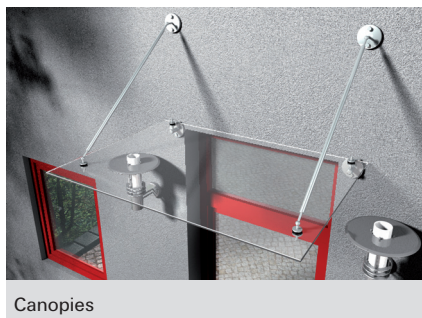


## Secure hold in aerated concrete



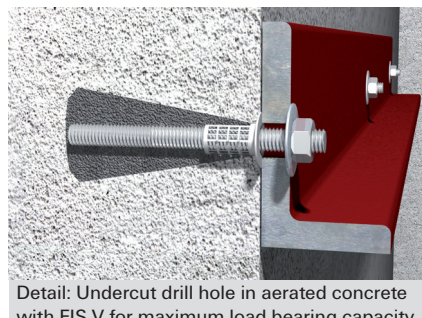
### VERSIONS

- Zinc-plated steel
- Stainless steel

### BUILDING MATERIALS

#### Approved for:

- Aerated concrete blocks



### CERTIFICATES



### ADVANTAGES

- The cone-shaped drill hole guarantees maximum load-bearing capacity in aerated concrete thanks to the interlock.
- The centring sleeve PBZ fixes the anchor in the drill hole, thus also allowing for overhead installation.
- Two anchorage depths in combination with the threaded rod FIS A allow for the ideal adaptation to the load to be applied.
- The anchoring in cylindric drilled holes are approved and enables therefore fixing solutions in through facings.
- The internal threaded anchor FIS E allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.

### APPLICATIONS

- Guard rails
- Consoles
- Gates
- Staircases
- Windows
- Façades
- Canopies
- Timber constructions
- Steel constructions
- Sun protection

### FUNCTIONING

- The highest loads will be achieved with a cone-shaped drill hole in combination with FIS V.
- Depending on the application, approved anchorings in aerated concrete can also be realised with FIS V, FIS VL, FIS GREEN and FIS P Plus in a cylindrical drill hole. FIS P is suitable as well, but does not have approvals.
- The injection system for aerated concrete is suitable for pre-positioned installation.
- The cone drill bit PBB allows for the drill hole and undercut to be made in one step by pivoting the drill.
- The mortar completely fills the undercut and transfers the load via the interlock.
- The drill hole is filled from the drill hole mouth using the centring sleeve PBZ.
- The threaded rod FIS A or the internal threaded anchor FIS E are set manually by turning lightly.

