) RODS - ZINC GALVANISED & HOT DIPPED GALVANISED

ANCHOR SIZE	HOLE DIAMETER (mm)	ANCHORAGE DEPTH (mm)	MINIMUM CONCRETE THICKNESS (mm)	TIGHTENING TORQUE (Nm)	RECOMMENDED SPACING & EDGE DISTANCE TO FULL LOAD (mm)		ABSOLUTE MINIMUM SPACING & EDGE DISTANCE (mm)		RECOMMENDED LOAD ¹ (kN)	
					TENSION	SHEAR	TENSION	SHEAR	TENSION	SHEAR
M8	10	80	110	10	160	80	40	40	6.6	8.6
M10	12	90	120	20	180	90	45	45	10.0	13.1
M12	14	110	140	40	220	110	55	55	14.0	18.9
M16	18	125	160	80	250	125	65	65	24.0	36.0
M20	24	175	220	120	350	175	85	85	41.6	51.6
M24	28	210	265	180	420	210	105	105	56.0	80.6
M30	35	270	350	300	540	270	135	135	87.5	128.0

¹ Loading based on non-cracked concrete, $f_{ck,cube} = 25 \text{ N/mm}^2$ (C20/25).

HP WITH VAR & VAS (STAINLESS STEEL) RODS - CLASS 304 (A2) & CLASS 316 (A4)

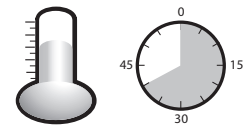
ANCHOR SIZE	HOLE DIAMETER (mm)	ANCHORAGE DEPTH (mm)	MINIMUM CONCRETE THICKNESS (mm)	TIGHTENING TORQUE (Nm)	RECOMMENDED SPACING & EDGE DISTANCE TO FULL LOAD (mm)		ABSOLUTE MINIMUM SPACING & EDGE DISTANCE (mm)		RECOMMENDED LOAD ¹ (kN)	
					TENSION	SHEAR	TENSION	SHEAR	TENSION	SHEAR
M8	10	80	110	10	160	80	40	40	6.6	6.0
M10	12	90	120	20	180	90	45	45	10.0	9.2
M12	14	110	140	40	220	110	55	55	14.0	13.3
M16	18	125	160	80	250	125	65	65	24.0	25.2
M20	24	175	220	120	350	175	85	85	41.6	39.4
M24	28	210	265	180	420	210	105	105	56.0	56.8
M30	35	270	350	300	540	270	135	135	87.5	89.7

¹ Loading based on non-cracked concrete, $f_{ck,cube} = 25 \text{ N/mm}^2$ (C20/25).

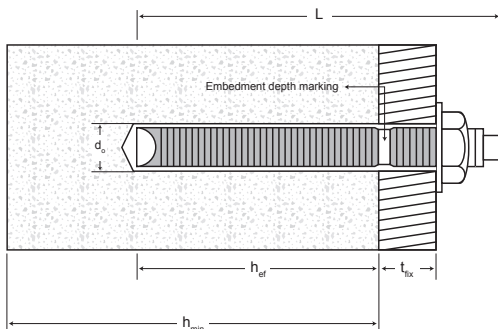
► GEL AND CURING TIME

BASE MATERIAL TEMPERATURE $T_{\text{base material}} (\text{°C})$	CURE TIME IN DRY CONCRETE $t_{\text{cure,dry}} (\text{hrs.})$	CURE TIME FOR WET CONCRETE $t_{\text{cure,wet}} (\text{hrs.})$
$-5 \leq T_{\text{base material}} < 0$	10	10
$0 \leq T_{\text{base material}} < +10$	5	10
$+10 \leq T_{\text{base material}} < +20$	2	4
$+20 \leq T_{\text{base material}} < +30$	1	2

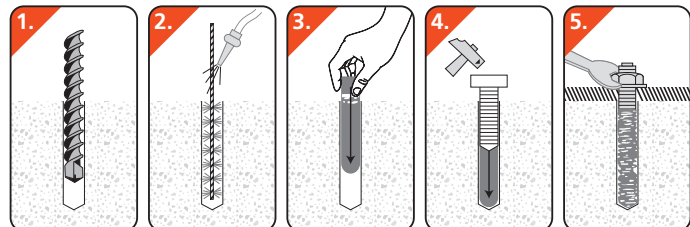
Note: If during the installation of the rod the temperature drop below -6°C or rises above 60°C , please contact our Engineers for the proper procedures.



