

## Chemical fastening systems



# Fastening Injection System ResiFIX

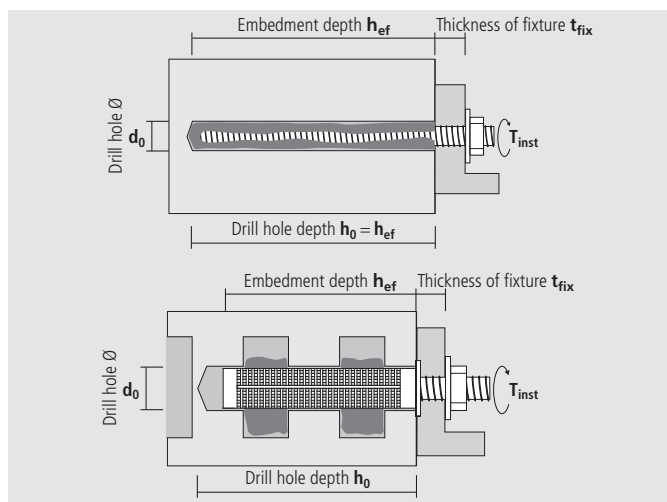


### Typical applications

- Steel constructions
- Canopies
- Cantilevers
- Distance mountings
- Facade substructures
- Door and window frames
- Machines
- Wood constructions
- Guard rails

### Suitable building materials

- ✓ Concrete
- ✓ Aerated concrete
- ✓ Natural stone
- ✓ Hollow brick
- ✓ Solid brick
- ✓ Hollow sand-lime brick
- ✓ Solid sand-lime brick
- ✓ Lightweight hollow concrete blocks
- ✓ Lightweight solid concrete blocks



### Mounting in concrete and solid brick

1. Drill hole
2. Clean hole (blow 4x, brush 4x)
3. 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. 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

# Chemical fastening systems



## For everyone the appropriate system

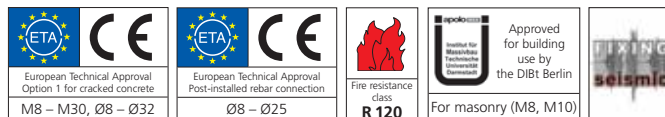
### In comparison

Type	Vinylester VY (styrene free)			Epoxyacrylate (styrene free)	Polyester PY		Polyester (styrene free)		Pure Epoxy (styrene free)
Content [ml]	300 SF	345 SF	410 SF	EY 300 SF	345	410	165 SF	300 SF	BR 385 SF
Shelf life (unopened)	18 months			18 months	12 months		12 months		24 months
	class 4.6, 5.8, 8.8 stainless steel			class 4.6, 5.8, 8.8 stainless steel	class 5.8, 8.8 stainless steel		✓		class 4.6, 5.8, 8.8 stainless steel
	✓			–	–		–		✓
Approval for post-installed rebar connections				–	–		–		–
Approval for cracked concrete (Option 1)				–	–		–		
Approval for non-cracked concrete (Option 7)					–		–		
Approval for masonry				–			–		–
Fire Test certification (R 120)				–	–		–		
Usage under seismic action				–	–		–		
Emissions in closed spaces					–		–		
Performance in non-cracked concrete C20/25 (M10-90)									
Performance in hollow brick HLZ 12 (M8-80)									not suitable
Wet drill holes	✓			✓	✓		✓		✓
Waterfilled drill holes	✓			✗	✗		✗		✓
Min. temp. of concrete	≥ -10°C			≥ -5°C	≥ +5°C		≥ +5°C		≥ +5°C
Temp. range after curing	-40°C to +120°C			-40°C to +40°C	-40°C to +80°C		-40°C to +80°C		-40°C to +72°C
Chemical resistance	very high			high	medium		medium		excellent
Odour	marginal			medium	strong		medium		marginal
Quantity per box	12 pcs			12 pcs	12 pcs		12 pcs		12 pcs

## Chemical fastening systems



# ResiFIX assortment



<b>Vinyl resin (styrene free)</b>				Price	Packing
Type	Art-No		Contents	€/pc	[pcs]
	new	old	[ml]		
VY 300 SF*	300VSF	504206	280		12
VY 345 SF*	345VSF	504209	345		12
VY 410 SF**	410VVSF	-	410		12

\*2 nozzles included, \*\*1 nozzle included



<b>Epoxyacrylate (styrene free)</b>				Price	Packing
Type	Art-No		Contents	€/pc	[pcs]
	new	old	[ml]		
EY 300 SF	300EVSF	-	280		12

2 nozzles included



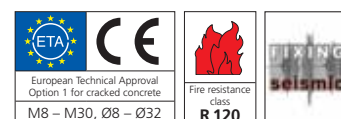
<b>Polyester resin</b>				Price	Packing
Type	Art-No		Contents	€/pc	[pcs]
	new	old	[ml]		
PY 345	345P	504208	345		12
PY 410	410P	504210	410		12

2 nozzles included



<b>Polyester resin (styrene free)</b>				Price	Packing
Type	Art-No		Contents	€/pc	[pcs]
	new	old	[ml]		
PY 165 SF	165PSF	504205	165		12
PY 300 SF	300PSF	504207	300		12

