

VESF CHEMICAL ANCHOR SYSTEM

High-performance vinylester (styrene-free) injection mortar for fixing into non-cracked concrete.

Function: After drilling and cleaning the hole, the adhesive mortar is injected with an applicator gun. A static mixing nozzle assures that the chemical components are properly mixed. Immediately afterwards a threaded stud is inserted into the resin with a twisting action to ensure even distribution of resin over the stud length and to displace any entrapped air. After the adhesive mortar has cured, the anchor can be fully loaded. The completed chemical reaction creates a durable expansion pressure free bond between the anchor stud, the reacted resin, and the concrete.

Benefits:

- Fixing produces no expansion pressure
- Reduced edge distances and spacings
- Installation into damp holes permitted
- Completely seals drilled hole
- Virtually odour free



SIMPSON
Strong-Tie

LEBIC



B.S.N. the professional fastener

1

VESF

CONSTRUCTION:



Threaded Stud LMAS
with hex nut and washer

VESF 300 ml, 345 ml and 410 ml cartridges

Applicator Guns
(see pg. 58)

MATERIAL:

- VESF: Vinylester resin (styrene-free), hardener and inorganic agents
- LMAS: Grade 5.8 carbon steel, zinc plated and blue passivated
- LMAS: A4-70 stainless steel

BASE MATERIAL:

- Non-cracked concrete C20/25 to C50/60
- Also suitable for other base materials (on-site testing recommended)

APPROVAL:

- ETA-09/0153: M8 – M24, carbon steel, zinc plated
- ETA pending: M8 – M24, A4 stainless steel

LOAD RANGE:

Tension: $N_{perm} = 5.2 - 46.9$ [kN]
Shear: $V_{perm} = 5.1 - 56.8$ [kN]

STORAGE OF VESF CARTRIDGES:

Dry, out of direct sunlight at a temperature between +5°C and +25°C

TEMPERATURE RANGE:

Maximum long-term service temperature = +24°C; Maximum short-term service temperature = +40°C

PRODUCT RANGE:

- VESF cartridges: 300ml, 345 ml and 410ml
- LMAS threaded studs: M8 – M24, carbon steel, zinc plated and blue passivated / A4 stainless steel

APPLICATIONS:

- Steel and metal construction
- Racking systems
- Railings
- Awnings
- Machines

BENEFITS:

- Causes no expansion pressure
- Reduced edge distances and spacings
- High capacity in non-cracked concrete
- Installation into damp holes permitted
- No special setting tool required for threaded stud
- Completely seals drilled hole

PRODUCT DESCRIPTION:

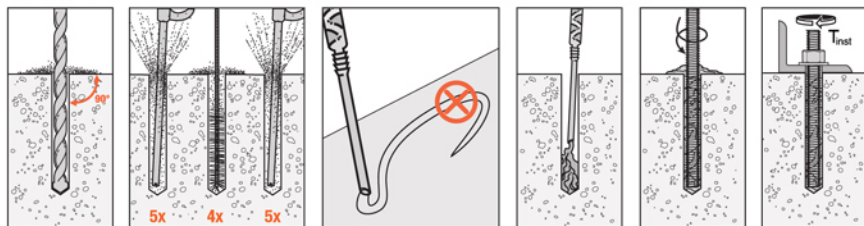
- The VESF Chemical Anchor system consists of a threaded stud and a 2-component chemical-filled cartridge system.
- The mortar is injected into the drilled hole with an applicator gun. A static mixing nozzle is used to ensure that the chemical components are properly mixed. A chemical reaction ensues and the mortar cures over a time period depending on the base material temperature.
- Immediately after injection, a threaded stud is inserted into the hole.
- After the adhesive mortar has cured, the anchor can be fully loaded. The completed chemical reaction creates a durable expansion pressure free bond between the anchor stud, the reacted resin, and the concrete.
- The bond strength between the cured chemical and the drilled hole is dependent on the thorough cleaning of the drilled hole. Follow the installation instructions carefully.

SHELF LIFE:

12 months after manufacture when stored according to the above recommendations. The manufacturing date is printed on the cartridge.

