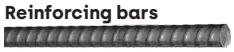
ResiFIX Systems in Comparison

	ResiFIX VYSF				ResiFIX VY ECO SF	ResiFIX PYSF				ResiFIX Pure Epoxy Plus EPP SF	ResiFIX Pure Epoxy EP SF
	300	345	410	300	300	165	300	345	410	585	585
											
Content [ml]	280	345	410	300	300	165	300	345	410	585	585
Nozzles included 	2	2	1	2	2	2	1	1	1	1	1
Types	Standard			Cool	Standard	Standard				Standard	
Shelf life*	18 months			12 mon.	12 months	12 months		18 months		24 months	
A4 STAINLESS STEEL **Threaded rod** 	steel 4.6, 5.8, 8.8 stainless steel				steel 4.6, 5.8, 8.8 stainless steel	steel 4.6, 5.8, 8.8 stainless steel				steel 4.6, 5.8, 8.8 stainless steel	
Reinforcing bars 	✓				✓ (only Option 7)	✗				✓	
Option 1 **Approval for cracked concrete (Option 1)**	ETA CE M8 - M30, Ø8 -Ø32				ETA CE M8 - M16	✗				ETA CE M8 - M30, Ø8 -Ø32	
Option 7 **Approval for non-cracked concrete (Option 7)**	ETA CE M8 - M30, Ø8 - Ø32				ETA CE M8 - M24, Ø8 -Ø25	ETA CE M8 – M16				ETA CE M8 - M30, Ø8 - Ø32	
Rebar **Approval for post-installed rebar connections**	ETA CE Ø8 -Ø32				✗	✗				ETA CE Ø8 -Ø40	ETA CE Ø8 -Ø40
Approval for diamond drilled holes	✗				✗	✗				✓	✓ only post-installed rebar connection
100 YEARS **Approval for 100 years**	50 years				50 years	50 years				✓	50 years
Masonry **Approval for masonry**	ETA CE M8 - M16				ETA CE M8 - M16	ETA CE M8 – M16				✗	
R 120 **Fire test certification (R 120)**	R 120				✗	✗				R 120	✗
FIXING seismic **Usage under seismic action**	FIXING seismic C1 C1				FIXING seismic C1/C2 C1/C2	✗				FIXING seismic C1/C2 C1/C2	✗
LEED tested; EMISSIONS DANS L'AIR INTÉRIEUR A+ **Low emissions**	✓				✓	✓				✓	
STYRENE FREE **Styrene free**	✓				✓	✓				✓	
Performance in non-cracked concrete C20/25 (M10-90, 5.8)	1350 Kg				900 Kg	900 Kg				1380 Kg	1380 Kg
Performance in hollow brick HLz 12 (M10-130)	140 Kg				100 Kg	100 Kg				✗	
Wet drill holes	✓				✓	✓				✓	
Waterfilled drill holes **Waterfilled drill holes**	✓				✓	✓				✓	
Suitable for contact with drinking water	✓				✗	✗				✓	✗
Min. temperature of base material	≥ -10°C			≥ -20°C	≥ -5°C	≥ -5°C				≥ 0°C	≥ +5°C
Temperature range after complete curing	-40°C to +120°C				-40°C to +80°C	-40°C to +80°C				-40°C to +72°C	
Chemical resistance	very high				high	high				excellent	
Odour	marginal				medium	medium				marginal	

Risk of staining in natural stone! Before use, we recommend a 5-days test (there is no risk with Pure Epoxy BRSF).
*All cartridges can be used until the expiration date by resealing with the cap or by replacing the static mixer.