2 nozzles included



<b>Pure Epoxy (styrene free)</b>				Price	Packing
Type	Art-No		Contents	€/pc	[pcs]
	new	old	[ml]		
BR 385 SF	385CRPE	-	385		12

1 nozzle and extension tube included

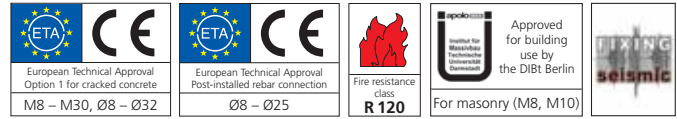
## Chemical fastening systems



## Accessories



30 x 40 x 23 cm



### Universal box with ResiFIX VY 300 SF, VY 345 SF

Type	Art-No	Contents [cartrid.]	€/box	pcs
VY 300 SF in universal box	SYS300VSF20	20		1
VY 345 SF in universal box	SYS345VSF20	20		1

2 nozzels per cartridge included



### Caulking gun APP / APVM

Type	Art-No		Suitable for ResiFIX type	Price €/pc	Packing pcs
	new	old			
APP 300	300APP	504194	300/165		1
APP 380	380APP	504196	410		1
APVM	345APVM	504195	345/300/165		1
OL 385	385OL	-	385		1



### Mixing nozzles MD transparent

Type	Art-No		Suitable cartridges	Price €/pc	Packing	
	new	old			pcs	pcs
MD	9MRMEA	504192	all		20	-

Suitable for all ResiFIX types except BR 385 SF



### Blow out pump AB

Type	Art-No		Price €/pc	Packing	
	new	old		pcs	pcs
AB	BOP	504505		1	-



### Cleaning brushes RBS steel, for concrete (length 115 mm, with M6 thread)

Type	Art-No		Suitable for hole Ø [mm]	Price €/pc	Packing	
	new	old			pcs	pcs
RBS Ø14	9M14RBK	504270	14		5	-
RBS Ø16	9M16RBK	504272	16		5	-
RBS Ø20	9M20RBK	504274	20		5	-



### Cleaning brushes RBK nylon, for masonry (length 300 mm)

Type	Art-No		Suitable for hole Ø [mm]	Price €/pc	Packing	
	new	old			pcs	pcs
RBK Ø20	9PLRBK	504276	20		5	-

# Chemical fastening systems



## Anchor rods RESI AST



RESI AST zinc plated 5.8 with nut and washer												Price	Packing	
Type $d_s$ -L	Art-No	in concrete					in solid brick		in perforated brick		€/100 pcs	[pcs]	[pcs]	
		$d_0$ [mm]	$h_{ef, min}$ [mm]	$t_{fix, max}$ for $h_{ef, min}$ [mm]	$h_{ef, Stand}^1$ [mm]	$t_{fix, max}$ for $h_{ef, Stand}^1$ [mm]	$d_0 - h_0$ [mm]	$t_{fix, max}$ [mm]	sleeve	$t_{fix, max}$ [mm]				
8-110	98110RAST	10	60	40	80	20	10-85	20	SH 13-100	20		10	200	
8-130	98130RAST	10	60	60	80	40	10-85	40	SH 13-100	40		10	200	
10-110	910110RAST	12	60	40	90	10	12-95	10	SH 15-100	10		10	200	
10-130	910130RAST	12	60	60	90	30	12-95	30	SH 15-100	30		10	200	
10-170	910170RAST	12	60	100	90	70	12-95	70	SH 15-100	70		10	100	
10-200	910200RAST	12	60	130	90	100	12-95	100	SH 15-100	100		10	100	
12-130	912130RAST	14	70	45	110	5	14-115	5	SH 20-85 <sup>2)</sup>	30		10	100	
12-160	912160RAST	14	70	75	110	35	14-115	35	SH 20-85 <sup>2)</sup>	60		10	100	
12-210	912210RAST	14	70	125	110	85	14-115	85	SH 20-85 <sup>2)</sup>	110		10	100	
16-160	916160RAST	18	80	60	125	15	18-130	15	SH 20-85 <sup>2)</sup>	60		10	50	
16-190	916190RAST	18	80	90	125	45	18-130	45	SH 20-85 <sup>2)</sup>	90		10	50	
16-235	916235RAST	18	80	135	125	90	18-130	90	SH 20-85 <sup>2)</sup>	135		10	40	
20-240	920240RAST	24	90	130	170	50	not suitable		not suitable			5	30	
24-300	924300RAST	28	96	180	210	65	not suitable		not suitable			5	25	