INSTALLATION:

Pre-fix installation shown



Drill hole
Clean out hole using a wire brush and blow out pump (blow out 5x, brush 4x and blow out 5x)
Dispense mortar to side until properly mixed (uniform colour)
Inject mortar into the hole
Insert threaded stud with a twisting action and observe the specified cure time
Attach fixture and apply the recommended fastening torque with a calibrated torque wrench



B.S.N. - the professional fastener

Carbon steel, zinc plated

LMAS



Threaded stud with hex nut and washer
Material: Grade 5.8, carbon steel, zinc plated and blue passivated
Approval: ETA-09/0153

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight	Box Quantity
			$d_o \times h_i$	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]
LMAS M8 x 110	LMAS0810080020	M8	10 x 80	20	9	80	110	4.0	20
LMAS M10 x 130	LMAS1012090025	M10	12 x 90	25	12	90	130	9.0	10
LMAS M10 x 165	LMAS1012090060	M10	12 x 90	60	12	90	165	10.6	10
LMAS M12 x 150	LMAS1214100035	M12	14 x 100	35	14	100	150	13.6	10
LMAS M12 x 185	LMAS1214100070	M12	14 x 100	70	14	100	185	16.8	10
LMAS M16 x 170	LMAS1618130020	M16	18 x 130	20	18	130	170	26.8	10
LMAS M16 x 200	LMAS1618130050	M16	18 x 130	50	18	130	200	31.5	10
LMAS M20 x 245	LMAS2025170050	M20	24 x 170	50	22	170	245	55.8	6
LMAS M24 x 310	LMAS2428210070	M24	28 x 210	70	26	210	310	101.8	6

Custom lengths and grades available on request.

A4 stainless steel

LMAS A4



Threaded stud with hex nut and washer
Material: A4-70 stainless steel
Approval: ETA (pending)

Type	Order Code	Thread Size	Ø x Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Total Length	Weight	Box Quantity
			$d_o \times h_i$	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg/100 pcs]
LMAS M8 x 110 A4	LMAS0810080020A4	M8	10 x 80	20	9	80	110	4.0	20
LMAS M10 x 130 A4	LMAS1012090025A4	M10	12 x 90	25	12	90	130	9.0	10
LMAS M10 x 165 A4	LMAS1012090060A4	M10	12 x 90	60	12	90	165	10.6	10
LMAS M12 x 150 A4	LMAS1214100035A4	M12	14 x 100	35	14	100	150	13.6	10
LMAS M12 x 185 A4	LMAS1214100070A4	M12	14 x 100	70	14	100	185	16.8	10
LMAS M16 x 170 A4	LMAS1618130020A4	M16	18 x 130	20	18	130	170	26.8	10
LMAS M16 x 200 A4	LMAS1618130050A4	M16	18 x 130	50	18	130	200	31.5	10
LMAS M20 x 245 A4	LMAS2025170050A4	M20	24 x 170	50	22	170	245	55.8	6
LMAS M24 x 310 A4	LMAS2428210070A4	M24	28 x 210	70	26	210	310	101.8	6

Custom lengths and grades available on request.

VESF Injection mortar-cartridges

Contains a styrene-free vinyl ester resin, hardener and inorganic agents



300 ml Cartridge (silicone tool)



345 ml Side-by-side cartridge



410 ml Coaxial cartridge

Type	Order Code	Content	Weight	Box Quantity*
		[ml]	[kg/12 pcs]	[pcs]
VESF 300	VESF300	300	7.2	15
VESF 345	VESF345	345	8.4	12
VESF 410	VESF410	410	10.8	12

*Each cartridge includes 1 mixing nozzle.

Mixing Nozzle



Type	Order Code	Weight
		[kg/100 pcs]
Mixing Nozzle	MD	1

Carbon steel, zinc plated / A4 stainless steel

Permissible loads for single anchors with no influencing edge distances or spacings. Loads are calculated using partial safety factors from ETAG 001 and the characteristic anchor and installation data from this catalogue.

Design calculations shall follow the requirements of ETA-approvals ETA-09/0153 (A4 pending).

Material: Carbon steel, Grade 5.8, zinc plated and blue passivated; A4-70 stainless steel / VESF (Vinylester resin, styrene-free)

Thread size	M8	M10	M12	M16	M20	M24
Effective embedment depth (h_{ef}) [mm]	80	90	100	130	170	210
Type LMAS...	M8 x ...	M10 x ...	M12 x ...	M16 x ...	M20 x ...	M24 x ...

