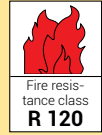


CELO

Made in Germany



Fastening injection system *ResiFIX*

Flexible, strong, reliable







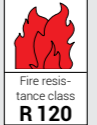




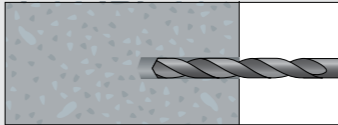
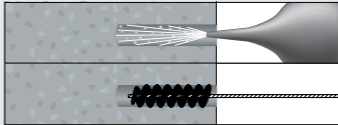
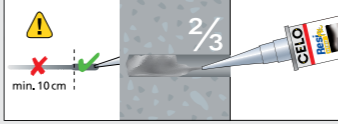
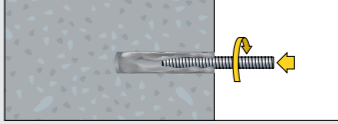
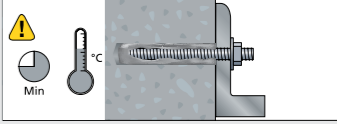
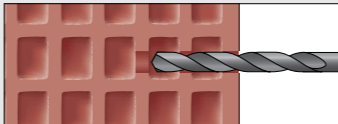
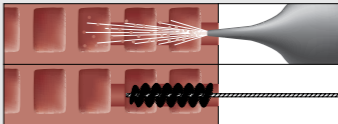
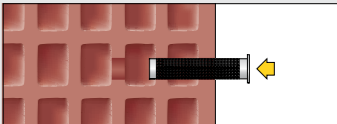
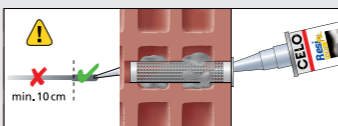
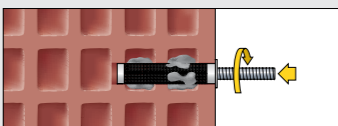
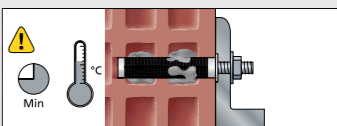


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Profile

Suitable building materials	   
Category	Chemical fastening system for medium and heavy loads
Assortment	Vinylester VYSF styrene free Standard, Cool Epoxyacrylate EYSF styrene free Standard, Express Polyester PYSF styrene free Standard
Cartridge sizes	165 ml to 410 ml
Approvals and certificates	      
Typical applications	<p>Suitable for the expansion pressure-free anchoring of threaded rods and reinforcing steel:</p> <ul style="list-style-type: none"> ▶ Steel constructions ▶ Cantilevers ▶ Facade substructures ▶ Machines ▶ Guard rails ▶ Canopies ▶ Distance mountings ▶ Door and window frames ▶ Stairways ▶ Wood constructions ▶ Cable trays ▶ Pipe installations
Mounting in concrete and solid brick	     <ol style="list-style-type: none"> 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 <p>Mounting video at www.celofixings.com</p>
Mounting in hollow brick	      <ol style="list-style-type: none"> 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 <p>Mounting video at www.celofixings.com</p>

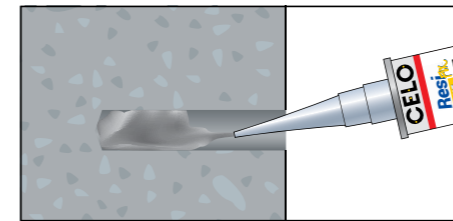
Systems in comparison

Type	Vinylester VVSF (styrene free)				Epoxyacrylate EYSF (styrene free)				Polyester PYSF (styrene free)				Pure Epoxy BRSF (styrene free)	
	300	345	410	300	300	345	410	300	165	300	345	410	385	585
Content [ml]	280	345	410	300	280	345	410	280	165	300	345	410	385	585
Types	Standard			Cool	Standard			Express	Standard				Standard	
Shelf life	18 months			12 mon.	18 months				12 months	18 months			24 months	
	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		
	✓				-				-			✓		
Approval for post-installed rebar connections	 Ø8 - Ø25				-				-			 Ø8 - Ø25		
Approval for cracked concrete (Option 1)	 M8 - M30, Ø8 - Ø32				-				-			 M8 - M30, Ø8 - Ø32		
Approval for non-cracked concrete (Option 7)	 M8 - M30, Ø8 - Ø32				 M8 - M24				 M8 - M16			 M8 - M30, Ø8 - Ø32		
Approval for masonry	 M8 - M16				 M8 - M16				 M8 - M16			-		
Fire test certification (R 120)					-				-					
Usage under seismic action					-				-					
ICC Approval					-				-			-		
Emissions in closed spaces														
Performance in non-cracked concrete C20/25 (M10-90)														
Performance in hollow brick HLZ 12 (M10-130)												not suitable		
Wet drill holes	✓				✓				✓			✓		
Waterfilled drill holes	✓				✓				✓			✓		
Min. temp. of concrete	≥ -10°C		≥ -20°C		≥ -5°C		≥ -10°C		≥ -5°C		≥ +5°C			
Suitable for contact with drinking water	✓				✗				✗			✓		
Temp. range after 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				medium			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.

ResiFIX – estimation of needed volume

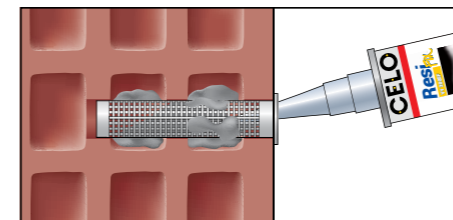


Consumption in solid materials

Calculation method: Complete filling of the drill hole*

Anchor rod RAST or VA AST	Drill hole			Number of fixings per ResiFIX cartridge					
	d ₀ [mm]	h _{ef,Stand} [mm]	Volume [cm³=ml]	165 ml [Fixings]	280 ml [Fixings]	300 ml [Fixings]	345 ml [Fixings]	385 ml [Fixings]	410 ml [Fixings]
M8	10	80	6,30	26,3	44,6	47,8	54,9	61,3	65,3
M10	12	90	10,20	16,2	27,5	29,5	33,9	37,8	40,3
M12	14	110	17,00	9,7	16,5	17,7	20,4	22,7	24,2
M16	18	125	31,80	5,2	8,8	9,4	10,9	12,1	12,9
M20	24	170	76,90	2,1	3,6	3,9	4,5	5,0	5,3
M24	28	210	129,20	1,3	2,2	2,3	2,7	3,0	3,2
M30	35	280	269,30	0,6	1,0	1,1	1,3	1,4	1,5

