

## Injection system FIS V with threaded rod FIS A (property class 5.8)

Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

Type					Cracked concrete				Non-cracked concrete			
	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M6 (5.8)	50		100	5,0					4,0	2,9	40	40
		72	102	5,0					5,2	2,9	40	40
FIS A M8 (5.8)	60		100	10,0					7,9	5,1	40	40
		160	190	10,0					9,0	5,1	40	40
FIS A M10 (5.8)	60		100	20,0	5,4	8,6	45	45	9,9	8,6	45	45
		200	230	20,0	13,8	8,6	45	45	13,8	8,6	45	45
FIS A M12 (5.8)	70		100	40,0	7,5	12,0	55	55	13,8	12,0	55	55
		240	270	40,0	20,5	12,0	55	55	20,5	12,0	55	55
FIS A M16 (5.8)	80		116	60,0	11,5	22,3	65	65	17,2	22,3	65	65
		320	356	60,0	37,6	22,3	65	65	37,6	22,3	65	65
FIS A M20 (5.8)	90		138	120,0	14,6	29,3	85	85	20,5	34,9	85	85
		400	448	120,0	58,6	34,9	85	85	58,6	34,9	85	85
FIS A M24 (5.8)	96		152	150,0	15,5	31,0	105	105	22,6	45,2	105	105
		480	536	150,0	77,6	50,9	105	105	84,3	50,9	105	105
FIS A M27 (5.8)	108		168	200,0	17,4	34,9	125	125	27,0	54,0	125	125
		540	600	200,0	87,2	65,7	125	125	109,5	65,7	125	125
FIS A M30 (5.8)	120		190	300,0	21,5	43,1	140	140	31,6	63,2	140	140
		600	670	300,0	107,7	80,6	140	140	133,8	80,6	140	140

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

## Injection system FIS V, FIS VW, FIS VS with threaded rod FIS A (property class 8.8)

Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

Type					Cracked concrete				Non-cracked concrete			
	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M6 (8.8)	50		100	5,0					4,0	4,6	40	40
		72	102	5,0					5,8	4,6	40	40
FIS A M8 (8.8)	60		100	10,0					7,9	8,6	40	40
		160	190	10,0					14,3	8,6	40	40
FIS A M10 (8.8)	60		100	20,0	5,4	10,8	45	45	9,9	13,1	45	45
		200	230	20,0	18,0	13,1	45	45	22,4	13,1	45	45
FIS A M12 (8.8)	70		100	40,0	7,5	15,1	55	55	13,8	19,4	55	55
		240	270	40,0	25,9	19,4	55	55	32,4	19,4	55	55
FIS A M16 (8.8)	80		116	60,0	11,5	23,0	65	65	17,2	36,0	65	65
		320	356	60,0	46,0	36,0	65	65	60,0	36,0	65	65
FIS A M20 (8.8)	90		138	120,0	14,6	29,3	85	85	20,5	41,1	85	85
		400	448	120,0	65,8	56,0	85	85	93,3	56,0	85	85
FIS A M24 (8.8)	96		152	150,0	15,5	31,0	105	105	22,6	45,2	105	105
		480	536	150,0	77,6	80,6	105	105	134,3	80,6	105	105
FIS A M27 (8.8)	108		168	200,0	17,4	34,9	125	125	27,0	54,0	125	125
		540	600	200,0	87,2	105,1	125	125	175,2	105,1	125	125
FIS A M30 (8.8)	120		190	300,0	21,5	43,1	140	140	31,6	63,2	140	140
		600	670	300,0	107,7	128,6	140	140	213,8	128,6	140	140