► SETTING DIAGRAM



► INSTALLATION PROCEDURE



HP HAMMER GLASS CAPSULE FOR POST-INSTALLED REBAR APPLICATIONS

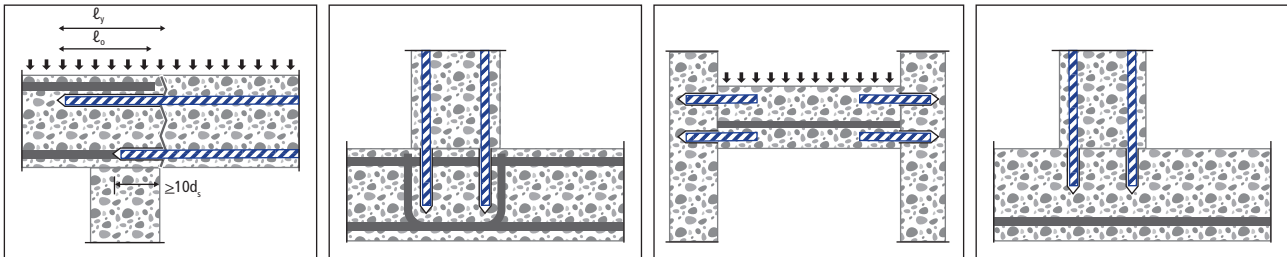
(Design Load Approach with BS8110 Bond Strength Method)

Concrete Compressive Strength: $f_{ck,cube} = 30 \text{ N/mm}^2$

Rebar Size, d_s	$\phi 10$	$\phi 12$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 32$
Design Steel Resistance, $N_{Rd,s}$ [kN]	31.4	45.2	80.4	125.7	196.4	321.7
Design Bond Stress, τ_{Rd} [N/mm ²]	6.8	6.1	6.1	6.1	5.8	5.8
Drilled Hole Diameter, d_o [mm]	13 ~ 14	15 ~ 16	20 ~ 22	25 ~ 28	30 ~ 32	40 ~ 42
Bar Spacing, s [mm]	50	65	80	100	125	160
Edge Distance, c [mm]	40	40	40	50	65	80
$L_{b,Rd}$ (to steel yield) / Rebar ϕ	20	20	20	20	20	20
Anchorage Length, L_b [mm]	Design Tensile Bonding Capacity, N_{Rd} [kN] (Single Capsule Application)					
100	21.5					
120		27.7				
160			49.3			
200				77.0		
250					114.5	
320						187.6
Anchorage Length, L_b [mm]	Design Tensile Bonding Capacity, N_{Rd} [kN] (Double Capsule Application)					
200	31.4					
240		45.3				
320			80.5			
400				125.7		
500					196.4	
640						321.7
Length to Develop Steel Yield, $L_{b,Rd}$ [mm]	200	240	320	400	500	640

- 1) Safety factor for design tensile steel resistance: $\gamma_{Ms,N} = 1.15$ (based on steel yield strength of 460 N/mm²).
- 2) Safety factor for design tensile pull-out resistance: $\gamma_{Mc,N} = 1.8$.
- 3) Safety factor for design tensile concrete cone resistance: $\gamma_{Mc,N} = 1.5$.
- 4) Loading applicable to non-cracked concrete with design comply in accordance to BS8110.
- 5) Minimum spacing shall be $4d_s$ bar to bar or $5d_s$ centre-to-centre.
- 6) Minimum edge distance shall be $2d_s$ bar to bar or $2.5d_s$ centre-to-centre.

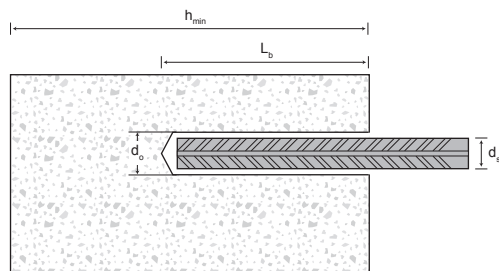
SUGGESTED APPLICATIONS



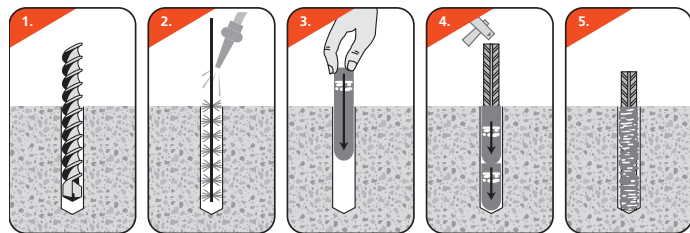
Overlap joints for slabs and beams or foundation column or wall; rebar connection for simply supported slabs or beams; shear connector or compression component joints.