* According to the ETA approval 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 rod RAST or VA AST	Drill hole			Number of fixings per ResiFIX cartridge				
		d ₀ [mm]	h ₀ [mm]	Volume [cm³=ml]	165 ml [Fixings]	280 ml [Fixings]	300 ml [Fixings]	345 ml [Fixings]	410 ml [Fixings]
SH 12/80	M6 / M8	12	85	9,00	15,9	26,9	28,8	33,2	39,4
SH 16/85	M8 / M10	16	90	17,10	8,4	14,3	15,3	17,6	20,9
SH 16/130	M8 / M10	16	135	26,10	5,5	9,3	10,0	11,5	13,6
SH 20/85	M12 / M16	20	90	26,70	5,4	9,1	9,8	11,2	13,4
SH 20/130	M12 / M16	20	135	40,80	3,5	6,0	6,4	7,3	8,7
SH 20/200	M12 / M16	20	205	62,80	2,3	3,9	4,2	4,8	5,7

ResiFIX VYSF – The all-rounder – top performance in concrete and masonry



ResiFIX VYSF – Advantages at a glance

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**

ICC Approval

► **Evaluated building product on the basis of the relevant standards in the USA**

Usage under seismic conditions

► **Tested for use in areas with high risk of earthquakes**

European Technical Approval 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**



Styrene free

► **Reduced odour exposure**



Usage also in water-filled drill holes

► **Extended range of applications**



Very high load values

► **Heavy-duty usage**



Fire resistance test R120

► **Fulfills fire protection requirements**



European Technical Approval for masonry (M8 - M16)

► **For more application flexibility**

ResiFIX VY SF is available as „Standard“ and „Cool“.
ResiFIX VY SF Cool is suitable for a temperature range down to -20°C.



Bridge railings

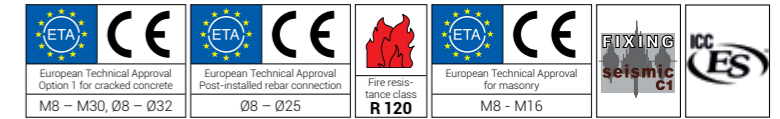


Railing fastenings



Pipe installations

ResiFIX VYSF – Assortment



Vinylester VYSF (styrene free)

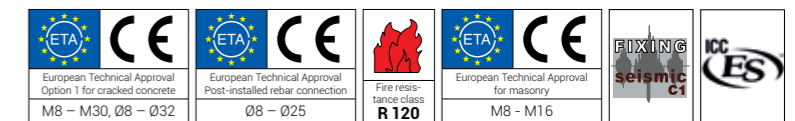
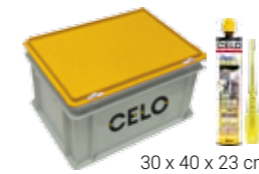
Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]
VY 300 SF	300VSF	280	2	18	12
VY 345 SF	345VSF	345	2	18	12
VY 410 SF	410VYSF	410	1	18	12



Vinylester VYSF Cool (styrene free) for -20°C to +10°C

Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]
VY 300 SF Cool	300VCSF	300	2	12	12

seasonal article



Universal box with ResiFIX VY 300 SF, VY 345 SF

Type	Art-No	Content [cartridges]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]
VY 300 SF in universal box	SYS300VSF20	20	40	18	1
VY 345 SF in universal box	SYS345VSF20	20	40	18	1

ResiFIX VYSF – Curing times

ResiFIX Vinylester VYSF

Temperature of building material [°C]	> -10 ¹⁾	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. 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 temp. min. 15 °C

²⁾ Double curing time in wet concrete

ResiFIX Vinylester VYSF Cool

Temperature of building material [°C]	> -20	> -15	> -10	> -5	> 0	> +5	+10	X
Min. 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

ResiFIX EYSF – Multi-material for every surface



ResiFIX EYSF – Advantages at a glance

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



Styrene free
 ▶ **Reduced odour exposure**



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



European Technical Approval Option 7 for non-cracked concrete (M8 - M24)
 ▶ **For standard applications in concrete**



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



Usage also in waterfilled drill holes
 ▶ **Extended range of applications**



Good load values in concrete and masonry
 ▶ **Multi-material usage**



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

ResiFIX EY SF is available as „Standard“ and „Express“.
ResiFIX VY SF Express cures very fast.
 ▶ **Reduced curing time, for -10°C to +30°C**



Canopy fastening

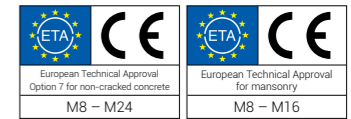


Bridge railings



Balcony rail fastening

ResiFIX EYSF – Assortment



Epoxyacrylate (styrene free)					Packing
Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	[pcs]
EY 300 SF	300EYSF	280	2	18	12
EY 345 SF	345EYSF	345	2	18	12
EY 410 SF	410EYSF	410	1	18	12



Epoxyacrylate EYSF Express (styrene free) reduced curing time, for -10°C to +30°C					Packing
Typ	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	[pcs]
EY 300 SF Express	300EXSF	280	2	18	12

ResiFIX EYSF – Curing times

ResiFIX Epoxyacrylate EYSF

Temperature of building material [°C]	> -10	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. working time [min]	–	90	45	25	20	6	4	1,5
Min. curing time ¹⁾ [min]	–	6h	3h	2h	100	45	25	15

¹⁾ Double curing time in wet concrete

ResiFIX Epoxyacrylate EYSF Express

Temperature of building material [°C]	> -10	> -5	> 0	> +5	> +10	> +15	> +20	+30
Min. working time [min]	60	45	25	10	4	3	2	1,5
Min. curing time ¹⁾ [min]	4h	2h	80	45	25	20	15	10

¹⁾ Double curing time in wet concrete

Fastening in concrete with ResiFIX Epoxyacrylate EYSF (Standard and Express)

Permissible loads F_{per} in [kN] in non-cracked concrete C20/25 for single anchor without influence of spacing and edge distance, installation parameters and unit dimensions. Total safety factors as per ETAG 001 included (γ_M und γ_F). See ETA-approval for design and calculations.