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

## Injection system FIS V, FIS VW, FIS VS with threaded rod FIS A A4 (property class A4-70)

Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

Type					Cracked concrete				Non-cracked concrete			
	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
FIS A M6 (A4-70)	50		100	5,0					4,0	3,2	40	40
		72	102	5,0					5,3	3,2	40	40
FIS A M8 (A4-70)	60		100	10,0					7,9	6,0	40	40
		160	190	10,0					9,9	6,0	40	40
FIS A M10 (A4-70)	60		100	20,0	5,4	9,2	45	45	9,9	9,2	45	45
		200	230	20,0	15,7	9,2	45	45	15,7	9,2	45	45
FIS A M12 (A4-70)	70		100	40,0	7,5	13,7	55	55	13,8	13,7	55	55
		240	270	40,0	22,5	13,7	55	55	22,5	13,7	55	55
FIS A M16 (A4-70)	80		116	60,0	11,5	23,0	65	65	17,2	25,2	65	65
		320	356	60,0	42,0	25,2	65	65	42,0	25,2	65	65
FIS A M20 (A4-70)	90		138	120,0	14,6	29,3	85	85	20,5	39,4	85	85
		400	448	120,0	65,7	39,4	85	85	65,7	39,4	85	85
FIS A M24 (A4-70)	96		152	150,0	15,5	31,0	105	105	22,6	45,2	105	105
		480	536	150,0	77,6	56,8	105	105	94,3	56,8	105	105
FIS A M27 (A4-70)	108		168	200,0	17,4	34,9	125	125	27,0	54,0	125	125
		540	600	200,0	87,2	73,7	125	125	123,0	73,7	125	125
FIS A M30 (A4-70)	120		190	300,0	21,5	43,1	140	140	31,6	63,2	140	140
		600	670	300,0	107,7	90,2	140	140	150,1	90,2	140	140

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

# LOADS

## Injection system FIS V, FIS VW, FIS VS with threaded rod FIS A C (property class C-70)

### Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

Type	Min. effective anchorage depth $h_{ef,min}$ [mm]	Max. effective anchorage depth $h_{ef,max}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Cracked concrete				Non-cracked concrete			
					Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
<b>FIS A M6 (C-70)</b>	50		100	5,0					4,0	4,0	40	40
		72	102	5,0					5,8	4,0	40	40
<b>FIS A M8 (C-70)</b>	60		100	10,0					7,9	7,4	40	40
		160	190	10,0					12,4	7,4	40	40
<b>FIS A M10 (C-70)</b>	60		100	20,0	5,4	10,8	45	45	9,9	11,4	45	45
		200	230	20,0	18,0	11,4	45	45	19,5	11,4	45	45
<b>FIS A M12 (C-70)</b>	70		100	40,0	7,5	15,1	55	55	13,8	17,1	55	55
		240	270	40,0	25,9	17,1	55	55	28,1	17,1	55	55
<b>FIS A M16 (C-70)</b>	80		116	60,0	11,5	23,0	65	65	17,2	31,4	65	65
		320	356	60,0	46,0	31,4	65	65	52,4	31,4	65	65
<b>FIS A M20 (C-70)</b>	90		138	120,0	14,6	29,3	85	85	20,5	41,1	85	85
		400	448	120,0	65,8	49,1	85	85	81,9	49,1	85	85
<b>FIS A M24 (C-70)</b>	96		152	150,0	15,5	31,0	105	105	22,6	45,2	105	105
		480	536	150,0	77,6	70,9	105	105	117,6	70,9	105	105
<b>FIS A M27 (C-70)</b>	108		168	200,0	17,4	34,9	125	125	27,0	54,0	125	125
		540	600	200,0	87,2	92,0	125	125	153,3	92,0	125	125
<b>FIS A M30 (C-70)</b>	120		190	300,0	21,5	43,1	140	140	31,6	63,2	140	140
		600	670	300,0	107,7	112,6	140	140	187,1	112,6	140	140

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C). Erection of the drill hole by hammer drilling with best possible drill hole cleaning according approval. The anchor may be installed in dry or wet concrete.

# LOADS

Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with internal threaded anchor RG MI (screw property class 8.8)

Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

Type	Effective anchorage depth $h_{ef}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Non-cracked concrete			
				Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
<b>RG M 8 I</b>	90	120	10,0	13,8	8,3	40	40
<b>RG M 10 I</b>	90	125	20,0	19,0	13,3	45	45
<b>RG M 12 I</b>	125	165	40,0	23,8	19,3	60	60
<b>RG M 16 I</b>	160	208	80,0	35,7	35,8	80	80
<b>RG M 20 I</b>	200	264	120,0	54,8	42,9	125	125

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for fixations in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval.