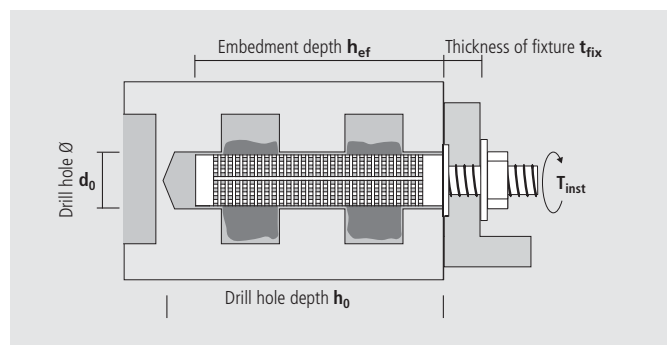
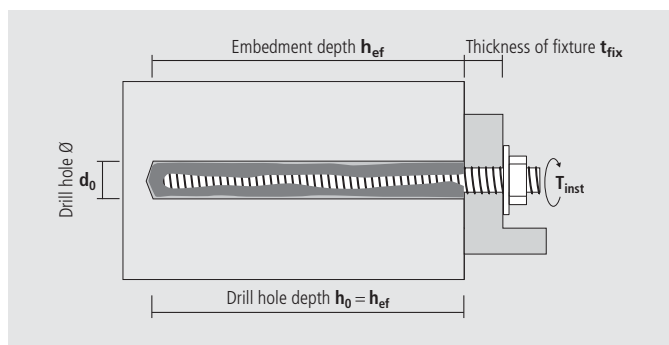
RESI AST stainless steel A4 with nut and washer												Price	Packing	
Type $d_s$ -L	Art-No	in concrete					in solid brick		in perforated brick		€/100 pcs	[pcs]	[pcs]	
		$d_0$ [mm]	$h_{ef, min}$ [mm]	$t_{fix, max}$ for $h_{ef, min}$ [mm]	$h_{ef, Stand}^1$ [mm]	$t_{fix, max}$ for $h_{ef, Stand}^1$ [mm]	$d_0 - h_0$ [mm]	$t_{fix, max}$ [mm]	sleeve	$t_{fix, max}$ [mm]				
8-110	9X8110RAST	10	60	40	80	20	10-85	20	SH 13-100	20		10	200	
8-130	9X8130RAST	10	60	60	80	40	10-85	40	SH 13-100	40		10	200	
10-110	9X10110RAST	12	60	40	90	10	12-95	10	SH 15-100	10		10	200	
10-130	9X10130RAST	12	60	60	90	30	12-95	30	SH 15-100	30		10	200	
10-170	9X10170RAST	12	60	100	90	70	12-95	70	SH 15-100	70		10	100	
10-200	9X10200RAST	12	60	130	90	100	12-95	100	SH 15-100	100		10	100	
12-130	9X12130RAST	14	70	45	110	5	14-115	5	SH 20-85 <sup>2)</sup>	30		10	100	
12-160	9X12160RAST	14	70	75	110	35	14-115	35	SH 20-85 <sup>2)</sup>	60		10	100	
12-210	9X12210RAST	14	70	125	110	85	14-115	85	SH 20-85 <sup>2)</sup>	110		10	100	
16-160	9X16160RAST	18	80	60	125	15	18-130	15	SH 20-85 <sup>2)</sup>	60		10	50	
16-190	9X16190RAST	18	80	90	125	45	18-130	45	SH 20-85 <sup>2)</sup>	90		10	50	
16-235	9X16235RAST	18	80	135	125	90	18-130	90	SH 20-85 <sup>2)</sup>	135		10	40	
20-240	9X20240RAST	24	90	130	170	50	not suitable		not suitable			5	30	
24-300	9X24300RAST	28	96	180	210	65	not suitable		not suitable			5	25	

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**

<sup>1)</sup> Standard embedment depth means the usually used embedment depth. Min. and max. embedment depth according to ETA-10/0134 for ResiFIX VY ... SF.

<sup>2)</sup> Not part of the DIBT approvals Z-21.3-1815 for ResiFIX PY and Z-21.3-1816 for ResiFIX VY ... SF.



## Chemical fastening systems



## Accessories



SH 13-100  
SH 15-100



SH 12-60, SH 15-85,  
SH 15-130, SH 20-85

### Plastic sleeves SH

Type	Art-No		d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	Suitable for thread Ø	Price €/100 pcs	Packing	
	new	old					[pcs]	[pcs]
SH 12-60	91260SH	-	12	65	M6-M8		24	432
SH 13-100*	913100SH	507111	14	105	M8		12	216
SH 15-85	91585SH	-	16	90	M10		12	216
SH 15-100*	915100SH	507119	16	105	M10		12	216
SH 15-130	915130SH	507112	16	135	M8-M12		12	144
SH 20-85	92085SH	507110	20	90	M12-M16		12	216

\*part of the approval



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

Type	Art-No		d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	Suitable for thread Ø	Price €/pc	Packing	
	new	old					[pcs]	[pcs]
SH 12-1000	12TMRMEA	507120	12	flexible	M6-8		10	-
SH 16-1000	16TMRMEA	507122	16	flexible	M8-M12		10	-
SH 22-1000	22TMRMEA	507124	22	flexible	M12-M16		8	-



### Internal threaded sleeves IGH

Type	Art-No		d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	Suitable for thread Ø	Outer Ø [mm]	Suitable for sleeve	Price €/100 pcs	Packing	
	new	old							[pcs]	[pcs]
IGH M8-80	9880IGH	507103	14	90	M8	12	SH 15-100 SH 20-85		12	216
IGH M10-80	91080IGH	507106	16	90	M10	14	SH 20-85		12	216
IGH M12-80	91280IGH	507107	18	90	M12	16	SH 20-85		12	144