Anchor rods RESI AST, VA AST	M8	M10	M12	M16	M20	M24
Drill hole \varnothing d_0 [mm]	10	12	14	18	24	28
Embedment 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

Tension load ¹⁾ (24 °C / 40 °C) ²⁾ in non-cracked concrete (dry or wet)

	N_{per} [kN]	M8	M10	M12	M16	M20	M24
Zinc plated 5.8	N_{per} [kN]	5,1 / 6,8 / 8,6	6,0 / 9,0 / 13,8	8,4 / 13,2 / 20,0	12,8 / 19,9 / 37,1	17,1 / 33,9 / 58,1	18,8 / 50,3 / 83,8
Stainless steel A4	N_{per} [kN]	5,1 / 6,8 / 9,9	6,0 / 9,0 / 15,7	8,4 / 13,2 / 22,5	12,8 / 19,9 / 42,0	17,1 / 33,9 / 65,3	18,8 / 50,3 / 94,3

Shear load ¹⁾ (24 °C / 40 °C) ²⁾

	V_{per} [kN]	M8	M10	M12	M16	M20	M24
Zinc plated 5.8	V_{per} [kN]	5,1	8,6	12,0	22,3	34,9	45,2 / 50,3 / 50,3
Stainless steel A4	V_{per} [kN]	6,0	9,2	13,7	25,2	39,4	45,2 / 56,8 / 56,8
Bending moment (Zinc plated 5.8)	M_{per} [Nm]	10,9	21,1	37,7	94,9	185,7	320,6
Bending moment (Stainless steel A4)	M_{per} [Nm]	11,9	23,8	42,1	106,7	207,9	359,9

Spacing and edge distance

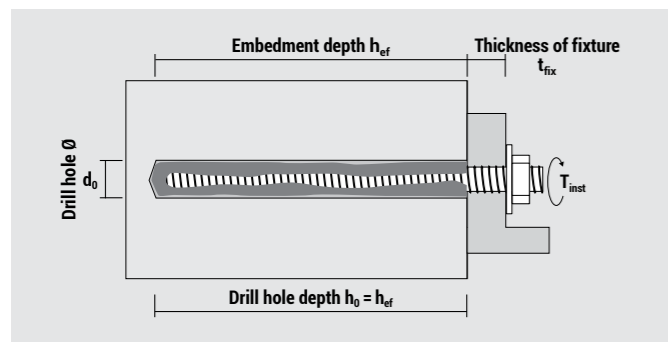
	$S_{cr,N}$ [mm]	M8	M10	M12	M16	M20	M24
Spacing	$S_{cr,N}$ [mm]	185	253	304	375	506	581
Edge distance	$C_{cr,N}$ [mm]	92	126	152	188	253	329
Minimum spacing distance	S_{min} [mm]	40	50	60	80	100	120
Minimum edge distance	C_{min} [mm]	40	50	60	80	100	120
Minimum thickness of concrete	h_{min} [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$		
Installation torque	$T_{inst} \leq$ [Nm]	10	20	40	80	120	160

¹⁾ Increasing factors for non-cracked concrete C30/37 = 1.08, C40/50 = 1.15, C50/60 = 1.19.

²⁾ Max. long term temperature / max. short term temperature after installation. For temperature range 50°C/80°C please see ETA-approval.

³⁾ Depends on h_{ef} . Values are valid for $h_{ef,stand}$.

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



Fastening in masonry with ResiFIX Epoxyacrylate EYSF (Standard and Express)

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

Fastenings in solid and hollow masonry

Suitable building materials	Density ρ [kg/dm ³]	Compressive strength f_b [N/mm ²]	Anchor rods RESI AST, VA AST	Sleeve	Min. embedment dept h_{ef} [mm]	Use category dry / dry 24°C/40°C ¹⁾															
						Tension load N_{per} [kN]	Shear V_{per} [kN]														
Solid sand-lime brick KS	$\geq 2,0$	≥ 20	M8, M10, M12, M16	without / SH 12-80, 16-85, 20-85, 20-85	80 / 80, 90 / 85, 100 / 85, 100 / 85	1,29 / 1,14, 1,29 / 1,14, 1,60 / 1,14, 1,29 / 1,14	1,29 / 1,14, 1,29 / 1,29, 1,43 / 1,43, 1,43 / 1,43														
								Solid brick Mz	$\geq 1,64$	≥ 20	M8, M10, M12, M16	without / SH 12-80, 16-85, 20-85, 20-85	80 / 80, 90 / 85, 100 / 85, 100 / 85	0,71 / 0,86, 0,71 / 0,86, 2,14 / 1,43, 0,57 / 0,86, 2,14 / 1,43, 1,00 / 0,86, 2,14 / 1,43							
															Aerated concrete AAC4	$\geq 0,50$	≥ 4	M8, M10, M12, M16	without, without, without	80, 90, 100, 100	0,32, 0,54, 0,90, 0,71, 0,90, 0,90, 1,25, 1,25
Hollow brick HLz (HLz 16DF)	$\geq 0,83$	≥ 12	M8, M10, M12, M16	SH 12-80, SH 16-85, SH 16-130, SH 20-85, SH 20-85	80, 85, 130, 85, 85	0,43, 1,00, 0,71, 1,71, 1,00, 2,30, 1,00, 1,71, 1,00, 1,71															

N_{per} , V_{per} : Permissible loads incl. safety factors (γ_M and $\gamma_F = 1,4$), without influence of spacing and edge distance.