## LOADS

Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with internal threaded anchor RG MI A4 (screw property class A4-70)

Highest permissible loads for a single anchor<sup>1) 6)</sup> in concrete C20/25<sup>4)</sup>

For the design the complete approval ETA - 02/0024 has to be considered.

				Non-cracked concrete			
Type	Effective anchorage depth $h_{ef}$ [mm]	Min. member thickness $h_{min}$ [mm]	Max. torque moment $T_{inst,max}$ [Nm]	Permissible tensile load $N_{perm}^{3)}$ [kN]	Permissible shear load $V_{perm}^{3)}$ [kN]	Min. spacing $s_{min}^{2)}$ [mm]	Min. edge distance $c_{min}^{2)}$ [mm]
<b>RG M 8 I A4</b>	90	120	10,0	9,9	5,9	40	40
<b>RG M 10 I A4</b>	90	125	20,0	15,7	9,3	45	45
<b>RG M 12 I A4</b>	125	165	40,0	22,5	13,5	60	60
<b>RG M 16 I A4</b>	160	208	80,0	35,7	25,1	80	80
<b>RG M 20 I A4</b>	200	264	120,0	54,8	39,4	125	125

<sup>1)</sup> The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of  $\gamma_L = 1,4$  are considered. As an single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1,5 \times h_{ef}$ .

<sup>2)</sup> Minimum possible axial spacings resp. edge distance while reducing the permissible load.

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

<sup>4)</sup> For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

<sup>6)</sup> The given loads are valid for fixations in dry and humid concrete for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and best possible drillhole cleaning according approval.

### Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A<sup>5)</sup>

Highest permissible loads<sup>1) 6)</sup> for a single anchor in solid brick masonry for pre-positioned or push-through installation.

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

							Solid brick masonry			
Type	Compressive brick strength	Brick raw density	Minimum brick dimensions <sup>7)</sup>	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Min. spacing <sup>2)</sup>	Min. edge distance <sup>2)</sup>
	$f_b$	$\rho$	(L x W x H)	$h_{ef}$	$h_{min}$	$T_{inst,max}$	$N_{perm}$	$V_{perm}$	$s_{min}$	$c_{min}$
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]
<b>Solid brick Mz, 2DF acc. EN 771-1</b>										
M8	≥ 10	≥ 1,8	240x115x113	50	115	10	0,86	0,86	115	60
M10	≥ 10			50			0,86	1,00	115	60
M12	≥ 10			100			1,57	1,00	115	60
M8	≥ 16			50			1,29	1,43	115	60
M10	≥ 16			50			1,29	1,57	115	60
M12	≥ 16			100			2,29	1,57	115	60
<b>Solid sand-lime brick KS acc. EN 771</b>										
M8	≥ 10	≥ 2,0	250x240x240	50	240	10	2,00	1,29	80	60
M10	≥ 10			50			2,00	1,29	80	60
M12	≥ 10			50			2,00	1,29	80	60
M16	≥ 10			50			1,57	1,29	80	60
M8	≥ 20			50			2,57	1,86	80	60
M10	≥ 20			50			2,57	1,86	80	60
M12	≥ 20			50			2,57	1,86	80	60
M16	≥ 20			50			2,14	1,86	80	60
M8	≥ 28			50			2,57	2,57	80	60
M10	≥ 28			50			2,57	2,57	80	60
M12	≥ 28			50			2,57	2,57	80	60
M16	≥ 28			50			2,57	2,57	80	60

<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 possible axial spacings resp. edge distance. Details concerning 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>5)</sup> gvz, A4 and C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

# Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in solid brick masonry for pre-positioned installation.