Important note: Architect or design engineer must conduct final checked with the actual site condition for any variations against tabulated data.

SETTING DIAGRAM



INSTALLATION PROCEDURE



HP HAMMER GLASS CAPSULE FOR POST-INSTALLED REBAR APPLICATIONS

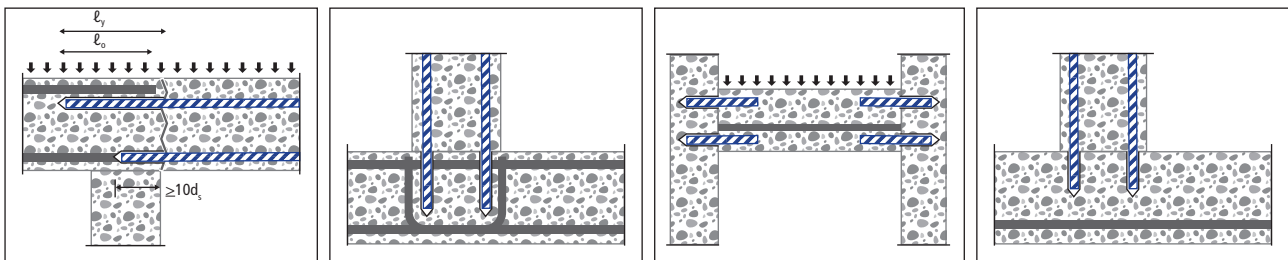
(Design Load Approach with BS8110 Bond Strength Method)

Concrete Compressive Strength: $f_{ck,cube} = 35 \text{ N/mm}^2$

Rebar Size, d_s		$\phi 10$	$\phi 12$	$\phi 16$	$\phi 20$	$\phi 25$	$\phi 32$
Design Steel Resistance, $N_{Rd,s}$	[kN]	31.4	45.2	80.4	125.7	196.4	321.7
Design Bond Stress, τ_{Rd}	[N/mm ²]	7.2	6.4	6.4	6.4	6.1	6.1
Drilled Hole Diameter, d_o	[mm]	13 ~ 14	15 ~ 16	20 ~ 22	25 ~ 28	30 ~ 32	40 ~ 42
Bar Spacing, s	[mm]	50	65	80	100	125	160
Edge Distance, c	[mm]	40	40	40	50	65	80
$L_{b,req}$ (to steel yield) / Rebar ϕ		20	20	20	20	20	20
Anchorage Length, L_b [mm]		Design Tensile Bonding Capacity, N_{Rd} [kN] (Single Capsule Application)					
100	22.5						
120		29.0					
160			51.6				
200				80.6			
250					119.9		
320						196.4	
Anchorage Length, L_b [mm]		Design Tensile Bonding Capacity, N_{Rd} [kN] (Double Capsule Application)					
200	31.4						
240		45.3					
320			80.5				
400				125.7			
500					196.4		
640							321.7
Length to Develop Steel Yield, $L_{b,req}$ [mm]		200	240	320	400	500	640

- 1) Safety factor for design tensile steel resistance: $\gamma_{Ms,N} = 1.15$ (based on steel yield strength of 460 N/mm²).
- 2) Safety factor for design tensile pull-out resistance: $\gamma_{Mc,N} = 1.8$.
- 3) Safety factor for design tensile concrete cone resistance: $\gamma_{Mc,N} = 1.5$.
- 4) Loading applicable to non-cracked concrete with design comply in accordance to BS8110.
- 5) Minimum spacing shall be $4d_s$ bar to bar or $5d_s$ centre-to-centre.
- 6) Minimum edge distance shall be $2d_s$ bar to bar or $2.5d_s$ centre-to-centre.

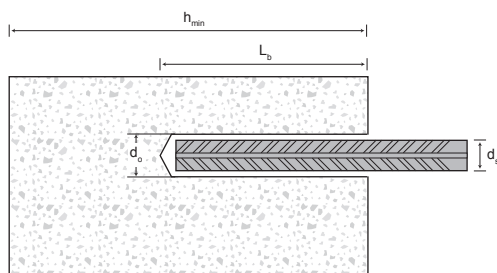
SUGGESTED APPLICATIONS



Overlap joints for slabs and beams or foundation column or wall; rebar connection for simply supported slabs or beams; shear connector or compression component joints.

Important note: Architect or design engineer must conduct final checked with the actual site condition for any variations against tabulated data.

SETTING DIAGRAM



INSTALLATION PROCEDURE