Drilling method: KSV and MZL hammer drilling; aerated concrete, KSL and HLz: rotary drilling

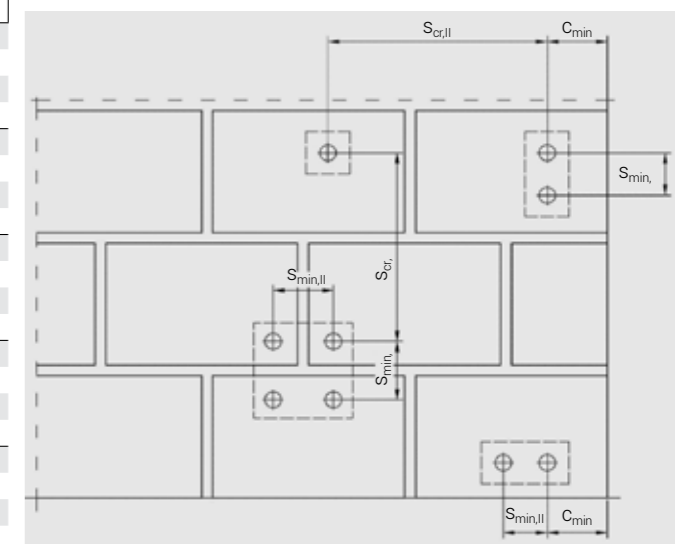
¹⁾ Max. long-term temperature / max. short-term temperature after installation.

Spacing and edge distances

Suitable building materials	Anchor rod	Sleeve	Min. edge distance $C_{cr} = C_{min}$ [mm]	Min. spacing parallel to the horizontal joint $S_{min, } + S_{cr, }$ [mm]	Min. spacing perpendicular to the horizontal joint $S_{min} = S_{cr}$ [mm]						
						Solid sand-lime brick KS	M8, M10, M12, M16	without	120, 135, 150, 150	240, 270, 300, 300	240, 240, 300, 300
Solid brick Mz	M8, M10, M12, M16	without	120, 135, 150, 150	240, 270, 300, 300	240, 270, 300, 300						
						Aerated concrete AAC6	M8, M10, M12, M16	SH 12-80, SH 16-85, SH 16-130, SH 20-85	100, 135, 150	240, 270, 300	240, 270, 300
Hollow brick HLz (HLz 16DF)	M8, M10, M12, M16	SH 12-80, SH 16-85, SH 16-130, SH 20-85	100, 100, 120, 120	497, 238, 238, 113							

Bending moment

Steel	Anchor size				
	M8	M10	M12	M16	
Zinc plated 5.8	M_{per} [Nm]	10,8	21,2	37,7	94,8
Stainless steel A4	M_{per} [Nm]	11,9	23,8	42,1	106,7



ResiFIX PYSF – Great price-performance ratio



ResiFIX PYSF – Advantages at a glance

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**



European Technical Approval Option 7 for non-cracked concrete (M8 - M16)
 ▶ **For standard applications in concrete**



Styrene free
 ▶ **Low odour exposure**



Can also be used with water-filled drill holes
 ▶ **Extended range of applications**



Good load values at a very good price-performance ratio



European Technical Approval for masonry (M8 - M16)
 ▶ **Also good performance in masonry**



French balcony

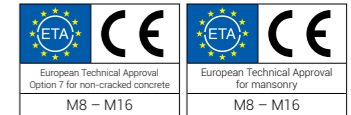


Satellite dish



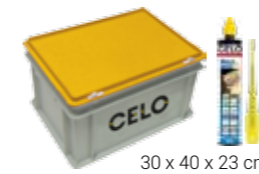
fastening oven pipe

ResiFIX PYSF – Assortment



Polyester PYSF (styrene free)

Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]
PY 300 SF	300PSF	300	1	12	12
PY 345 SF	345PSF	345	1	18	12
PY 410 SF	410PYSF	410	1	18	12



30 x 40 x 23 cm



Universal box with ResiFIX PY 300 SF, PY 345 SF

Type	Art-No	Content [cartridges]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]
PY 300 SF in universal box	SYS300PSF20	20	20	12	1
PY 345 SF in universal box	SYS345PSF20	20	20	18	1



Fastening injection system ResiFIX PY

Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	Packing [pcs]	Packing [Blister]
PY 165 SF	165PSF	165	2	12	1	12

ResiFIX PYSF – Curing times

ResiFIX Polyester PYSF

Temperature of building material [°C]	> -10	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. working time [min]	–	90	45	25	20	6	4	1,5
Min. curing time ¹⁾ [min]	–	6h	3h	2h	100	45	25	15

¹⁾ Double curing time in wet concrete

Fastening in concrete with ResiFIX Polyester PYSF

Permissible loads F_{per} in [kN] in non-cracked concrete C20/25 for single anchor without influence of spacing and edge distance, installation parameters and unit dimensions. Total safety factors as per ETAG 001 included (γ_M und γ_F). See ETA-approval for design and calculations.

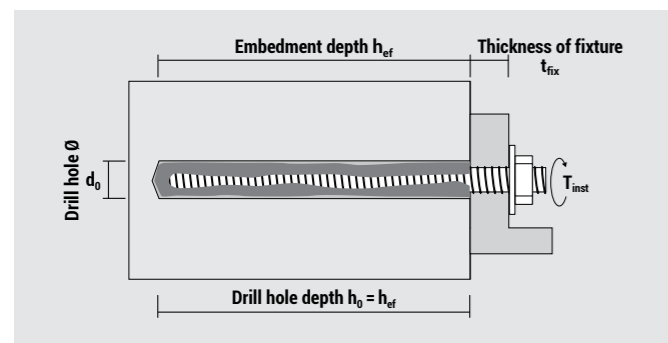
Anchor rods RESI AST, VA AST		M8	M10	M12	M16
Drill hole \varnothing	d_0 [mm]	10	12	14	18
Embedment depth $h_{ef,min} / h_{ef,stand} / h_{ef,max}$	[mm]	60/80/160	60/90/200	70/110/240	80/125/320
Tension load ¹⁾ (24 °C / 40 °C) ²⁾ in non-cracked concrete (dry or wet)					
Zinc plated 5.8	N_{per} [kN]	5,1 / 6,8 / 8,6	6,0 / 9,0 / 13,8	8,4 / 13,2 / 20,0	12,8 / 19,9 / 37,1
Stainless steel A4	N_{per} [kN]	5,1 / 6,8 / 9,9	6,0 / 9,0 / 15,7	8,4 / 13,2 / 22,5	12,8 / 19,9 / 42,0
Shear load ¹⁾ (24 °C / 40 °C) ²⁾					
Zinc plated 5.8	V_{per} [kN]	5,1	8,6	12,0	22,3
Stainless steel A4	V_{per} [kN]	6,0	9,2	13,7	25,2
Bending moment (Zinc plated 5.8)	M_{per} [Nm]	10,9	21,1	37,7	94,9
Bending moment (Stainless steel A4)	M_{per} [Nm]	11,9	23,8	42,1	106,7
Spacing and edge distance					
Spacing	$S_{cr,N}$ [mm]	185	253	304	375
Edge distance	$C_{cr,N}$ [mm]	92	126	152	188
Minimum spacing distance	S_{min} [mm]	40	50	60	80
Minimum edge distance	C_{min} [mm]	40	50	60	80
Minimum thickness of concrete	h_{min} [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$
Installation torque	$T_{inst} \leq$ [Nm]	10	20	40	80

