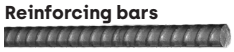
ResiFIX Systems in Comparison

	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)

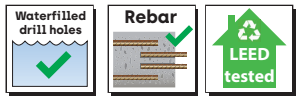
Injection mortar ResiFIX Pure Epoxy EPP (styrene free)

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

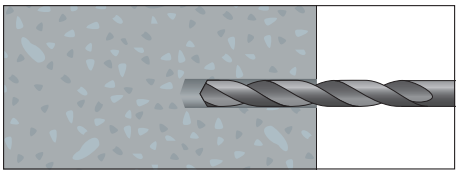
- Concrete
- Solid brick
- Solid sand-lime brick
- Lightweight solid concrete blocks
- Aerated concrete
- Hollow brick
- Hollow sand-lime brick
- Lightweight hollow concrete blocks
- Natural stone (risk of discolouration)

Typical applications

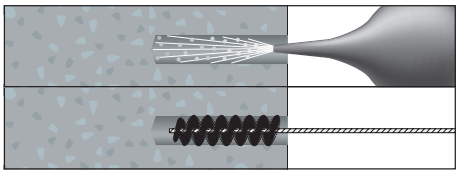
- Steel constructions
- Cantilevers
- Facade substuctures
- Machines
- Guard rails
- Canopies
- Distance mountings
- Door and window frames
- Stairways
- Wood constructions
- Cable trays
- Pipe installations

Fastening injection system ResiFIX

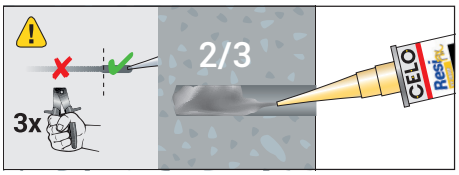
Mounting in concrete and solid brick



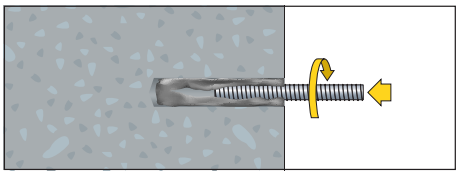
1. Drill hole



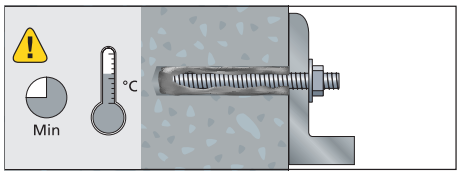
2. Clean hole (blow 4x, brush 4x)



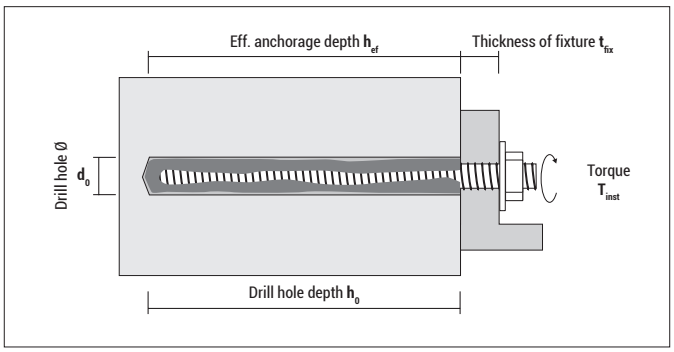
3. Discard first 10 cm. Inject necessary amount of chemical mortar, (min. 2/3 of hole)



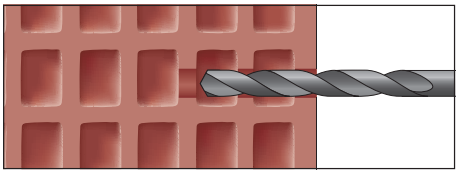
4. Push the anchor rod into the hole while turning



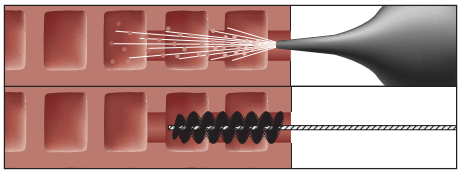
5. Respect curing time before applying any load or torque