### FOR USE WITH



**FIS V mortar**  
see page 113



**FIS GREEN mortar**  
see page 133



**FIS P Plus mortar**  
see page 136

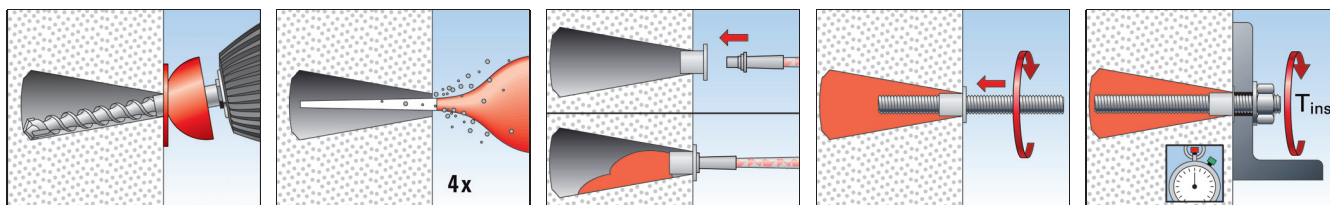


**FIS P mortar**  
see page 138

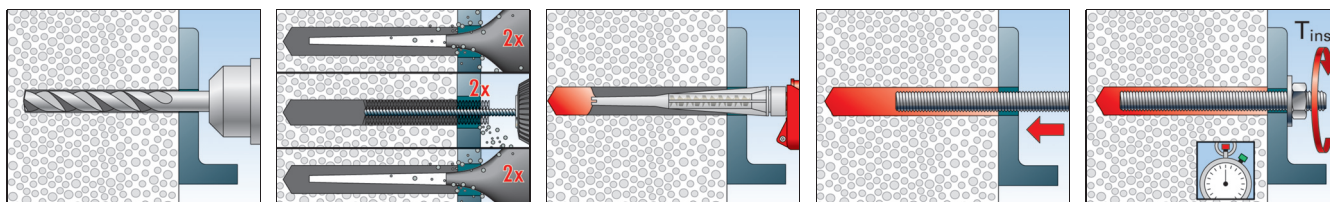


**FIS VL mortar**  
see page 119

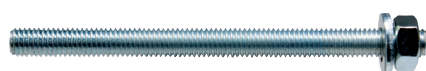
## INSTALLATION - UNDERCUT DRILL HOLE



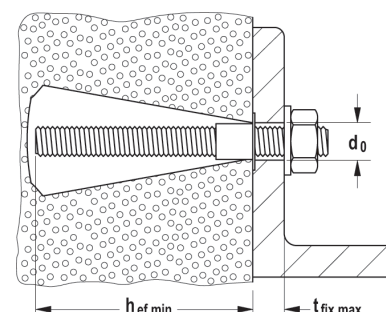
## INSTALLATION - CYLINDRICAL DRILL HOLE



## TECHNICAL DATA FOR UNDERCUT DRILL HOLE



Threaded rod FIS A



	zinc plated, steel grade 5.8	zinc plated, steel grade 8.8	stainless steel	Approval	Drill hole diameter in aerated concrete	Min. anchorage depth in aerated concrete	Max. useful length in aerated concrete	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	$d_0$ [mm]	$h_{ef, min}$ [mm]	$t_{fix, max}$ [mm]	[scale units]	[pcs]
Item	gvz	gvz	A4						
FIS A M 8 x 90	090274	519390	090440	■	14	75	5	—	10
FIS A M 8 x 110	090275	519391	090441	■	14	75	25	—	10
FIS A M 8 x 130	090276	519392	090442	■	14	75	45	3	10
FIS A M 8 x 175	090277	519393	090443	■	14	75	90	3	10
FIS A M 10 x 110	090278	—	090444	■	14	75	25	—	10
FIS A M 10 x 130	090279	524170	090447	■	14	75	45	6	10
FIS A M 10 x 150	090281	517935	090448	■	14	75	65	4	10
FIS A M 10 x 170	044969	519395	044973	■	14	75	85	4	10
FIS A M 10 x 190	—	517936	—	■	14	75	—	4	10
FIS A M 10 x 200	090282	519396	090449	■	14	75	115	4	10
FIS A M 12 x 120	044971	519397	044974	■	14	75	30	5	10
FIS A M 12 x 140	090283	519398	090450	■	14	75	50	5	10
FIS A M 12 x 160	090284	517937	090451	■	14	75	70	5	10
FIS A M 12 x 180	090285	519399	090452	■	14	75	90	5	10
FIS A M 12 x 200	—	517938	—	■	14	75	—	5	10
FIS A M 12 x 210	090286	—	090453	■	14	75	115	5	10
FIS A M 12 x 260	090287	—	090454	■	14	75	170	5	10

The anchoring of threaded rods M6 - M16 can also be made with a cylindric drilled hole. The minimum anchorage depth is 100 mm.