Fastening injection system ResiFIX

Advantages

Injection mortar ResiFIX VYSF (styrene free)

Injection mortar ResiFIX VY ECO SF (styrene free)

Injection mortar ResiFIX PYSF (styrene free)

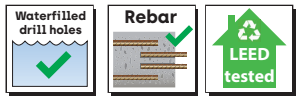
Injection mortar ResiFIX Pure Epoxy EPP (styrene free)

Injection mortar ResiFIX Pure Epoxy EP (styrene free)

Approvals and certificates

European Technical Assessment
Option 1 for cracked concrete

European Technical Assessment
for masonry



Suitable building materials

Very suitable

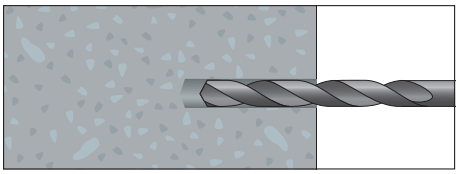
- Concrete
- Solid brick
- Solid sand-lime brick
- Lightweight solid concrete blocks
- Aerated concrete
- Hollow brick
- Hollow sand-lime brick
- Lightweight hollow concrete blocks
- Natural stone (risk of discolouration)

Typical applications

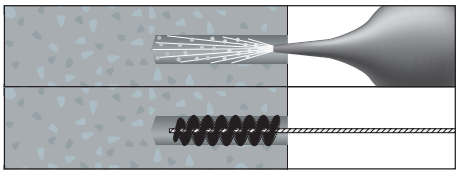
- Steel constructions
- Cantilevers
- Facade substuctures
- Machines
- Guard rails
- Canopies
- Distance mountings
- Door and window frames
- Stairways
- Wood constructions
- Cable trays
- Pipe installations

Fastening injection system ResiFIX

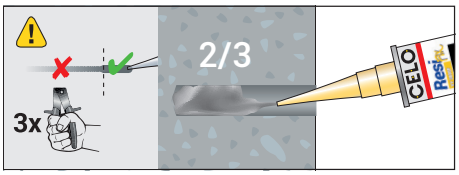
Mounting in concrete and solid brick



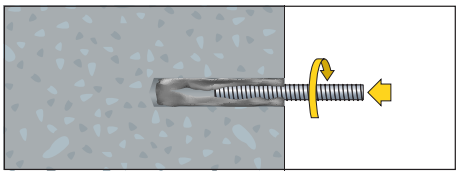
1. Drill hole



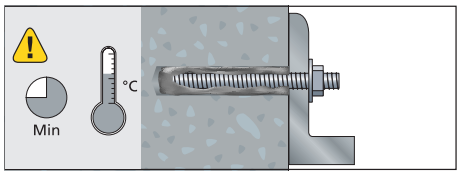
2. Clean hole (blow 4x, brush 4x)



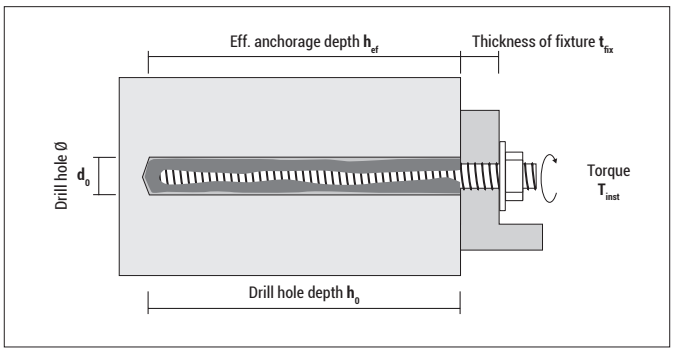
3. Discard first 10 cm. Inject necessary amount of chemical mortar, (min. 2/3 of hole)



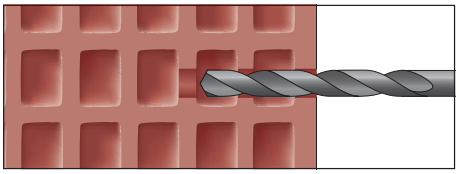
4. Push the anchor rod into the hole while turning



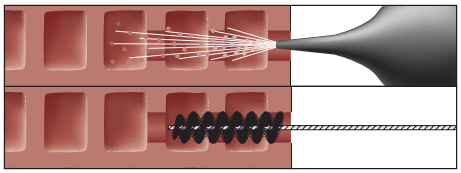
5. Respect curing time before applying any load or torque