## ResiFIX curing times

### Curing time Vinyl resin VY 300 SF, VY 345 SF, VY 410 SF

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

<sup>1)</sup> Cartridge temp. min. 15 °C

<sup>2)</sup> Double curing time in wet concrete

### Curing time Epoxyacrylate EY 300 SF

Temperature of building material	[°C]	> -10	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. working time	[min]	-	90	45	25	15	<b>6</b>	4	1,5
Min. curing time	[min]	-	6h	3h	2h	80	<b>45</b>	25	15

### Curing time Polyester resin PY 345, PY 410, PY 165 SF, PY 300 SF

Temperature of building material	[°C]	> -10	> -5	> 0	> +5	> +10	> +20	> +30	> +40
Min. working time	[min]	-	-	-	25	15	<b>6</b>	4	2
Min. curing time <sup>1)</sup>	[min]	-	-	-	2h	80	<b>45</b>	24	15

<sup>1)</sup> Double curing time in wet concrete

### Curing time Pure Epoxy BR 385 SF

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

<sup>1)</sup> Double curing time in wet concrete



## ResiFIX technical data

### Fastening in concrete with the professional system ResiFIX VY...SF

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 ( $\gamma_M$  und  $\gamma_P$ ). Design according to TR029. See approval ETA-10/0134 for design and calculations.

Anchor rods RESI AST, VA AST	M8	M10	M12	M16	M20	M24	M30
Drill hole $\varnothing$	10	12	14	18	24	28	35
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	120/280/600

#### Tension load <sup>1)2)</sup> (24 °C / 40 °C) <sup>3)</sup> non-cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	7,2/8,6/8,6	9,0/13,5/13,8	11,7/19,7/20,0	14,3/28,0/37,6	17,1/44,4/58,6	18,8/61,0/83,8	26,3/94,0/133,3
Stainless steel A4	$N_{per}$ [kN]	7,2/9,6/9,9	9,0/13,5/15,7	11,7/19,7/22,5	14,3/28,0/42,0	17,1/44,4/65,3	18,8/61,0/94,3	26,3/70,2/70,2

#### Tension load <sup>1)2)</sup> (24 °C / 40 °C) <sup>3)</sup> cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	-	-	5,8/9,1/19,7	8,8/13,7/35,1	12,3/23,3/54,9	15,8/34,6/79,0	26,3/68,1/133,3
Stainless steel A4	$N_{per}$ [kN]	-	-	5,8/9,1/19,7	8,8/13,7/35,1	12,3/23,3/54,9	15,8/34,6/79,0	26,3/68,1/70,2

#### Tension load <sup>1)2)</sup> (50 °C / 80 °C) <sup>3)</sup> non-cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	5,4/7,2/8,6	6,7/10,1/13,8	9,4/14,8/20,0	14,3/22,4/37,6	17,1/38,1/58,6	18,8/53,4/83,8	26,3/68,1/133,3
Stainless steel A4	$N_{per}$ [kN]	5,4/7,2/9,9	6,7/10,1/15,7	9,4/14,8/22,5	14,3/22,4/42,0	17,1/38,1/65,3	18,8/53,4/94,3	26,3/68,1/70,2

#### Tension load <sup>1)2)</sup> (50 °C / 80 °C) <sup>3)</sup> cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	-	-	4,2/6,6/14,4	6,4/10,0/25,5	9,0/17,0/39,9	11,5/25,1/57,4	20,2/47,1/101,0
Stainless steel A4	$N_{per}$ [kN]	-	-	4,2/6,6/14,4	6,4/10,0/25,5	9,0/17,0/39,9	11,5/25,1/57,4	20,2/47,1/70,2

#### Shear load <sup>1)</sup> (24 °C / 40 °C, 50 °C / 80 °C) <sup>3)</sup> cracked and non-cracked concrete

Zinc plated 5.8	$V_{per}$ [kN]	5,1/5,1/5,1	7,2/8,3/8,3	9,4/12,0/12,0	11,9/22,6/22,6	14,7/35,1/35,1	16,6/50,3/50,3	24,0/66,1/80,0
Stainless steel A4	$V_{per}$ [kN]	6,0/6,0/6,0	7,7/9,2/9,2	9,9/13,7/13,7	12,6/24,7/25,2	15,6/39,4/39,4	17,6/56,8/56,8	25,5/42,0/42,0
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

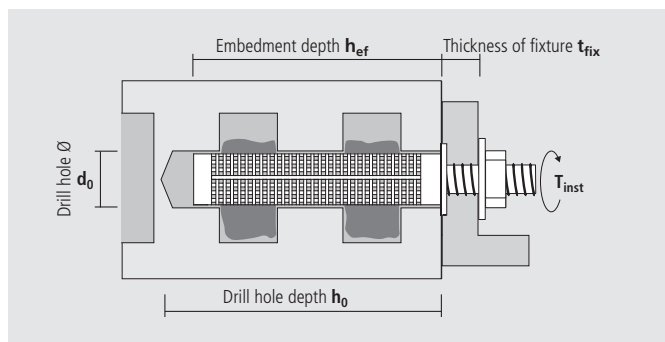
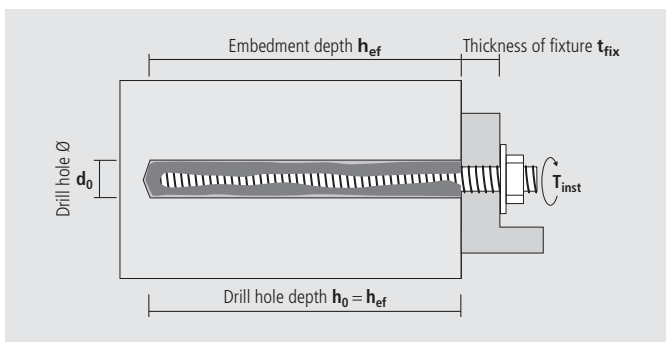
Spacing <sup>4)</sup>	$s_{cr,N}$ [mm]	185	253	304	375	506	581	657
Edge distance <sup>4)</sup>	$c_{cr,N}$ [mm]	92	126	152	188	253	291	329
Minimum spacing distance	$s_{min}$ [mm]	40	50	60	80	100	120	150
Minimum edge distance	$c_{min}$ [mm]	40	50	60	80	100	120	150
Minimum thickness of concrete	$h_{min}$ [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