¹⁾ Increasing factors for non-cracked concrete C30/37 = 1.08, C40/50 = 1.15, C50/60 = 1.19.

²⁾ Max. long term temperature / max. short term temperature after installation. For temperature range 50°C/80°C please see ETA-approval.

³⁾ Depends on h_{ef} . Values are valid for $h_{ef,stand}$.

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



Fastening in masonry with ResiFIX Polyester PYSF

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

Fastenings in solid and hollow masonry		Density ρ [kg/dm ³]	Compressive strength f_b [N/mm ²]	Anchor rods RESI AST, VA AST	Sleeve	Min. embedment dept h_{ef} [mm]	Use category dry / dry 24°C/40°C ¹⁾	
Suitable building materials	Size						Tension load N_{per} [kN]	Shear V_{per} [kN]
Solid sand-lime brick KS		$\geq 2,0$	≥ 20	M8, M10, M12, M16	without / SH 12-80, 16-85, 20-85	80 / 80, 90 / 85, 100 / 85	1,29 / 1,14	1,29 / 1,14
							1,29 / 1,14	1,29 / 1,29
							1,60 / 1,14	1,43 / 1,43
							1,29 / 1,14	1,43 / 1,43
Solid brick Mz		$\geq 1,64$	≥ 20	M8, M10, M12, M16	without / SH 12-80, 16-85, 20-85	80 / 80, 90 / 85, 100 / 85	0,71 / 0,86	1,29 / 1,14
							0,71 / 0,86	1,57 / 1,43
							0,57 / 0,86	2,14 / 1,43
							1,00 / 0,86	2,14 / 1,43
Aerated concrete AAC4		$\geq 0,50$	≥ 4	M8, M10, M12, M16	without	80, 90, 100	0,32	0,54
							0,90	0,71
							0,90	0,90
							1,25	1,25
Hollow sand-lime brick KSL (KSL 3DF)		$\geq 1,4$	≥ 12	M8, M10, M12, M16	SH 12-80, 16-85, 16-130, 20-85	80, 85, 130, 85, 85	0,57	0,71
							0,57	1,00
							1,00	1,29
							0,57	1,00
Hollow brick HLz (HLz 16DF)		$\geq 0,83$	≥ 12	M8, M10, M12, M16	SH 12-80, 16-85, 16-130, 20-85	80, 85, 130, 85, 85	0,43	1,00
							0,71	1,71
							1,00	2,30
							1,00	1,71
							1,00	1,71

N_{per}, V_{per} : Permissible loads incl. safety factors (γ_M and $\gamma_F = 1,4$), without influence of spacing and edge distance.

Drilling method: KSV and MZL hammer drilling; aerated concrete, KSL and HLz: rotary drilling

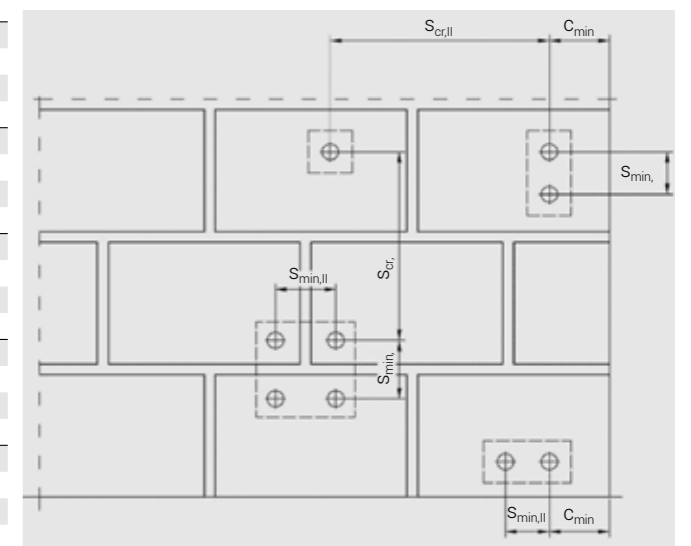
¹⁾ Max. long-term temperature / max. short-term temperature after installation.