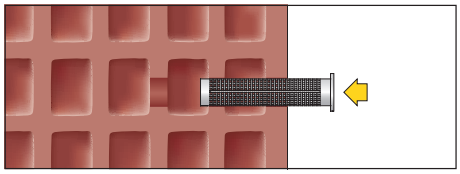
Mounting in hollow brick



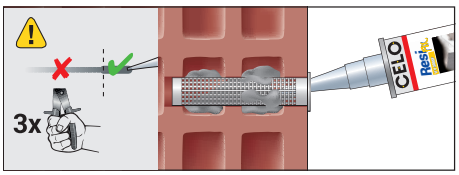
1. Drill hole



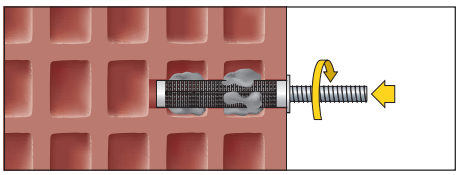
2. Clean hole (blow 2x, brush 2x)



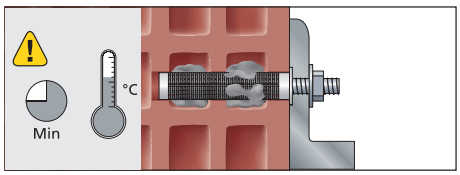
3. Insert anchor sleeve



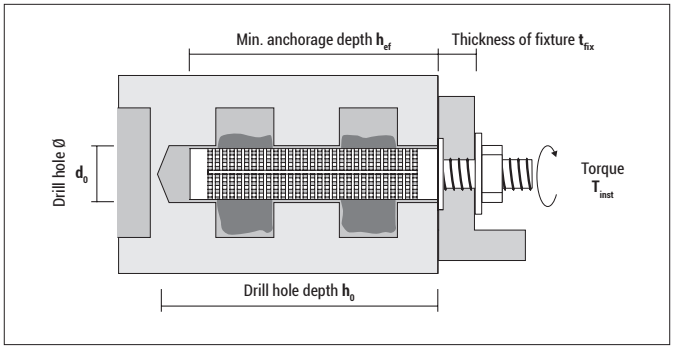
4. Discard first 10 cm. Inject necessary amount of chemical mortar (fill sleeve completely)



5. Push the anchor rod into the hole while turning

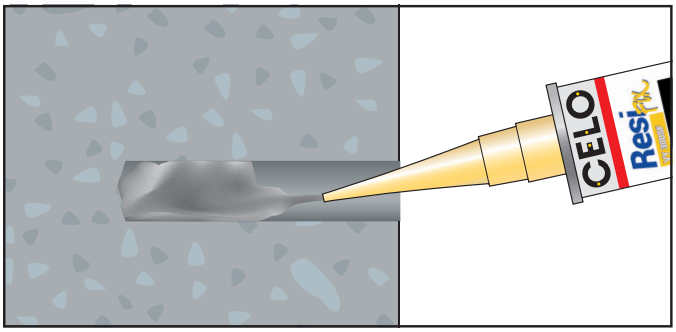


6. Respect curing time before applying any load or torque



Fastening injection system ResiFIX

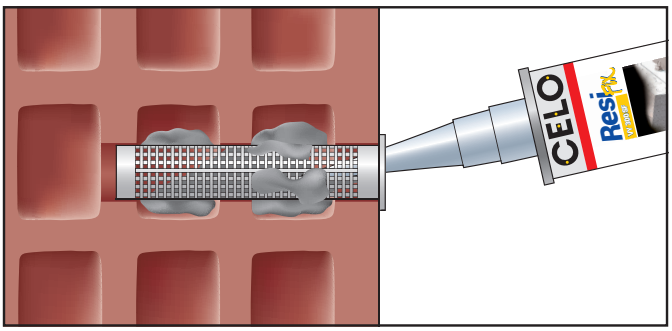
Estimation of needed volume (all types)