Permissible tension loads ¹⁾				Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4
N_{perm}	Non-cracked concrete ³⁾	C20/25	[kN]	5.3	5.3	8.3	8.3	13.2	13.2	24.8	24.8	26.9	26.9	39.7	39.7
		C30/37	[kN]	5.7	5.3	8.9	8.3	14.3	13.2	26.8	24.8	29.1	26.9	42.9	39.7
		C40/50	[kN]	6.1	5.3	9.5	8.3	15.2	13.2	28.5	24.8	31.0	26.9	45.6	39.7
		C50/60	[kN]	6.2	5.3	9.8	8.3	15.6	13.2	29.3	24.8	31.8	26.9	46.8	39.7

Permissible shear loads ^{1) 2)}				Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4
V_{perm}	Non-cracked concrete ³⁾	C20/25	[kN]	5.1	5.6	8.6	9.2	12.6	13.3	23.4	25.2	36.6	39.4	52.6	56.8
		C30/37	[kN]	5.1	5.6	8.6	9.2	12.6	13.3	23.4	25.2	36.6	39.4	52.6	56.8
		C40/50	[kN]	5.1	5.6	8.6	9.2	12.6	13.3	23.4	25.2	36.6	39.4	52.6	56.8
		C50/60	[kN]	5.1	5.6	8.6	9.2	12.6	13.3	23.4	25.2	36.6	39.4	52.6	56.8

Permissible bending moments ¹⁾				Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4	Steel	A4
M_{perm}	[Nm]	10.9	11.9	22.3	23.8	38.9	42.1	98.9	106.7	192.6	207.9	333.7	359.9		

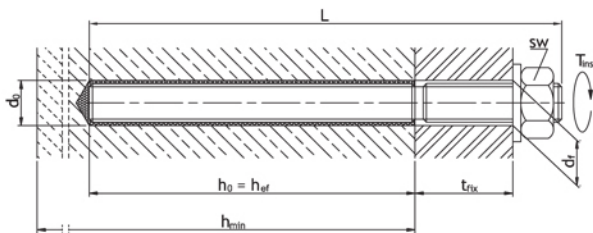
Spacings, edge distances and member thicknesses

Effective embedment depth	h_{ef}	[mm]	80	90	100	130	170	210
Characteristic spacing ⁴⁾	$s_{cr,N}$	[mm]	160	180	200	260	340	420
Minimum spacing	s_{min}	[mm]	40	45	50	75	85	105
Characteristic edge distance ⁴⁾	$c_{cr,N}$	[mm]	80	90	100	130	170	210
Minimum edge distance	c_{min}	[mm]	40	45	50	75	85	105
Minimum member thickness	h_{min}	[mm]	160	180	200	260	340	420

Installation data

Drill hole diameter	d_0	[mm]	10	12	14	18	24	28
Drill hole depth <td>h_1</td> <td>[mm]</td> <td>80</td> <td>90</td> <td>100</td> <td>130</td> <td>170</td> <td>210</td>	h_1	[mm]	80	90	100	130	170	210
Clearance hole in the fixture <td>d_f</td> <td>[mm]</td> <td>9</td> <td>12</td> <td>14</td> <td>18</td> <td>22</td> <td>26</td>	d_f	[mm]	9	12	14	18	22	26
Width across flats <td>sw</td> <td>[mm]</td> <td>13</td> <td>17</td> <td>19</td> <td>24</td> <td>30</td> <td>36</td>	sw	[mm]	13	17	19	24	30	36
Installation torque <td>T_{inst}</td> <td>[Nm]</td> <td>15</td> <td>30</td> <td>50</td> <td>100</td> <td>160</td> <td>240</td>	T_{inst}	[Nm]	15	30	50	100	160	240

Installed anchor



Curing schedule

Temperature [°C]	-5 to 0	1 to 5	6 to 10	11 to 15	16 to 20	21 to 25
Gel time [min]	25	12	9	6	5	3
Curing time [min]	150	80	50	45	35	30

1) The permissible loads have been calculated using the partial safety factors for resistances stated in the ETA-approval and a partial safety factor for actions of $\gamma_k = 1.4$. The permissible loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing $s \geq 15$ cm and reinforced concrete with a rebar spacing $s \geq 10$ cm if the rebar is 10 mm or smaller.

2) The permissible shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge ($c \leq 10 h_{ef}$ or 60 d) concrete edge failure must be checked per ETAG 001, Annex C, design method A.

3) Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_k + \sigma_{ra} \leq 0$. In the absence of detailed verification $\sigma_{ra} = 3$ N/mm² can be assumed (σ_k equals the tensile stress within the concrete as a result of external loads, forces on anchors included).

4) If spacings or edge distances become smaller than the characteristic values (i.e. $s \leq s_{cr,N}$ and/or $c \leq c_{cr,N}$) a calculation per ETAG 001, Annex C, design method A must be performed. For details, see ETA 09/0153 (A4 pending).

Complete your designs more easily by downloading our LIEBIG anchor software from our home-page: www.simpson-liebig.com