MIT-SE Plus Mortar for use in concrete

Injection anchors for use in concrete

The anchor is placed into a drilled hole filled with injection mortar. The steel element is anchored via the bond between metal part, injection mortar and concrete. The steel consist of a threaded rod or reinforcing bar.

1 SPECIFICATIONS OF INTENDED USE

Anchorages subject to:
-Static and quasi-static loads: M8 to M30, Rebar ø8 to ø32
-Seismic action for Performance Category C1

Base materials:
-Reinforced or unreinforced cracked or non-cracked normal weight concrete strength classes C20/25 to C50/60 according to EN 206-1:2000 (see ETA 10/0130 of 13 December 2016)
-Dry or wet concrete and flooded bore holes (see ETA 10/0130 of 13 December 2016)
-Dry or wet masonry (see ETA-12/0544 of 15 December 2016)

Approvals:
-European Assessment Document (ETAG 001, Part 5)
-European Assessment Document, for post-installed rebar connections (ETAG 001, Part 5)
-European Assessment Document, metal injection anchors for use in masonry (ETAG 029, April 2013)
-Seismic action for performance category C1 and fire resistance up to 180°C for threaded rods and rebar connections

Reaction to fire:
-Anchorages with threaded rod or Rebar satisfy requirements for Class A1

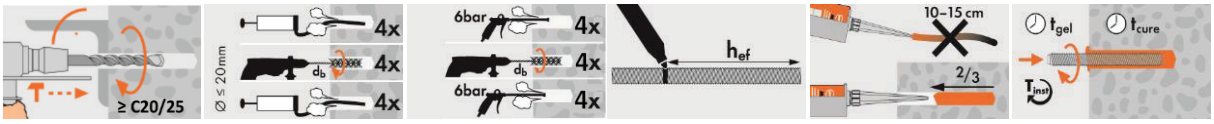
Resistance to fire:
-Fire resistance test certification for Rebar connections up to 180°C (Assessment of resistance under fire exposure -Z-21.8-1937)
-Fire resistance test certification for threaded rod connections up to 120°C (Assessment of resistance under fire exposure EBB 170019_31)

Installation:
-Dry or wet concrete and flooded holes (not sea water)
-Hole drilling by hammer or compressed air drill mode
-Overhead installation allowed
-Anchor Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site

2 CURING TIME AND INSTALLATION INSTRUCTIONS

MAXIMUM WORKING TIME AND MINIMUM CURING TIME IN CONCRETE									
Concrete temperature	**-10 ÷ -6°C**	**-5 ÷ -1°C**	**0 ÷ 4°C**	**5 ÷ 9°C**	**10 ÷ 19°C**	**20 ÷ 29°C**	**30 ÷ 34°C**	**35 ÷ 39°C**	**> 40°C**
max. working time t_{gel}	90 min	90 min	45 min	25 min	15 min	6 min	4 min	2 min	1,5 min
min. curing time in dry concrete t_{cure}	24 h	14 h	7 h	2 h	80 min	45 min	25 min	20 min	15 min
min. curing time in wet concrete t_{cure}	48 h	28 h	14 h	4 h	160 min	90 min	50 min	40 min	30 min
Cartridge temperature	**15 ÷ 40°C**	**5 ÷ 40°C**							

Graphic installation guide for MIT-SE Plus Injection system



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1. Drilling the hole with hammer drill or compressed air drill mode.
2.1. **Uncracked concrete:** Cleaning the hole with manual cleaning (diameter of metal anchor ≤ 20 mm and embedment depth ≤ 240 mm).
2.2. **Cracked or uncracked concrete:** Compressed air cleaning (≥ 6 bar) can be used for all sizes.
3. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor
4. Inject mixture into the hole only when an even color is flowing. Start filling from the bottom of the hole to avoid air pockets.
5. push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. Tightening with the torque wrench and predetermined value of T_{inst}.