Consumption in solid materials Calculation method: Complete filling of the drill hole*

Anchor stud RAST or VA AST	Drill hole			Number of fixings per ResiFIX cartridge				
	d_0 [mm]	$h_{ef,\,Stand}$ [1] [mm]	Volume [cm^3=ml]	165 ml [fixings]	280 ml [fixings]	300 ml [fixings]	345 ml [fixings]	410 ml [fixings]
M8	10	80	6,3	26,3	44,6	47,8	54,9	65,3
M10	12	90	10,2	16,2	27,5	29,5	33,9	40,3
M12	14	110	17,0	9,7	16,5	17,7	20,4	24,2
M16	18	125	31,8	5,2	8,8	9,4	10,9	12,9
M20	24	170	76,9	2,1	3,6	3,9	4,5	5,3
M24	28	210	129,2	1,3	2,2	2,3	2,7	3,2
M30	35	280	269,3	0,6	1,0	1,1	1,3	1,5

* According to the ETA assessment only 2/3 of the drill hole has to be filled with mortar. The experience shows that the user uses more, so that the filling of the complete drill hole is calculated here.



Consumption in hollow bricks with sleeve Calculation method: Complete filling of the sleeve + 15%

Sleeve	Anchor stud RAST or VA AST	Drill hole			Number of fixings per ResiFIX cartridge				
		d_0 [mm]	h_0 [mm]	Volume [cm^3=ml]	165 ml [fixings]	280 ml [fixings]	300 ml [fixings]	345 ml [fixings]	410 ml [fixings]
SH 12/80	M6 / M8	12	85	9,1	15,9	26,9	28,8	33,2	39,4
SH 16/85	M8 / M10	16	90	17,1	8,4	14,3	15,3	17,6	20,9
SH 16/130	M8 / M10	16	135	26,1	5,5	9,3	10,0	11,5	13,6
SH 20/85	M12 / M16	20	90	26,7	5,4	9,1	9,8	11,2	13,4
SH 20/130	M12 / M16	20	135	40,8	3,5	6,0	6,4	7,3	8,7
SH 20/200	M12 / M16	20	205	62,8	2,3	3,9	4,2	4,8	5,7

Fastening injection system ResiFIX VYSF

Approvals and certificates

European Technical Assessment Option 1 for cracked concrete (M8 – M30, Ø8 – Ø32)

European Technical Assessment for masonry (M8 - M16)

European Technical Assessment for post-installed rebar connections (Ø8 – Ø32)

MADE IN GERMANY

Approved for anchor rods and reinforced steel bars
- **Various applications**

Class A+: Lowest emissions of critical substances in closed spaces
- **Harmless to health after curing**

Sustainability certification LEED
- **Environmentally friendly, low-pollutant, low-emission and sustainable construction product**

Usage under seismic conditions
- **Tested for use in areas with high risk of earthquakes**

Option 1
(M8 – M30, Ø8 – Ø32)

European Technical Assessment Option 1 for cracked and non-cracked concrete (M8 - M30)
- **For a wide range of safety critical applications**

Apart from the 410 ml cartridge, two mixing nozzles are included
- **You can continue working immediately after an interruption**

1350 kg
M10- 90mm
C20/25

Very high load values
- **Heavy-duty usage**

Waterfilled drill holes

Usage also in water-filled drill holes and suitable for contact with drinking water
- **Extended range of applications**

R 120

Fire resistance test R120
- **Fulfills fire protection requirements**

Masonry
(M8 - M16)

European Technical Assessment for masonry (M8 - M16)
- **For more application flexibility**

STYRENE FREE

Styrene free
- **Reduced odour exposure**

Fastening injection system ResiFIX VYSF


VY 300 SF


VY 345 SF


VY 410 SF

Vinylester VYSF (styrene free)