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

							Solid brick masonry			
Type	Compressive brick strength	Brick raw density	Minimum brick dimensions <sup>7)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Min. spacing <sup>2)</sup>	Min. edge distance <sup>2)</sup>
	$f_b$	$\rho$	(L x W x H)	$h_{ef}$	$h_{min}$	$T_{inst,max}$	$N_{perm}$	$V_{perm}$	$s_{min}$	$c_{min}$
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]
<b>Solid brick Mz, 2DF acc. EN 771-1</b>										
M8	≥ 10	≥ 1,8	240x115x113	85	115	10	0,86	0,86	115	60
M10	≥ 10						0,86	1,00	115	60
M8	≥ 16						1,29	1,43	115	60
M10	≥ 16						1,29	1,57	115	60
<b>Solid sand-lime brick KS acc. EN 771</b>										
M8/M10	≥ 10	≥ 2,0	250x240x240	85	240	10	2,29	1,29	80	60
M8/M10	≥ 20						2,57	1,86	80	60
M8/M10	≥ 28						2,57	2,57	80	60
<b>Solid brick of lightweight aggregate concrete Vbl acc. EN 771-3</b>										
M8	≥ 4	≥ 1,6	250x240x239	50	240	4	0,57	0,86	250	130
M8	≥ 4			85			1,00	1,00	250	130
M10	≥ 4			85			1,14	1,00	250	130
M8	≥ 6			50			0,86	1,29	250	130
M8	≥ 6			85			1,43	1,29	250	130
M10	≥ 6			85			1,86	1,57	250	130
M8	≥ 8			50			1,14	1,71	250	130
M8/M10	≥ 8			85			2,43	2,00	250	130
M12/M16	≥ 8			85			2,57	2,43	250	130

<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 possible axial spacings resp. edge distance. Details concerning 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> The max. anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> gvz, A4 and C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.



## Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A<sup>5)</sup> and anchor sleeve FIS H..K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry for pre-positioned installation.

For the design the complete assessment ETA-10/O383 has to be considered.

Type	Compressive brick strength  $f_b$ [N/mm <sup>2</sup> ]	Brick raw density  $\rho$ [kg/dm <sup>3</sup> ]	Minimum brick dimensions <sup>7)</sup>  (L x W x H) [mm]	Min. effective anchorage depth <sup>4)</sup>  $h_{ef}$ [mm]	Min. member thickness  $h_{min}$ [mm]	Maximum torque  $T_{inst,max}$ [Nm]	Perforated brick masonry			
							Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Min. spacing <sup>2)</sup>	Min. edge distance <sup>2)</sup>
							$N_{perm}$ [kN]	$V_{perm}$ [kN]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>Vertically perforated brick Hlz, shape B acc. EN 771-1</b>										
M6 / M8	≥ 6	≥ 1,0	370x240x237	50	240	2,0	0,17	0,21	100	100
M8 - M16	≥ 6			85			0,43	0,21	100	100
M6 / M8	≥ 8			50			0,21	0,26	100	100
M8 - M16	≥ 8			85			0,57	0,26	100	100
M6 / M8	≥ 16			50			0,86	0,43	100	100
M8 - M16	≥ 16			85			0,86	0,43	100	100
<b>Perforated sand-lime brick KSL acc. EN 771-2</b>										
M6 / M8	≥ 12	≥ 1,4	240x175x113	50	175	2,0	0,71	0,71	100	60
M12 / M16	≥ 12			85			1,00	1,29	100	80
M8 / M10	≥ 20			85			1,43	2,14	100	80
M12 / M16	≥ 20			85			1,71	2,14	100	80
<b>Hollow block of lightweight aggregate concrete Hbl acc. EN 771-3</b>										
M6 / M8	≥ 4	≥ 1,0	362x240x240	50	240	2,0	0,71	0,57	100	60
M12 / M16	≥ 4			85			0,86	0,57	100	60

<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 possible axial spacings resp. edge distance. Details concerning 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> The max. anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

<sup>5)</sup> gvz, A4 and C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

## Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A<sup>5)</sup> and push-through anchor sleeve FIS H.K

Highest permissible loads<sup>1) 6)</sup> for a single anchor in perforated brick masonry for push-through installation.