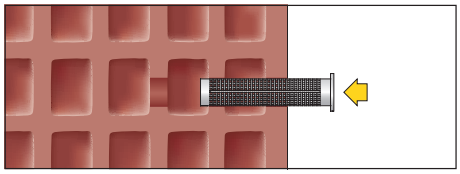
Mounting in hollow brick



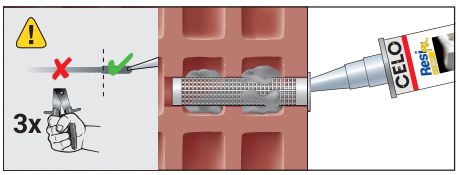
1. Drill hole



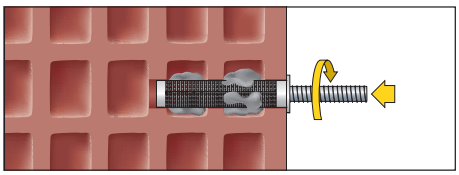
2. Clean hole (blow 2x, brush 2x)



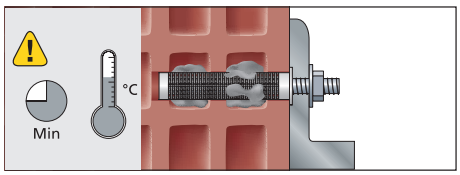
3. Insert anchor sleeve



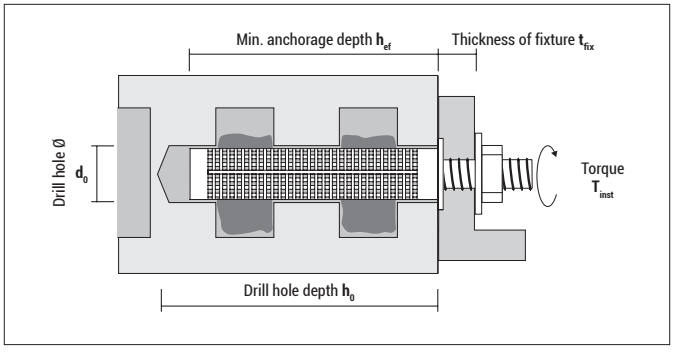
4. Discard first 10 cm. Inject necessary amount of chemical mortar (fill sleeve completely)



5. Push the anchor rod into the hole while turning

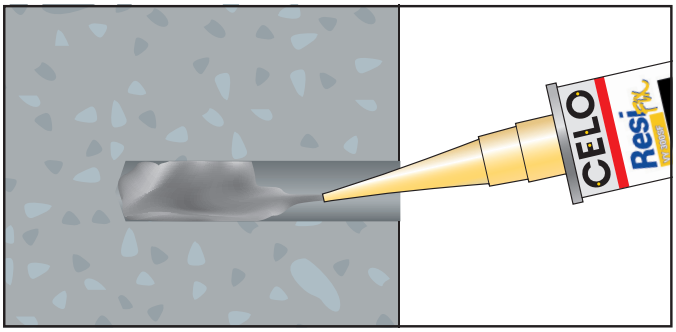


6. Respect curing time before applying any load or torque



Fastening injection system ResiFIX

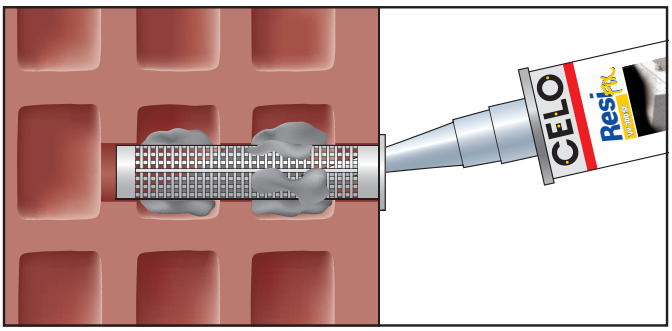
Estimation of needed volume (all types)