Type	Art-No	Content [ml]	Mixings nozzles included [pcs]	Shelf life [months]	ETA	€ / pc	[pcs]
VY 300 SF	300VSF	280	2	18	●		12
VY 345 SF	345VSF	345	2	18	●		12
VY 410 SF	410VYSF	410	1	18	●		12

Vinylester VYSF Cool (styrene free)

for -20°C to +10°C

Type	Art-No	Content [ml]	Mixings nozzles included [pcs]	Shelf life [months]	ETA	€ / pc	[pcs]
VY 300 SF Cool	300VCSF	300	2	12	●		12

Seasonal article


30 x 40 x 23 cm

Universal box with ResiFIX VY 300 SF, VY 345 SF

Type	Art-No	Content [cartridges]	Mixings nozzles included [pcs]	Shelf life [months]	ETA	€ / box	[pcs]
VY 300 SF in universal box	SYS300VSF20	20	40	18	●		1
VY 345 SF in universal box	SYS345VSF20	20	40	18	●		1

Curing times ResiFIX Vinylester VYSF

Temperature of building material	[°C]	> -10 [1]	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Max. working time	[min]	90	90	45	25	15	**6**	4	1,5
Min. curing time [2]	[min]	24h	14h	7h	2h	80	**45**	25	15

[1] Cartridge temperature min. 15 °C

[2] Double curing time in wet concrete

Curing times ResiFIX Vinylester VYSF Cool

Temperature of building material	[°C]	> -20 ❄	> -15 ❄	> -10	> -5	> 0	> +5	+10
Max. working time	[min]	75	55	35	20	10	**6**	6
Min. curing time [1]	[min]	24h	16h	10h	5h	2,5h	**80**	60

[1] Double curing time in wet concrete

Fastening injection system ResiFIX VYSF

Fastening in concrete (Standard and Cool)

Permissible loads F_{per} in [kN] in non-cracked concrete C20/25 (option 7) and cracked concrete C20/25 (option 1) without influence of edge distances and spacing as well as installation parameters and unit dimensions. The permissible loads F_{per} include the partial safety factors for the resistance from the ETA and a partial safety factor for the actions of γF = 1.4. Design method according TR 055. The ETA assessment must be observed in the design.