Spacing and edge distances

Suitable building materials	Anchor rod	Sleeve	Min. edge distance $C_{cr} = C_{min}$ [mm]	Min. spacing parallel to the horizontal joint $S_{min, } = S_{cr, }$ [mm]	Min. spacing perpendicular to the horizontal joint $S_{min,\perp} = S_{cr,\perp}$ [mm]
Solid sand-lime brick KS	M8	without	120	240	240
	M10	without	135	270	240
	M12	without	150	300	300
	M16	without	150	300	300
Solid brick Mz	M8	without	120	240	240
	M10	without	135	270	270
	M12	without	150	300	300
	M16	without	150	300	300
Aerated concrete AAC6	M8	SH 12-80	120	240	240
	M10	SH 16-85	135	270	270
	M10	SH 16-130	150	300	300
	M12,M16	SH 20-85	150	300	300
Hollow sand-lime brick KSL (KSL 3DF)	M8	SH 12-80	100	240	113
	M10	SH 16-85	100	240	113
	M10	SH 16-130	100	240	113
	M12,M16	SH 20-85	120	240	113
Hollow brick HLz (HLz 16DF)	M8	SH 12-80	100	497	238
	M10	SH 16-85	100	497	238
	M10	SH 16-130	100	497	238
	M12,M16	SH 20-85	120	497	238

Bending moment

Steel	Anchor size				
	M8	M10	M12	M16	
Zinc plated 5.8	M_{per} [Nm]	10,8	21,2	37,7	94,8
Stainless steel A4	M_{per} [Nm]	11,9	23,8	42,1	106,7



ResiFIX BRSF – High professional mortar for highest loads in concrete



ResiFIX VVSF – Advantages at a glance

Class A+: Lowest emissions of critical substances in closed spaces

► Harmless to health after curing



Very high load values

► Heavy-duty usage



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



European Technical Approval Option 1 for cracked and non-cracked concrete (M8 - M30)

► For a wide range of safety critical applications



One mixing nozzle and one extension tube are always included

► Deeper drill holes can also be filled



Styrene free

► Reduced odour exposure



Usage also in water-filled drill holes

► Extended range of applications



Fire resistance test R120

► Fulfills fire protection requirements



European Technical Approval for post-installed rebar connections

► Various applications

ResiFIX BRSF – Assortment



Pure Epoxy (styrene free)					Packing
Type	Art-No	Content [ml]	Nozzles included [pcs]	Shelf life (unopened) [months]	[pcs]
BR 385 SF	385CRPE	385	1	24	12
BR 585 SF*	585CRPE	585	1	24	12
BR 1400 SF*	1400CRPE	1400	1	24	12

1 extension tube (length 200 mm) included
* delivery only on request

ResiFIX BRSF – Curing times

ResiFIX Pure Epoxy BRSF

Temperature of building material [°C]	> -10	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. working time [min]	–	–	–	120	90	30	20	12
Min. curing time ¹⁾ [min]	–	–	–	50h	30h	10h	6h	4h

¹⁾ Double curing time in wet concrete

Fastening in concrete with ResiFIX Pure Epoxy BRSF

Permissible loads F_{per} in [kN] in non-cracked (Option 7) concrete C20/25 and cracked (Option 1) concrete C20/25 for single anchor without influence of spacing and edge distance, installation parameters and unit dimensions. Total safety factors as per ETAG 001 included (γ_m und γ_r). Design according to TR029. See ETA-approval for design and calculations.

Anchor rods RESI AST, VA AST	M8	M10	M12	M16	M20	M24	M30
Drill hole \varnothing d_0 [mm]	10	12	14	18	24	28	35
Embedment depth $h_{ef,min} / h_{ef,stand} / h_{ef,max}$ [mm]	60/80/96	60/90/120	70/110/144	80/125/192	90/170/240	96/210/288	120/280/360

Tension load ^{1) 2)} (24 °C / 40 °C) ³⁾ non-cracked concrete

Zinc plated 5.8	N_{per} [kN]	8,6 / 8,6 / 8,6	9,3 / 13,8 / 13,8	11,7 / 20,0 / 20,0	14,3 / 28,0 / 37,1	14,7 / 38,1 / 58,1	16,2 / 52,3 / 83,8	22,6 / 80,5 / 117,3
Stainless steel A4	N_{per} [kN]	9,0 / 9,9 / 10,5	9,3 / 15,7 / 16,5	11,7 / 22,5 / 23,8	14,3 / 28,0 / 44,4	14,7 / 38,1 / 63,9	16,2 / 52,3 / 83,8	22,6 / 70,2 / 70,2

Tension load ^{1) 2)} (24 °C / 40 °C) ³⁾ cracked concrete

Zinc plated 5.8	N_{per} [kN]	4,2 / 5,6 / 6,7	5,2 / 7,9 / 10,5	7,9 / 12,3 / 16,2	10,2 / 16,2 / 24,9	10,5 / 21,8 / 30,8	11,5 / 29,6 / 40,6	16,1 / 49,4 / 63,5
Stainless steel A4	N_{per} [kN]	4,2 / 5,6 / 6,7	5,2 / 7,9 / 10,5	7,9 / 12,3 / 16,2	10,2 / 16,2 / 24,9	10,5 / 21,8 / 30,8	11,5 / 29,6 / 40,6	16,1 / 49,4 / 63,5

Tension load ^{1) 2)} (43 °C / 60 °C) ³⁾ non-cracked concrete

Zinc plated 5.8	N_{per} [kN]	6,8 / 7,6 / 8,6	7,1 / 10,7 / 13,8	9,4 / 14,8 / 19,4	13,6 / 21,2 / 32,6	14,7 / 29,1 / 41,0	16,2 / 40,4 / 55,4	22,6 / 67,3 / 86,6
Stainless steel A4	N_{per} [kN]	5,7 / 9,1 / 9,1	7,1 / 10,7 / 14,2	9,4 / 14,8 / 19,4	13,6 / 21,2 / 32,6	14,7 / 29,1 / 41,0	16,2 / 40,4 / 55,4	22,6 / 67,3 / 70,2

Tension load ^{1) 2)} (43 °C / 60 °C) ³⁾ cracked concrete

Zinc plated 5.8	N_{per} [kN]	2,7 / 3,6 / 4,3	3,4 / 5,0 / 6,7	4,7 / 7,4 / 9,7	6,4 / 10,0 / 15,3	6,7 / 12,7 / 18,0	8,6 / 18,8 / 25,9	13,5 / 31,4 / 40,4
Stainless steel A4	N_{per} [kN]	2,7 / 3,6 / 4,3	3,4 / 5,0 / 6,7	4,7 / 7,4 / 9,7	6,4 / 10,0 / 15,3	6,7 / 12,7 / 18,0	8,6 / 18,8 / 25,9	13,5 / 31,4 / 40,4