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 Pure Epoxy Plus EPP SF

Approvals and certificates

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

European Technical Assessment for post-installed rebar connections (Ø8 - Ø40)

MADE IN GERMANY

100 YEARS

Service life of the product: 100 years based on the ETA
- **Long-lasting and safe**

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**

Diamond drilling is approved
- **Premium product**

One mixing nozzle and one extension tube are always included
- **Deeper drill holes can also be filled**

2.010 Kg M12-110mm 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 report R120
- **Fulfills fire protection requirements**

Rebar (Ø8 – Ø40)

European Technical Assessment post-installed rebar connections (Ø8 - Ø40)
- **For more application flexibility**

STYRENE FREE

Styrene free
- **Reduced odour exposure**

Pure Epoxy EPP SF (styrene free)

Type	Art-No	Content [ml]	Mixings nozzles included [pcs]	Mixings nozzle extension (200mm) incl. [pcs]	Shelf life [months]	ETA	€ / pc	[pcs]
EPP 440 SF *	440EPPSF	385	1	1	24	●		12
EPP 585 SF [1]	585EPPSF	585	1	1	24	●		12
EPP 1400 SF *	1400EPPSF	1400	1	1	24	●		12

* Delivery time on request

[1] Delivery quantity on request

Curing times ResiFIX Pure Epoxy EPP SF

Temperature of building material	[°C]	> -10	> -5	> 0	> +5	> +10	> +15	> +20	> +25	> +35	> +40
Max. working time	[min]	–	–	90	80	60	40	**30**	12	8	8
Min. curing time [1]	[min]	–	–	144h	48h	28h	18h	**12h**	9h	6h	4h