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

							Perforated brick masonry			
Type	Compressive brick strength	Brick raw density	Minimum brick dimensions <sup>7)</sup>	Min. effective anchorage depth <sup>4)</sup>	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Min. spacing <sup>2)</sup>	Min. edge distance <sup>2)</sup>
	$f_b$ [N/mm <sup>2</sup> ]	$\rho$ [kg/dm <sup>3</sup> ]	(L x W x H) [mm]	$h_{ef}$ [mm]	$h_{min}$ [mm]	$T_{inst,max}$ [Nm]	$N_{perm}$ [kN]	$V_{perm}$ [kN]	$s_{min}$ [mm]	$c_{min}$ [mm]
<b>Vertically perforated brick shape B, Hz acc. EN 771-1</b>										
M10 / M12	≥ 6	≥ 0,7	500x200x300	130	200	2,0	0,57	0,26	100	80
M16	≥ 6						0,71	0,26	100	80
M10 / M12	≥ 8						0,71	0,34	100	80
M16	≥ 8						0,86	0,34	100	80
M10 / M12	≥ 10						0,86	0,43	100	80
M16	≥ 10						1,14	0,43	80	120
<b>Perforated sand-lime brick KSL acc. EN 771-2</b>										
M10 / M12	≥ 12	≥ 1,4	240x175x113	130	175	2,0	1,00	1,29	100	80
M16	≥ 12						1,00	1,14	100	80
M10 / M12	≥ 20						1,71	2,14	100	80
M16	≥ 20						1,71	1,86	100	80
<b>Hollow block of lightweight aggregate concrete Hbl acc. EN 771-3</b>										
M10 - M16	≥ 2	≥ 1,0	362x240x240	130	240	2,0	0,43	0,26	100	60
M16	≥ 4						0,86	0,57	100	60

<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 possible axial spacings resp. edge distance. Details concerning 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> The maximum anchorage depth is corresponding with the relevant push-through anchor sleeves FIS H 18 K and FIS H 22 K (see technical data).

<sup>5)</sup> gvz, A4 and C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.

<sup>7)</sup> Hole patterns see assessment.

# LOADS

## Injection system FIS V, FIS VW HIGH SPEED and FIS VS LOW SPEED with threaded rod FIS A<sup>5)</sup>

Highest permissible loads<sup>1) 6)</sup> for a single anchor in aerated concrete.

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

							Aerated concrete			
Type	Compressive brick strength	Brick raw density	Minimum brick dimensions	Min. effective anchorage depth	Min. member thickness	Maximum torque	Permissible tensile load <sup>3)</sup>	Permissible shear load <sup>3)</sup>	Min. spacing <sup>2)</sup>	Min. edge distance <sup>2)</sup>
	$f_b$	$\rho$	(L x W x H)	$h_{ef}$	$h_{min}$	$T_{inst,max}$	$N_{perm}$	$V_{perm}$	$s_{min}$	$c_{min}$
	[N/mm <sup>2</sup> ]	[kg/dm <sup>3</sup> ]	[mm]	[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]
<b>Aerated concrete acc. EN 771-4</b>										
M8 <sup>8)</sup>	≥ 4	≥ 0,50	130	100	-	1,0	0,71	0,71	250	100
M10 <sup>8)</sup>	≥ 4	≥ 0,50		100		2,0	1,07	0,89	250	100
M12 <sup>8)</sup>	≥ 4	≥ 0,50		100		2,0	0,89	0,89	250	100
M8 <sup>7)</sup>	≥ 4	≥ 0,50	125	95		2,0	1,25	1,07	250	150
M10 <sup>7)</sup>	≥ 6	≥ 0,65		95		2,0	1,43	2,14	250	150
M12 <sup>7)</sup>	≥ 6	≥ 0,65		95		2,0	1,43	2,14	250	150

<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 possible axial spacings resp. edge distance. Details concerning 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>5)</sup> gvz, A4 and C.

<sup>6)</sup> The given loads are valid for installation and use of fixations in dry masonry for temperatures in the substrate up to +50°C (resp. short term up to 80°C) and drillhole cleaning according assessment. The given brick types in combination with the permissible loads are only a small extract of the assessment.

<sup>7)</sup> Drilling with cone drill PBB. Only pre-positioned installation possible.

<sup>8)</sup> Cylindrical drill hole. Pre-positioned and push-through installation possible.