Shear load ¹⁾ non-cracked concrete

Zinc plated 5.8	V_{per} [kN]	5,1	8,6	12,0	22,3	34,9	45,1 / 50,3 / 50,3	63,1 / 80,0 / 80,0
Stainless steel A4	V_{per} [kN]	6,0	9,2	13,7	25,2	39,4	45,1 / 56,8 / 56,8	42,0 / 42,0 / 42,0

Shear load ¹⁾ cracked concrete

Zinc plated 5.8	V_{per} [kN]	5,1	8,6	12,0	22,3	29,3 / 34,9 / 34,9	32,2 / 50,3 / 50,3	45,1 / 80,0 / 80,0
Stainless steel A4	V_{per} [kN]	6,0	9,2	13,7	24,5	29,3 / 39,4 / 39,4	32,2 / 56,8 / 56,8	42,0 / 42,0 / 42,0

Bending moment (Zinc plated 5.8)	M_{per} [Nm]	10,9	21,1	37,1	94,9	185,1	320,0	641,7
Bending moment (Stainless steel A4)	M_{per} [Nm]	11,9	23,8	42,1	106,2	207,9	359,0	337,6

Spacing and edge distance

Spacing ⁴⁾	$s_{cr,N}$ [mm]	226	270	330	375	510	607	759
Edge distance ⁴⁾	$c_{cr,N}$ [mm]	113	135	165	188	255	304	380
Minimum spacing distance	s_{min} [mm]	40	50	60	80	100	120	150
Minimum edge distance	c_{min} [mm]	40	50	60	80	100	120	150
Minimum thickness of concrete	h_{min} [mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$			
Installation torque	$T_{inst, \leq}$ [Nm]	10	20	40	80	120	160	200

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

²⁾ Increasing factors for cracked and non-cracked concrete C30/37 = 1.04, C40/50 = 1.08, C50/60 = 1.10.

³⁾ Max. long term temperature / max. short term temperature after installation.

⁴⁾ Depends on h_{ef} . Values are valid for $h_{ef,stand}$.

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

Manual dispenser – Powerful and robust with low effort



APP300



- ▶ High force transmission of 1:25 and so **noticeably reduced force expenditure**
- ▶ **Robust manual dispenser** made out of metal
- ▶ Also suitable for **all standard cartridges**, e.g. commercial adhesives and sealants (silicone, MS Polymer)
- ▶ Reduced weight - **improved working comfort**
- ▶ The **cartridge area is rotatable 360°** which facilitates the usage of sealants especially in corners

Manual dispenser APP 300			Packing
Type	Art-No	Suitable for ResiFIX Type	[pc]
APP 300	300APP	300 / 165	1



APVM



- ▶ High force transmission of 1:25 and so **noticeably reduced force expenditure**
- ▶ **Robust manual dispenser** made out of metal
- ▶ Low weight due to the use of magnesium **only 680 g light**; therefore increased working comfort
- ▶ **Suitable for side-by-side cartridges with 345 ml content**. Also suitable for standard cartridges with 165 ml, 280 ml, 300 ml to read the scale units of ResiFIX; outer rod serves as a pointer

Manual dispenser APVM			Packing
Type	Art-No	Suitable for ResiFIX Type	[pc]
APVM	345APVM	345 / 300 / 165	1



APP380



- ▶ High force transmission of 1:25 and so **noticeably reduced force expenditure**
- ▶ **Robust manual dispenser** made out of metal
- ▶ Suitable for **ResiFIX cartridges with 410 ml**

Manual dispenser APP 380			Packing
Type	Art-No	Suitable for ResiFIX Type	[pc]
APP 380	380APP	410	1



OL385

Manual dispenser OL for ResiFIX Pure Epoxy (with mixing ratio 3:1)			Packing
Type	Art-No	Suitable for ResiFIX type	[pcs]
OL 385	385OL	385 / 585	1

ResiFIX Accessories



Mixing nozzle MD transparent			Packing
Type	Art-No	Suitable cartridges	[pcs]
MD	9MRMEA	all, except Pure Epoxy BR SF	20

Mixing nozzle extension for MD

Type	Art-No	Length [mm]	Packing [pcs]
MDV	9MDV	200	10



Blow out pump AB			Packing
Type	Art-No	Tube Ø [mm]	[pcs]
AB	BOP	8	1



Cleaning brush RBK nylon, for masonry				Packing
Type	Art-No	Length [mm]	Suitable for hole Ø [mm]	[pcs]
RBK Ø20	9PLRBK	300	≤ 20	5



Cleaning brush RBS steel, for concrete						Packing
Type	Art-No	Length [mm]	Suitable for hole Ø [mm]	Suitable for anchor rod	Connecting thread	[pcs]
RBS Ø12	9M12RBK	170	10	M8	M6	5
RBS Ø14	9M14RBK	170	12	M10	M6	5
RBS Ø16	9M16RBK	200	14	M12	M6	5
RBS Ø20	9M20RBK	200	18	M16	M6	5
RBS Ø26	9M26RBK	250	24	M20	M6	5
RBS Ø30	9M30RBK	300	28	M24	M6	5



MRBKV:
Extension
for RBS



MRBKH:
Handle
for RBS

Handle and Extension for RBS					Packing
Type	Art-No	Length [mm]	Suitable for RBS Ø	Connecting thread	[pcs]
MRBKV	MRBKV	140	all	M 6	5
MRBKH	MRBKH	-	all	M 6	5

ResiFIX Sleeves



Plastic sleeves SH

Type	Art-No	d ₀ [mm]	L [mm]	h ₀ [mm]	Suitable for thread Ø	Packing	
						[pcs]	[pcs]
SH 12-60 ¹⁾	91260SH	12	60	65	M6, M8	24	432
SH 12-80	91280SH	12	80	85	M6, M8	24	432
SH 16-85	91585SH	16	85	90	M8, M10	12	216
SH 16-130	915130SH	16	130	135	M8, M10	12	144
SH 20-85	92085SH	20	85	90	M12, M16	12	216
SH 20-130	920130SH	20	130	135	M12, M16	20	160
SH 20-200	920200SH	20	200	205	M12, M16	20	160

Note: The system (resin, sleeve and anchor rod) is only approved completely if approved components are used.