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

<sup>2)</sup> Increasing factors for non-cracked concrete C30/37 = 1,04, C40/50 = 1,08, C50/60 = 1,10.

<sup>3)</sup> Max. long term temperature / max. short term temperature after installation. For temperature range 72°C/120°C please see approval ETA-10/0134.

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



## Chemical fastening systems



# ResiFIX technical data

### Fastening in concrete with Epoxyacrylate ResiFIX EY...SF

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 ( $\gamma_M$  und  $\gamma_F$ ). See approval ETA-12/0107 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	$h_{ef}$ [mm]	80	90	110	125	170	210

#### Tension load <sup>1)</sup>(24 °C / 40 °C) <sup>2)</sup>

Zinc plated 5.8	$N_{per}$ [kN]	6,3	12,8	13,9	19,8	29,8	37,7
Stainless steel A4	$N_{per}$ [kN]	6,3	12,8	13,9	19,8	29,8	37,7

#### Shear load <sup>1)</sup>(24 °C / 40 °C) <sup>3)</sup>

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

Spacing	$s_{cr,N}$ [mm]	160	180	220	250	340	420
Edge distance	$c_{cr,N}$ [mm]	80	90	110	125	170	210
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]	110	120	140	160	215	260
Installation torque	$T_{inst \leq}$ [Nm]	10	20	40	60	120	150

<sup>1)</sup> Increasing factors for non-cracked concrete C30/37 = 1,08, C40/50 = 1,15, C50/60 = 1,19

<sup>2)</sup> Max. long term temperature / max. short term temperature after installation

### Fastening in concrete with ResiFIX PY und PY...SF

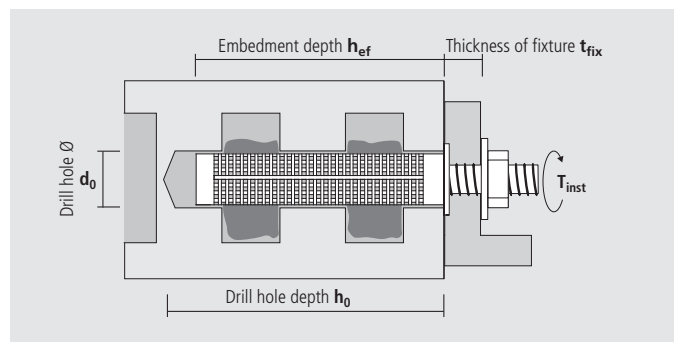
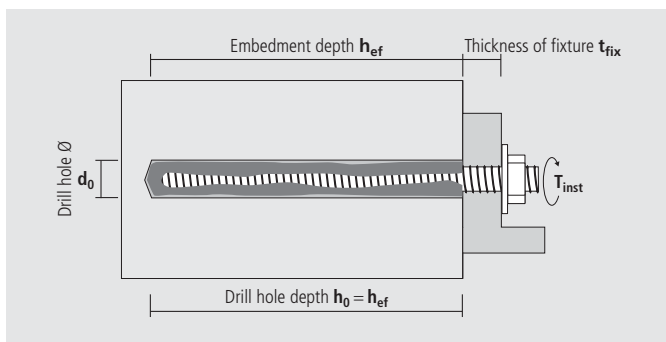
Recommended load  $F_{rec}$  in [kN] in non-cracked concrete C20/25 for single anchor without influence of spacing and edge distance. The safety factors are included.

Anchor		M8	M10	M12	M16	M20
Embedment depth	$h_{ef}$ [mm]	80	90	110	125	170
Edge distance	$c_{cr,N}$ [mm]	1,5 x $h_{ef}$				
Spacing	$s_{cr,N}$ [mm]	3,0 x $h_{ef}$				
Recommended tension load 50 °C / 80 °C <sup>1)</sup>	$N_{rec}$ [kN]	4,5	6,9	9,6	10,8	18,1
Recommended shear load without lever arm for steel 5.8 <sup>2)</sup>	$V_{rec}$ [kN]	5,1	8,6	12,0	22,3	34,9

<sup>1)</sup> Long term temperature / short term temperature. Long term concrete temperature is roughly constant over significant periods of time.

Short term elevated temperatures are those that occur over brief intervals, e.g. as a result of day / night cycle.

<sup>2)</sup> Shear load with lever arm acc. Annex C of ETAG 001.