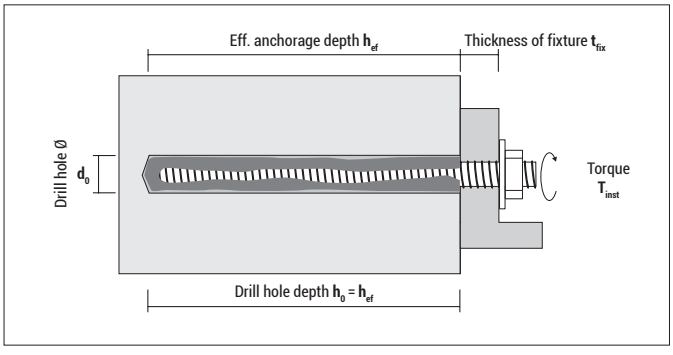
Anchor studs RESI AST, VA AST			M8	M10	M12	M16	M20	M24	M 27	M30
Drill hole Ø	d_0	[mm]	10	12	14	18	24	28	30	35
Anchorage depth	$h_{ef,min}$ / $h_{ef,stand}$ / $h_{ef,max}$	[mm]	60 / 80 / 160	60 / 90 / 200	70 / 110 / 240	80 / 125 / 320	90 / 170 / 400	96 / 210 / 480	108 / 240 / 540	120 / 280 / 600
Permissible tension load [1) 2)] (24 °C / 40 °C) [3)] in non-cracked concrete (dry or wet)										
Zinc plated 5.8	N_{per}	[kN]	7,2 / 8,7 / 8,7	9,0 / 13,5 / 13,8	11,7 / 19,7 / 20,0	14,3 / 28,0 / 37,3	17,1 / 44,4 / 58,3	18,8 / 61,0 / 83,9	23,1 / 74,5 / 109,4	26,3 / 93,9 / 133,5
Stainless steel A4	N_{per}	[kN]	7,2 / 9,6 / 9,8	9,0 / 13,5 / 15,5	11,7 / 19,7 / 22,5	14,3 / 28,0 / 41,9	17,1 / 44,4 / 65,5	18,8 / 61,0 / 94,3	23,1 / 57,3 / 57,4	26,3 / 70,0 / 70,0
Permissible tension load [1) 2)] (24 °C / 40 °C) [3)] in cracked concrete (dry or wet)										
Zinc plated 5.8	N_{per}	[kN]	2,9 / 3,8 / 7,7	3,7 / 5,6 / 12,5	5,8 / 9,1 / 19,7	8,8 / 13,7 / 35,1	12,2 / 23,3 / 54,9	13,4 / 34,6 / 79,0	16,5 / 52,5 / 109,4	18,8 / 66,9 / 133,5
Stainless steel A4	N_{per}	[kN]	2,9 / 3,8 / 7,7	3,7 / 5,6 / 12,5	5,8 / 9,1 / 19,7	8,8 / 13,7 / 35,1	12,2 / 23,3 / 54,9	13,4 / 34,6 / 79,0	16,5 / 52,5 / 57,4	18,8 / 66,9 / 70,0
Permissible tension load [1) 2)] (50 °C / 80 °C) [3)] in non-cracked concrete (dry or wet)										
Zinc plated 5.8	N_{per}	[kN]	5,4 / 7,2 / 8,7	6,7 / 10,1 / 13,8	9,4 / 14,8 / 20,0	14,3 / 22,4 / 37,3	17,1 / 38,1 / 58,3	18,8 / 53,4 / 83,9	23,1 / 60,6 / 109,4	26,3 / 68,1 / 133,5
Stainless steel A4	N_{per}	[kN]	5,4 / 7,2 / 9,8	6,7 / 10,1 / 15,5	9,4 / 14,8 / 22,5	14,3 / 22,4 / 41,9	17,1 / 38,1 / 65,5	18,8 / 53,4 / 94,3	23,1 / 57,4 / 57,4	26,3 / 68,1 / 70,0
Permissible tension load [1) 2)] (50 °C / 80 °C) [3)] in cracked concrete (dry or wet)										
Zinc plated 5.8	N_{per}	[kN]	1,8 / 2,4 / 4,8	2,6 / 3,9 / 8,7	4,2 / 6,6 / 14,4	6,4 / 10,0 / 25,5	9,0 / 17,0 / 39,9	11,5 / 25,1 / 57,4	16,5 / 36,4 / 78,8	18,8 / 47,1 / 101,0
Stainless steel A4	N_{per}	[kN]	1,8 / 2,4 / 4,8	2,6 / 3,9 / 8,7	4,2 / 6,6 / 14,4	6,4 / 10,0 / 25,5	9,0 / 17,0 / 39,9	11,5 / 25,1 / 57,4	16,5 / 36,4 / 57,4	18,8 / 47,1 / 70,0
Permissible shear load [1)] in non-cracked concrete										
Zinc plated 5.8	V_{per}	[kN]	5,2	8,3	12,0	22,4	35,0	45,2 / 50,4 / 50,4	55,5 / 65,6 / 65,6	63,2 / 80,1 / 80,1
Stainless steel A4	V_{per}	[kN]	5,9	9,3	13,5	25,1	39,2	45,2 / 56,5 / 56,5	34,5 / 34,5 / 34,5	42,1 / 42,1 / 42,1
Permissible shear load [1)] in cracked concrete										
Zinc plated 5.8	V_{per}	[kN]	5,2 / 5,2 / 5,2	8,3	12,0	21,1 / 22,4 / 22,4	29,3 / 35,0 / 35,0	32,2 / 50,4 / 50,4	39,6 / 65,6 / 65,6	45,1 / 80,1 / 80,1
Stainless steel A4	V_{per}	[kN]	5,7 / 5,9 / 5,9	9,0 / 9,3 / 9,3	13,5	21,1 / 25,1 /25,1	29,3 / 39,2 / 39,2	32,2 / 56,5 / 56,5	34,5 / 34,5 / 34,5	42,1 / 42,1 / 42,1
Permissible bending moment (Zinc plated 5.8)	M_{per}	[Nm]	10,7	21,4	37,4	94,9	185,2	320,0	476,2	642,1
Permissible bending moment (Stainless steel A4)	M_{per}	[Nm]	12,0	24,0	41,9	106,4	207,8	359,0	250,1	337,2
Spacing and edge distance										
Spacing	$s_{cr,N}$	[mm]	180 / 240 / 480	180 / 270 / 600	210 / 330 / 720	240 / 375 / 960	270 / 510 / 1200	288 / 630 / 1440	324 / 720 / 1620	360 / 840 / 1800
Edge distance	$c_{cr,N}$	[mm]	90 / 120 / 240	90 / 135 / 300	105 / 165 / 360	120 / 188 / 480	135 / 255 / 600	144 / 315 / 720	162 / 360 / 810	180 / 420 / 900
Minimum spacing	s_{min}	[mm]	40	50	60	80	100	120	135	150
Minimum edge distance	c_{min}	[mm]	40	50	60	80	100	120	135	150
Min. thickness of structural part	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_0$				
Max. installation torque	T_{inst} ≤	[Nm]	10	20	40	80	120	160	180	200