[1] Double curing time in wet concrete

Fastening in concrete

Permissible loads F_{per} in [kN] for a service life of 50 years in non-cracked concrete C20/25 (Option 7) and cracked concrete C20/25 (Option 1) without influence of edge distances and spacing (c ≥ 10 x h_{ef} or 60 d, s ≥ 3 x h_{ef}, h ≥ 2 x h_{ef}) as well as installation parameters and unit dimensions. F_{per} includes the partial safety factors for the resistance from the ETA and a partial safety factor for the actions of γF = 1.4. 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	22	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_{zul}	[kN]	8,7	10,9 / 13,8 / 13,8	13,7 / 20,1 / 20,1	16,8 / 32,7 / 37,3	20,0 / 51,9 / 58,3	22,0 / 71,3 / 83,9	26,3 / 87,1 / 109,4	30,8 / 109,8 / 133,5
Stainless steel A4 [4]	N_{zul}	[kN]	9,8	10,9 / 15,5 / 15,5	13,7 / 22,5 / 22,5	16,8 / 32,7 / 41,9	20,0 / 51,9 / 65,5	22,0 / 71,3 / 94,2	26,3 / 57,4 / 57,4	30,8 / 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_{zul}	[kN]	5,0 / 6,7 / 8,7	6,3 / 9,4 / 13,8	9,6 / 16,8 / 20,1	11,7 / 22,9 / 37,3	14,0 / 36,3 / 58,3	15,4 / 49,9 / 83,9	18,4 / 61,0 / 109,4	21,6 / 76,8 / 133,5
Stainless steel A4 [4]	N_{zul}	[kN]	5,0 / 6,7 / 9,8	6,3 / 9,4 / 15,5	9,6 / 16,8 / 22,5	11,7 / 22,9 / 41,9	14,0 / 36,3 / 65,5	15,4 / 49,9 / 94,2	18,4 / 57,4 / 57,4	21,6 / 70,0 / 70,0
Permissible tension load [1] [2] (50 °C / 72 °C) [3] in non-cracked concrete (dry or wet)										
Zinc plated 5.8	N_{zul}	[kN]	8,7	10,9 / 13,8 / 13,8	13,7 / 20,1 / 20,1	16,8 / 32,7 / 37,3	20,0 / 51,9 / 58,3	22,0 / 71,3 / 83,9	26,3 / 87,1 / 109,4	30,8 / 109,8 / 133,5
Stainless steel A4 [4]	N_{zul}	[kN]	9,8	10,9 / 15,5 / 15,5	13,7 / 22,5 / 22,5	16,8 / 32,7 / 41,9	20,0 / 51,9 / 65,5	22,0 / 71,3 / 94,2	26,3 / 57,4 / 57,4	30,8 / 70,0 / 70,0
Permissible tension load [1] [2] (50 °C / 72 °C) [3] in cracked concrete (dry or wet)										
Zinc plated 5.8	N_{zul}	[kN]	4,3 / 5,7 / 8,7	6,3 / 9,4 / 13,8	8,8 / 13,8 / 20,1	11,7 / 20,9 / 37,3	14,0 / 35,6 / 58,3	15,4 / 49,9 / 83,9	18,4 / 61,0 / 109,4	21,6 / 76,8 / 133,5
Stainless steel A4 [4]	N_{zul}	[kN]	4,3 / 5,7 / 9,8	6,3 / 9,4 / 15,5	8,8 / 13,8 / 22,5	11,7 / 20,9 / 41,9	14,0 / 35,6 / 65,5	15,4 / 49,9 / 94,2	18,4 / 57,4 / 57,4	21,6 / 70,0 / 70,0
Permissible shear load [1] in non-cracked concrete										
Zinc plated 5.8	V_{zul}	[kN]	5,2	8,3	12,0	22,4	35,0	44,1 / 50,4 / 50,4	52,6 / 65,6 / 65,6	61,6 / 80,1 / 80,1
Stainless steel A4 [4]	V_{zul}	[kN]	5,9	9,3	13,5	25,1	39,2	44,1 / 56,5 / 56,5	52,6 / 52,6 / 52,6	61,6 / 64,2 / 64,2
Permissible shear load [1] in cracked concrete										
Zinc plated 5.8	V_{zul}	[kN]	5,2	8,3	12,0	22,4 / 22,4 / 22,4	28,0 / 35,0 / 35,0	30,8 / 50,4 / 50,4	36,8 / 65,6 / 65,6	43,1 / 80,1 / 80,1
Stainless steel A4 [4]	V_{zul}	[kN]	5,9	9,3	13,5	23,5 / 25,1 / 25,1	28,0 / 39,2 / 39,2	30,8 / 56,5 / 56,5	36,8 / 52,6 / 52,6	43,1 / 64,2 / 64,2
Zulässiges Biegemoment Zinc plated 5.8	M_{zul}	[Nm]	10,7	21,4	37,4	94,9	185,2	320,0	476,2	642,1
Zulässiges Biegemoment Stainless steel A4 [4]	M_{zul}	[Nm]	12,0	24,0	41,9	106,4	207,8	359,0	249,7	337,6
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	75	95	155	125	140
Minimum edge distance	c_{min}	[mm]	35	40	45	50	60	65	75	80
Min. thickness of concrete	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_0$				
Max. installation torque	T_{inst} ≤	[Nm]	10	20	40	60	100	170	250	300

Characteristic loads F_{char} in [kN] for a service life of 100 years please refer to the ETA.

The load values apply to hammer-drilled and compressed air-drilled holes (for hollow drill bits and diamond-drilled holes see ETA).

1) Values apply to $h_{ef,min}$/ $h_{ef,stand}$/ $h_{ef,max}$

2) Increase factor for cracked and non-cracked concrete C25/30=1.02, C30/37 = 1.04, C35/45 = 1.07, C40/50 = 1.08, C45/55 = 1.09, C50/60 = 1.10

3) Max. Long-term temperature / max. short-term temperature in installed condition.

4) Stainless steel A4: M8-M24: Class 70, M27 and M30: Class 50

The load capacity must be reduced if the char. edge/spacing distance (C_{cr} or S_{cr}) is not reached. h_{min}, S_{min} and C_{min} must be observed