# Chemical fastening systems



## ResiFIX technical data

### Fastening in masonry with chemical mortar ResiFIX VY...SF, PY und PY...SF

Permissible  $F_{per}$  and recommended loads  $F_{rec}$  in [kN] for all load directions, installation parameters and unit dimensions. Safety factors included ( $\gamma_M$  and  $\gamma_F$ ). See DIBt approvals Z-21.3-1815/1816 for design and calculations.

Anchor rods RESI AST, VA AST			M8 *	M10 *	M12	M16
<b>Fastenings in solid masonry (without sleeve)</b>						
Solid clay brick	Mz 12	$F_{per}$ [kN]	1,7	1,7	1,7	1,7
Solid sand-lime brick	KS 12	$F_{per}$ [kN]	1,7	1,7	1,7	1,7
Drill hole $\varnothing$		$d_0$ [mm]	10	12	14	18
Drill hole depth		$h_0$ [mm]	85	95	115	130
Anchorage depth of anchor rod		$h_{ef}$ [mm]	80	90	110	125

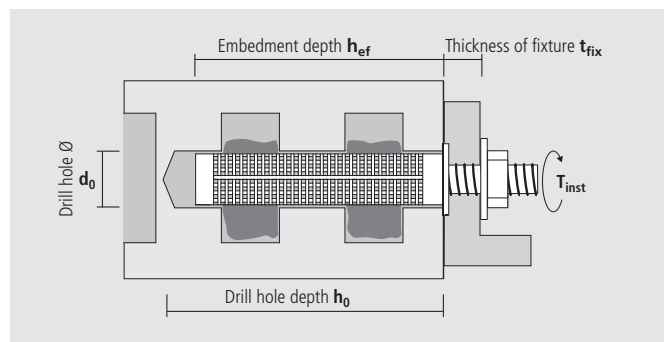
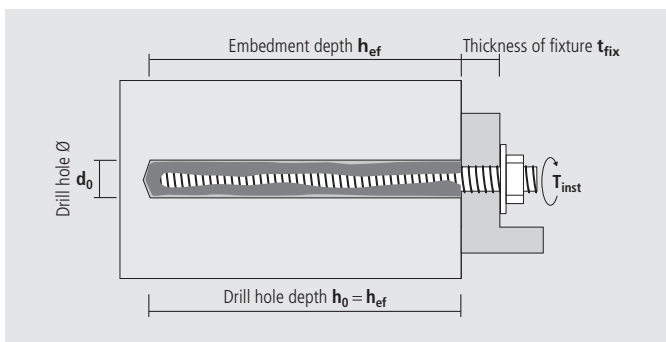
Fastenings in hollow masonry (with sleeve)			SH 13-100	SH 15-100	SH 15-130	SH 20-85	SH 20-85
<b>Sleeve</b>							
Hollow clay brick	HLz 4	$F_{per}$ [kN]	0,3 (0,6)	0,3 (0,6)	0,3 (0,6)		0,3 (0,6)
	HLz 6	$F_{per}$ [kN]	0,4 (0,8)	0,4 (0,8)	0,4 (0,8)		0,4 (0,8)
	HLz 12	$F_{per}$ [kN]	0,8 (1,0)	0,8 (1,0)	0,8 (1,0)		0,8 (1,0)
Hollow sand-lime brick	KSL 4	$F_{per}$ [kN]	0,4 (0,6)	0,4 (0,6)	0,4 (0,6)		0,4 (0,6)
	KSL 6	$F_{per}$ [kN]	0,6 (0,8)	0,6 (0,8)	0,6 (0,8)		0,6 (0,8)
	KSL 12	$F_{per}$ [kN]	0,8 (1,4)	0,8 (1,4)	0,8 (1,4)		0,8 (1,4)
Lightw. hollow concrete block	Hbl 2	$F_{rec}$ [kN]	0,3 (0,6) **	0,3 (0,6) **	0,3 (0,6)		0,3 (0,6)
	Hbl 4	$F_{rec}$ [kN]	0,6 (0,8) **	0,6 (0,8) **	0,6 (0,8)		0,6 (0,8)
Concrete hollow block	Hbn 4	$F_{rec}$ [kN]	0,6 (0,8) **	0,6 (0,8) **	0,6 (0,8)		0,6 (0,8)
Drill hole $\varnothing$		$d_0$ [mm]	14	16	16	20	20
Drill hole depth		$h_0$ [mm]	105	105	135	90	90
Embedment depth		$h_{ef}$ [mm]	80	90	130	85	85
Bending moment (zinc plated 5.8)		$M_{per}$ [Nm]	10,7	21,4	37,4		94,9
Bending moment (stainless steel A4)		$M_{per}$ [Nm]	12,1	24,1	42,1		104,2

Spacing and edge distance						
Spacing (anchor group)	$a \geq$ [mm]		100 (Hbl and Hbn = 200)			
Minimum spacing	min a [mm]		50 (Hbl and Hbn = 200)			
Spacing (single anchor)	$a_z$ [mm]		250			
Edge distance	$a_r \geq$ [mm]		200 for hollow bricks, 250 for solid bricks			
Edge distance for special applications	$a_r \geq$ [mm]		50 for hollow bricks, 60 for solid bricks			
Min. thickness of base material (masonry)	$h_{min}$ [mm]		110			
Diameter of clearance hole in fixture	$d_f$ [mm]		9	12	14	18
Installation torque	$T_{inst} \leq$ [Nm]		2	2	8	8

Load values: When anchoring in hollow or perforated masonry the values in parentheses may be used if the hole is made with a rotary drill (hammer switched off). For KSL the outer wall must be min 30 mm.