[1)] Values are valid for $h_{ef,min}$ / $h_{ef,stand}$ / $h_{ef,max}$

[2)] For higher concrete strengths up to C50/60 the values increase by max. 10%.

[3)] Max. long term temperature / max. short term temperature after installation. For temperature range 72°C/120°C please see ETA assessment

If underrun the char. spacing or edge distance (C_{cr} or S_{cr}) the loads must be reduced. h_{min}, S_{min} and C_{min} must be observed.



Fastening injection system ResiFIX VYSF

Fastening in masonry (Solid and hollow brick) Standard and Cool

Permissible loads in [kN] and installation parameters - selection; for additional brick types and application conditions please see ETA assessment.

Suitable building materials		Density ρ [kg/dm³]	Compressive strength f_b [N/mm²]	Anchor studs RESI AST, VA AST Size	Sleeve Size	Min. Anchorage depth h_{ef} [mm]	Use category dry / dry 24°C/40°C [1] Tension load N_{per} [kN]	Use category dry / dry 24°C/40°C [1] Shear load V_{per} [kN]
Solid sand-lime brick KS (NF)		≥ 2,0	≥ 28	M8	without / SH 12-80	80 / 80	2,00 / 2,00	2,00 / 2,00
				M10	without / SH 16-85	90 / 85	2,00 / 2,00	2,00 / 2,00
				M12	without / SH 20-85	100 / 85	2,00 / 2,00	2,00 / 2,00
				M16	without / SH 20-85	100 / 85	2,00 / 2,00	2,00 / 2,00
Solid brick Mz (DF)		≥ 2,0	≥ 20	M8	without / SH 12-80	80 / 80	2,00 / 2,00	2,29 / 2,29
				M10	without / SH 16-85	90 / 85	2,00 / 2,00	2,29 / 2,29
				M12	without / SH 20-85	100 / 85	2,00 / 2,00	2,29 / 2,29
				M16	without / SH 20-85	100 / 85	2,29 / 2,29	3,43 / 3,43
Aerated concrete AAC2		≥ 0,35	≥ 2	M8	without	80	0,43 / 1,07	0,54 / 1,61
				M10	without	90	0,43 / 1,07	0,89 / 2,68
Aerated concrete AAC4		≥ 0,50	≥ 4	M12	without	100	0,71 / 1,79	0,71 / 2,68
				M16	without	100	0,71 / 1,79	0,71 / 2,68
Hollow sand-lime brick KSL (KSL 3DF)		≥ 1,4	≥ 12	M8	SH 16-85	85	0,64	1,53
				M10	SH 16-85	85	0,64	1,53
				M10	SH 16-130	130	0,64	1,53
				M12	SH 20-85	85	1,65	1,53
				M16	SH 20-85	85	1,65	1,53
Hollow brick HLz (10DF)		≥ 1,25	≥ 12	M8	SH 12-80	80	0,55	1,77
				M10	SH 16-85	85	0,55	1,77
				M10	SH 16-130	130	0,55	1,77
				M12	SH 20-85	85	1,11	1,77
				M16	SH 20-85	85	1,11	2,55