## TECHNICAL DATA



Internal threaded sockets **FIS E**

	zinc-plated steel	Approval	Drill hole diameter	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	ETA	$d_0$ [mm]	$h_{ef}$ [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[scale units]	[pcs]
Item	gvz							
<b>FIS E 11 x 85 M6</b>	<b>043631</b>	■	14	85	6	60	20	10
<b>FIS E 11 x 85 M8</b>	<b>043632</b>	■	14	85	8	60	20	10

The ETA also allows that the internal threaded sockets FIS E M6 - M12 can be anchored in cylindric drilled holes.

## ACCESSORIES



Cone drill **PBB**



Centring sleeve **PBZ**

		Approval	Match	Contents	Sales unit
Item	Art.-No.	ETA			[pcs]
<b>Cone drill PBB</b>	<b>090634</b>	■	M8 - M12; FIS E	1x cone drill PBB	1
<b>Centring sleeve PBZ</b>	<b>090671</b>	■	M8 - M12; FIS E	10x centring sleeve PBZ, 5x injection adapter	10

## LOADS

### Injection system FIS V with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-10/0383 has to be considered.

Type anchor rod	Compressive-brick-strength  $f_b$ [N/mm <sup>2</sup> ]	Brick raw density  $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions  (L x W x H) [mm]	Min. effective-anchorage depth  $h_{ef}$ [mm]	Min. member thickness  $h_{min}$ [mm]	Maximum torque  $T_{inst,max}$ [Nm]	Permissible tensile load <sup>3)</sup>  $N_{perm}$ [kN]	Permissible shear load <sup>3)</sup>  $V_{perm}$ [kN]	Characteristic spacing parallel to bed joint  $s_{cr \parallel}$ [mm]	Characteristic spacing perpendicular to bed joint  $s_{cr \perp}$ [mm]	Min. spacing <sup>2)</sup>  $s_{min \parallel} \parallel$ / $s_{min \perp \perp}$ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  $c_{cr} = c_{min}$ [mm]			
Aerated concrete acc. to EN 771-4															
M8 <sup>6)</sup>	≥ 2	≥ 0,35		100	130	1	0,54	0,43	250	250	250	100			
M10 <sup>6)</sup>						2	0,54	0,43							
M12 <sup>6)</sup>						2	0,71	0,54							
M16 <sup>6)</sup>						2	0,71	0,43							
M8 <sup>6)</sup>	≥ 4	≥ 0,50				1	0,71	0,89							
M10 <sup>6)</sup>						2	1,07	0,71							
M12 <sup>6)</sup>						2	0,89	0,89							
M16 <sup>6)</sup>						2	0,71	0,71							
M8 <sup>6)</sup>	≥ 6	≥ 0,65				1	1,25	1,07							
M10 <sup>6)</sup>						2	1,79	1,07							
M12 <sup>6)</sup>						2	1,79	1,25							
M16 <sup>6)</sup>						2	1,07	1,61							
M8, M10, M12 <sup>7)</sup>	≥ 2	≥ 0,35				75	105	2	0,71	0,89	240	240	240	120	
M8, M10, M12 <sup>7)</sup>	≥ 4	≥ 0,50							1,07	1,61					
M8, M10, M12 <sup>7)</sup>	≥ 6	≥ 0,65							1,43	2,14					
M8, M10, M12 <sup>7)</sup>	≥ 2	≥ 0,35							0,89	0,89	300	250	300 / 250	150	
M8, M10, M12 <sup>7)</sup>	≥ 4	≥ 0,50							1,25	1,61					
M8, M10, M12 <sup>7)</sup>	≥ 6	≥ 0,65							1,61	2,14					

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>6)</sup> Cylindrical drill hole. Pre-positioned and push-through installation possible.

<sup>7)</sup> Drill hole to be made with cone drill bit PBB. Pre-positioned installation only.