\*) The DIBt approvals Z-21.3-1815 for ResiFIX PY and Z-21.3-1816 for ResiFIX VY ... SF include anchor rods M8 and M10; for M12 and M16 recommended loads  $F_{rec}$ .

\*\*\*) The DIBt approvals Z-21.3-1815 for ResiFIX P and Z-21.3-1816 for ResiFIX VY ... SF do not include Hbl 2, Hbl 4 and Hbn 4.





## ResiFIX technical data

### Fastening in concrete with the professional system Pure Epoxy

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 ( $\gamma_M$  und  $\gamma_P$ ). Design according to TR029. See approval ETA-09/0373 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 <sup>1)2)</sup> (24 °C / 40 °C) <sup>3)</sup> 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]	9,3/9,9/9,9	9,3/15,7/15,7	11,7/22,5/22,5	14,3/28,0/42,0	14,7/38,1/63,9	16,2/52,3/84,0	22,6/70,2/70,2

#### Tension load <sup>1)2)</sup> (24 °C / 40 °C) <sup>3)</sup> cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	-	-	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]	-	-	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 <sup>1)2)</sup> (43 °C / 60 °C) <sup>3)</sup> non-cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	6,8/8,6/8,6	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]	6,8/9,1/9,9	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 <sup>1)2)</sup> (43 °C / 60 °C) <sup>3)</sup> cracked concrete

Zinc plated 5.8	$N_{per}$ [kN]	-	-	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]	-	-	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 <sup>1)</sup> (24 °C / 40 °C, 43 °C / 60 °C) <sup>3)</sup> cracked and non-cracked concrete

Zinc plated 5.8	$V_{per}$ [kN]	5,1/5,1/5,1	8,1/8,6/8,6	10,5/12,0/12,0	13,4/22,3/22,3	16,5/34,9/34,9	18,7/50,3/50,3	27,0/80,0/80,0
Stainless steel A4	$V_{per}$ [kN]	6,0/6,0/6,0	8,1/9,2/9,2	10,5/13,7/13,7	13,4/25,2/25,2	16,5/39,4/39,4	18,7/56,6/56,8	27,0/42,0/42,0
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

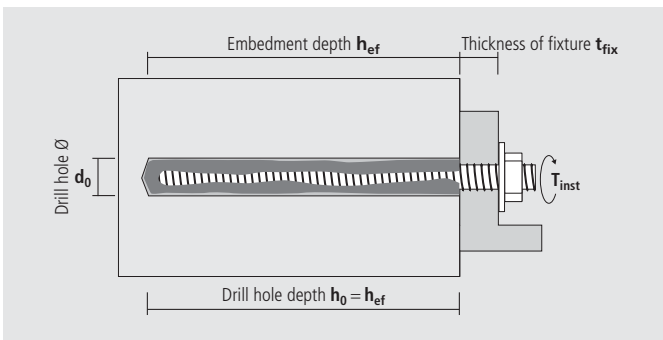
Spacing <sup>4)</sup>	$s_{cr,N}$ [mm]	226	270	330	375	510	607	759
Edge distance <sup>4)</sup>	$c_{cr,N}$ [mm]	113	135	165	188	255	304	380
Minimum spacing distance	$s_{min}$ [mm]	40	50	60	80	100	120	150
Minimum edge distance	$c_{min}$ [mm]	40	50	60	80	100	120	150
Minimum thickness of concrete	$h_{min}$ [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

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

<sup>2)</sup> Increasing factors for non-cracked concrete C30/37 = 1,04, C40/50 = 1,08, C50/60 = 1,10.

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

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



## Chemical fastening systems



# Bonded anchor VA and anchor studs VA AST



Bonded anchor VA



Anchor stud VA AST

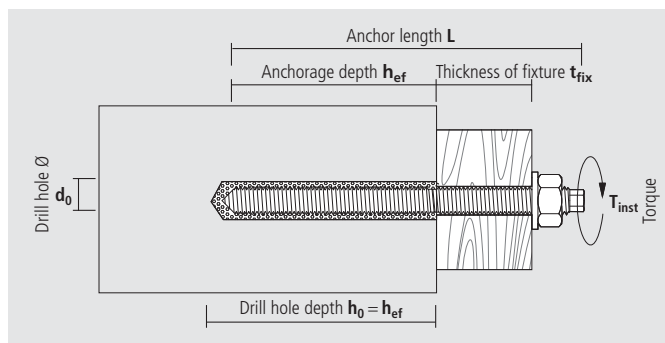


### Advantages

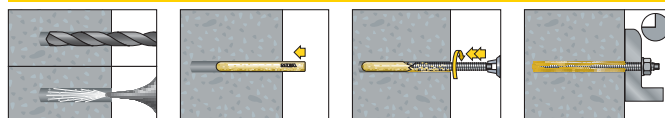
- Suitable for fastening heavy loads in concrete with small edge distances
- The VA bonded anchor utilises the joint between the steel, the mortar and the concrete
- During installation the small glass tube is crushed and mixes with the resin, hardener and the aggregates
- The bonded anchor VA made of two components contains styrene free vinylester
- Long shelf life of 2.5 years