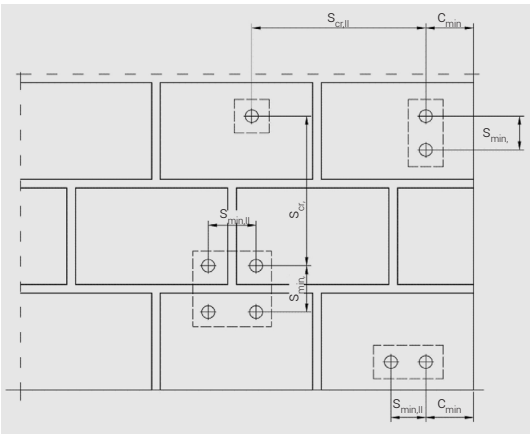
N_{per}, V_{per}: Permissible loads incl. safety factors (γ_M and γ_F = 1,4), without influence of spacing and edge distance.
Drilling method: KS and Mz: hammer drilling; Aerated concrete, KSL and HLz: rotary drilling
[1] Max. long-term temperature / max. short-term temperature after installation.

Spacing and edge distance

Suitable building materials	Anchor stud	Sleeve	Char. Edge distance c_{cr} [mm]	Min. Edge distance c_{min} [mm]	Char. Spacing parallel to the bearing joint $s_{cr,II}$ [mm]	Char. Spacing perpendicular to the bearing joint $s_{cr,\perp}$ [mm]	Min. Spacing s_{min} [mm]	Max. Torque T_{inst} [Nm]
Solid sand-lime brick KS (NF)	M8	without	150	60	240	150	75	10
	M10	without	150	60	240	150	75	10
	M12	without	150	60	240	150	75	15
	M16	without	150	60	240	150	75	15
Solid brick Mz (DF)	M8	without	150	60	240	130	65	10
	M10	without	150	60	240	130	65	10
	M12	without	150	60	240	130	65	10
	M16	without	150	60	240	130	65	10
Aerated concrete AAC6	M8	without	150	50*	300	250	50	5
	M10	without	150	50*	300	250	50	5
	M12	without	150	50*	300	250	50	10
	M16	without	150	50*	300	250	50	16
Hollow sand-lime brick KSL (KSL 3DF)	M8	SH 12-80	120	60	240	120	120	5
	M10	SH 16-85	120	60	240	120	120	5
	M10	SH 16-130	120	60	240	120	120	5
	M12,M16	SH 20-85	120	60	240	120	120	8
Hollow brick HLz (10DF)	M8	SH 12-80	120	50	300	250	50	5
	M10	SH 16-85	120	50	300	250	50	10
	M10	SH 16-130	120	50	300	250	50	10
	M12,M16	SH 20-85	120	50	300	250	50	10

Permissible bending moment

Steel		Anchor stud M8	M10	M12	M16
Zinc plated 5.8	M_{per} [Nm]	10,9	21,1	37,7	94,4
Stainless steel A4	M_{per} [Nm]	11,9	23,8	42,1	106,7



* Values are valid for pull-out load; for shear load parallel to the free edge: 75 mm, for shear load perpendicular to the free edge: 1,5 x h_{ef}
Group factors for anchor groups under tension, shear load parallel or perpendicular to the free edge: please see ETA assessment