## LOADS

### Injection system FIS VL with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-15/0263 has to be considered.

Type anchor rod	Compressive-brick-strength  $f_b$ [N/mm <sup>2</sup> ]	Brick raw density  $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions  (L x W x H) [mm]	Min. effective-anchorage depth  $h_{ef}$ [mm]	Min. member thickness  $h_{min}$ [mm]	Maximum torque  $T_{inst,max}$ [Nm]	Permissible tensile load <sup>3)</sup>  $N_{perm}$ [kN]	Permissible shear load <sup>3)</sup>  $V_{perm}$ [kN]	Characteristic spacing parallel to bed joint  $s_{cr \parallel}$ [mm]	Characteristic spacing perpendicular to bed joint  $s_{cr \perp}$ [mm]	Min. spacing <sup>2)</sup>  $s_{min \parallel} / s_{min \perp}$ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  $c_{cr} = c_{min}$ [mm]			
Aerated concrete acc. to EN 771-4															
M8	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100			
M10						2	0,54	0,43							
M12						2	0,54	0,54							
M8	≥ 4	≥ 0,50				1	0,71	0,89							
M10						2	0,89	0,71							
M12						2	0,89	0,89							
M8	≥ 6	≥ 0,65				1	1,25	1,07							
M10						2	1,79	1,07							
M12						2	1,79	1,25							

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

## LOADS

### Injection system FIS GREEN with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-14/0471 has to be considered.

Type anchor rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick dimensions  (L x W x H) [mm]	Min. effective-anchorage depth  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub>    [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub>    / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]														
Aerated concrete acc. to EN 771-4																										
M8	≥ 2	≥ 0,35	-	100	130	1	0,71	0,32	240	115	240 / 115	80														
M10						2	0,71	0,32																		
M12						2	0,89	0,32																		
M16						2	0,89	0,43																		
M8	≥ 4	≥ 0,50				-	100	130					1	0,89	0,54	240	115	240 / 115	80							
M10													2	1,07	0,54											
M12													2	1,07	0,54											
M16													2	1,07	0,54											
M8	≥ 6	≥ 0,65											-	100	130					1	1,25	0,89	240	115	240 / 115	80
M10																				2	1,43	0,89				
M12																				2	1,43	0,89				
M16																				2	1,43	0,71				

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

## LOADS

### Injection system FIS P Plus with threaded rod FIS A<sup>4)</sup>

Highest permissible loads<sup>1) 5)</sup> for a single anchor in aerated concrete.

For the design the complete assessment ETA-11/04 19 has to be considered.

Type anchor rod	Compressive-brick-strength  f <sub>b</sub> [N/mm <sup>2</sup> ]	Brick raw density  ρ [kg/dm <sup>3</sup> ]	Minimum brick dimensions  (L x W x H) [mm]	Min. effective-anchorage depth  h <sub>ef</sub> [mm]	Min. member thickness  h <sub>min</sub> [mm]	Maximum torque  T <sub>inst,max</sub> [Nm]	Permissible tensile load <sup>3)</sup>  N <sub>perm</sub> [kN]	Permissible shear load <sup>3)</sup>  V <sub>perm</sub> [kN]	Characteristic spacing parallel to bed joint  s <sub>cr</sub> ∥ [mm]	Characteristic spacing perpendicular to bed joint  s <sub>cr</sub> ⊥ [mm]	Min. spacing <sup>2)</sup>  s <sub>min</sub> ∥ / s <sub>min</sub> ⊥ [mm]	Characteristic resp. min. edge distance <sup>2)</sup>  c <sub>cr</sub> = c <sub>min</sub> [mm]			
Aerated concrete acc. to EN 771-4															
M8	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100			
M10						2	0,54	0,43							
M12						2	0,54	0,54							
M8	≥ 4	≥ 0,50				1	0,71	0,89							
M10						2	0,89	0,71							
M12						2	0,89	0,89							
M8	≥ 6	≥ 0,65				1	1,25	1,07							
M10						2	1,79	1,07							
M12						2	1,79	1,25							

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered.

<sup>2)</sup> Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>3)</sup> For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

<sup>4)</sup> Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

<sup>5)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.