### Suitable building materials

- ✓ Concrete



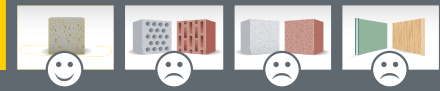
### Montage



VA						Price	Packing	
Type	Art-No		d <sub>0</sub> [mm]	h <sub>0</sub> [mm]	Suitable for VA AST	€/100 pcs	[pcs]	[pcs]
	new	old						
VA M 8	98VA	504101	10	80	M 8		10	200
VA M 10	910VA	504103	12	90	M 10		10	200
VA M 12	912VA	504105	14	110	M 12		10	200
VA M 16	916VA	504107	18	125	M 16		10	200
VA M 20	920VA	504109	25	170	M 20		5	50
VA M 24	924VA	504139	28	210	M 24		5	50
VA M 30*	930VAS	504111	35	280	M 30		5	25

\* not part of the approval

## Chemical fastening systems



# Bonded anchor VA and anchor studs VA AST



VA AST zinc plated 5.8 with nut and washer								Price	Packing	
Type	Art-No		d <sub>0</sub> [mm]	h <sub>ef</sub> =h <sub>0</sub> [mm]	L [mm]	t <sub>fix</sub> ≤ [mm]	nut	€/100 pcs	[pcs]	[pcs]
	new	old								
M 8-110	98100AST	504161	10	80	110	16	SW 13		10	200
M 10-130	910130AST	504163	12	90	130	22	SW 17		10	200
M 10-165	910165AST	504172	12	90	165	58	SW 17		10	200
M 10-190	910190AST	504174	12	90	190	82	SW 17		10	100
M 12-160	912160AST	504165	14	110	160	30	SW 19		10	100
M 12-220	912220AST	504176	14	110	220	90	SW 19		10	80
M 12-250	912250AST	504178	14	110	250	120	SW 19		10	80
M 12-300	912300AST	504180	14	110	300	170	SW 19		10	60
M 16-165	916165AST	504182	18	125	165	13	SW 24		10	50
M 16-190	916190AST	504167	18	125	190	38	SW 24		10	50
M 16-250	916250AST	504184	18	125	250	98	SW 24		10	40
M 20-260	920260AST	504169	25	170	260	70	SW 30		5	30
M 24-300	924300AST	504160	28	210	300	65	SW 36		5	25
M 30-380*	930380AST	504170	35	280	380	70	SW 46		5	5

\* not part of the approval; without hexagon head  
Every box contains a setting tool (Allen screw)



VA AST stainless steel A4 with nut and washer								Price	Packing	
Type	Art-No		d <sub>0</sub> [mm]	h <sub>ef</sub> =h <sub>0</sub> [mm]	L [mm]	t <sub>fix</sub> ≤ [mm]	nut	€/100 pcs	[pcs]	[pcs]
	new	old								
M 8-110	9X8100AST	504171	10	80	110	16	SW 13		10	200
M 10-130	9X10130AST	504173	12	90	130	22	SW 17		10	200
M 12-160	9X12160AST	504175	14	110	160	30	SW 19		10	100
M 16-190	9X16190AST	504177	18	125	190	38	SW 24		10	50
M 20-260	9X20260VMAST	504179	25	170	260	70	SW 30		5	30

Every box contains a setting tool (Allen screw)

## Loads, spacing and edge distance in concrete

Type	Concrete C20/25 bis C50/60					Spacing		Edge distance		Min. thickness of structural part d [mm]	Max. torque T <sub>inst</sub> ≤ [Nm]
	Tension load N <sub>per</sub> [kN]	Shear load		Bending moment		S <sub>cr</sub> [mm]	S <sub>min</sub> [mm]	C <sub>cr,N</sub> [mm]	C <sub>min</sub> [mm]		
		zinc plated V <sub>zul</sub> [kN]	A4 V <sub>zul</sub> [kN]	zinc plated M <sub>per</sub> [kN]	A4 M <sub>per</sub> [kN]						
M 8	3,6	4,4	5,0	8,8	10,1	240	60	120	60	110	10
M 10	4,8	7,2	7,8	16,5	18,8	270	70	135	70	120	20
M 12	6,4	10,4	11,9	30,8	34,3	330	85	165	85	150	40
M 16	9,9	19,8	22,4	79,1	88,8	380	95	190	95	160	60
M 20	15,9	31,3	35,3	156,6	175,8	510	130	255	130	220	120
M 24	23,8	45,6	50,8	273,6	306,6	630	160	315	160	300	150
M 30*	60,0	60,0	60,0	642,0	402,0	700	280	350	140	330	400

\* not part of the ETA approval. Values according to former DiBT approval

## Curing times in dry concrete

Temperature inside drill hole	[°C]	> -5	> 0	> +5	> +10	> +20
Min. curing time	[min]	360	180	90	40	20

Installation possible in dry or wet concrete.  
Installation for anchor sizes M12 to M24 possible in holes filled with water (no sea water) as well.  
For wet concrete curing time must be doubled.