¹⁾ Not part of the ETA-approval

Metal sleeves SH-1000 can be cut individually (length 1m)

Type	Art-No	d ₀ [mm]	h ₀ [mm]	Suitable for thread Ø	Packing	
					[pcs]	[pcs]
SH 12-1000	12TMRMEA	12	flexible	M6 – M8	10	–
SH 16-1000	16TMRMEA	16	flexible	M8 – M12	10	–
SH 22-1000	22TMRMEA	22	flexible	M12 – M16	8	–

Internal threaded sleeves IGH

Type	Art-No	d ₀ [mm]	h ₀ [mm]	Suitable for thread Ø	Thread L* [mm]	Outer Ø [mm]	Suitable for sleeve	Packing	
								[pcs]	[pcs]
IGH M8-80	9880IGH	14	90	M8	26	12	SH 16-85 SH 20-85	12	216
IGH M10-80	91080IGH	16	90	M10	26	14	SH 20-85	12	216
IGH M12-80	91280IGH	18	90	M12	26	16	SH 20-85	12	144

*Internal thread length



Heavy-duty sleeve ResiTHERM[®] S Set for heavy-duty applications in hollow / perforated brick walls

Type	Art-No	Set contains (packed in bag)	d ₀ [mm]	L [mm]	h ₀ [mm]	Packing	
						[set]	[sets]
RTH S	RTHS2	2x ResiTHERM [®] S 2x Threaded stud M12x70 mm, stainless steel A4 2x Washer M12 DIN 125, stainless steel A4 2x Hexagon nut M12 DIN 934, stainless steel A4 1x ResiFIX VY300SF	40	125	125	1	10

For further information, technical data and ResiTHERM[®] for insulated hollow brick walls see www.celofixings.com

ResiFIX Anchor rods



RESI AST zinc plated, steel 5.8 with nut and washer

Type d _s - L	Art-No	in concrete					in solid brick		in perforated brick		Packing	
		d ₀ [mm]	h _{ef, min} [mm]	t _{fix, max} for h _{ef, min} [mm]	h _{ef, Stand} ¹⁾ [mm]	t _{fix, max} for h _{ef, Stand} [mm]	d ₀ - h ₀ [mm]	t _{fix, max} [mm]	sleeve [mm]	t _{fix, max} [mm]	[pcs]	[pcs]
M8-110	98110RAST	10	60	40	80	20	10 - 80	20	SH 12-80	20	10	100
M8-130	98130RAST	10	60	60	80	40	10 - 80	40	SH 12-80	40	10	100
M10-110	910110RAST	12	60	40	90	10	12 - 90	10	SH 16-85	15	10	100
M10-130	910130RAST	12	60	60	90	30	12 - 90	30	SH 16-85	35	10	100
M10-170	910170RAST	12	60	100	90	70	12 - 90	70	SH 16-85	75	10	100
M10-200	910200RAST	12	60	130	90	100	12 - 90	100	SH 16-85	105	10	60
M12-130	912130RAST	14	70	45	110	5	14 - 100	15	SH 20-85	30	10	100
M12-160	912160RAST	14	70	75	110	35	14 - 100	45	SH 20-85	60	10	100
M12-210	912210RAST	14	70	125	110	85	14 - 100	95	SH 20-85	110	10	60
M16-160	916160RAST	18	80	60	125	15	18 - 100	40	SH 20-85	60	10	60
M16-190	916190RAST	18	80	90	125	45	18 - 100	70	SH 20-85	90	10	60
M16-235	916235RAST	18	80	135	125	90	18 - 100	115	SH 20-85	135	10	40
M20-240	920240RAST	24	90	130	170	50	not suitable		not suitable		5	20
M24-300	924300RAST	28	96	180	210	65	not suitable		not suitable		5	20

RESI AST stainless steel A4 with nut and washer

Type d _s - L	Art-No	in concrete					in solid brick		in perforated brick		Packing	
		d ₀ [mm]	h _{ef, min} [mm]	t _{fix, max} for h _{ef, min} [mm]	h _{ef, Stand} ¹⁾ [mm]	t _{fix, max} for h _{ef, Stand} [mm]	d ₀ - h ₀ [mm]	t _{fix, max} [mm]	sleeve [Type]	t _{fix, max} [mm]	[pcs]	[pcs]
M8-110	9X8110RAST	10	60	40	80	20	10 - 80	20	SH 12-80	20	10	100
M8-130	9X8130RAST	10	60	60	80	40	10 - 80	40	SH 12-80	40	10	100
M10-110	9X10110RAST	12	60	40	90	10	12 - 90	10	SH 16-85	15	10	100
M10-130	9X10130RAST	12	60	60	90	30	12 - 90	30	SH 16-85	35	10	100
M10-170	9X10170RAST	12	60	100	90	70	12 - 90	70	SH 16-85	75	10	100
M10-200	9X10200RAST	12	60	130	90	100	12 - 90	100	SH 16-85	105	10	60
M12-130	9X12130RAST	14	70	45	110	5	14 - 100	15	SH 20-85	30	10	100
M12-160	9X12160RAST	14	70	75	110	35	14 - 100	45	SH 20-85	60	10	100
M12-210	9X12210RAST	14	70	125	110	85	14 - 100	95	SH 20-85	110	10	60
M16-160	9X16160RAST	18	80	60	125	15	18 - 100	40	SH 20-85	60	10	60
M16-190	9X16190RAST	18	80	90	125	45	18 - 100	70	SH 20-85	90	10	60
M16-235	9X16235RAST	18	80	135	125	90	18 - 100	115	SH 20-85	135	10	40
M20-240	9X20240RAST	24	90	130	170	50	not suitable		not suitable		5	20
M24-300	9X24300RAST	28	96	180	210	65	not suitable		not suitable		5	20

Also suitable for ResiFIX: Anchor rods VA AST for the bonded anchor (with outer hexagon)

Further lengths, steel 8.8, hot-dip galvanized steel and stainless steel HCR on request

¹⁾ Standard embedment depth means the usually used embedment depth. Min. embedment depth according to ETA-approvals

CELO

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