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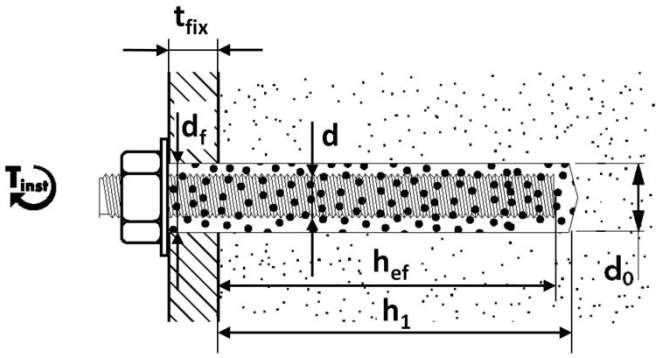
3 INSTALLATION DATA IN CONCRETE

Installation parameters for Mungo Injection system MIT-SE Plus in concrete are based on ETA-10/0130 of 13 December 2016

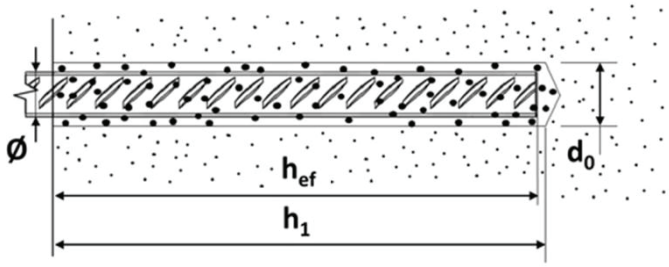
3.1 Installation parameters for threaded rod

THREADED ROD SIZE			M8	M10	M12	M16	M20	M24	M27	M30
Thread diameter	d	[mm]	8	10	12	16	20	24	27	30
Diameter of clearence hole in the fixture	d_f	[mm]	9	12	14	18	22	26	30	33
MIT-SE Plus INSTALLATION DATA										
Drill hole diameter in substrate	d_0	[mm]	10	12	14	18	24	28	32	35
Depth of drilled hole	h_1	[mm]	h_{ef} + 5 mm							
Effective anchorage depth	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120
	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
Installation torque	T_{inst} ≤	[Nm]	10	20	40	80	120	160	180	200
Minimum thickness of concrete memeber	h_{min}	[mm]	h_{ef} + 30 mm (≥ 100 mm)			h_{ef} + 2d_0				
Minimum spacing	s_{min}	[mm]	40	50	60	80	100	120	135	150
Minimum edge distane	c_{min}	[mm]	40	50	60	80	100	120	135	150



3.2 Installation parameters for reinforcing bar

REINFORCING BAR SIZE			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Rebar diameter	Ø	[mm]	8	10	12	14	16	20	25	28	32
MIT-COOL Plus INSTALLATION DATA											
Drill hole diameter in substrate	d_0	[mm]	12	14	16	18	20	24	32	35	40
Depth of drilled hole	h_1	[mm]	h_{ef} + 5 mm								
Effective anchorage depth	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100	112	128
	$h_{ef,max}$	[mm]	160	200	240	280	320	400	480	540	640
Minimum thickness of concrete memeber	h_{min}	[mm]	h_{ef} + 30 mm (≥ 100 mm)		h_{ef} + 2d_0						
Minimum spacing	s_{min}	[mm]	40	50	60	70	80	100	125	140	160
Minimum edge distane	c_{min}	[mm]	40	50	60	70	80	100	125	140	160



4 RECOMMENDED TENSION RESISTANCE

Basic performance data for MIT-SE Plus system in cracked and non-cracked concrete C20/25 without influence of edge distance, spacing and splitting failure due to dimensions of the concrete member

REQUIRED PROOFS FOR RECOMMENDED TENSION RESISTANCE:

For design tension resistance with chemical system MIT-SE Plus the minimum value for combined pull-out, concrete cone failure and steel failure needs to be considered:

For use in non-cracked concrete; $N_{rec,ucr} = \min(N_{rec,c,ucr}; N_{rec,s})$

For use in cracked concrete; $N_{rec,cr} = \min(N_{rec,c,cr}; N_{rec,s})$

4.1 Recommended tension resistance ($N_{rec,c}$) for combined pull-out and concrete cone failure (cracked or non-cracked concrete C20/25 with threaded rod)

Metrical Thread Size				[mm]	M8[1)]	M10[1)]	M12	M16	M20	M24	M27	M30
Setting Depth h_{ef} [mm]	60	Non-Cracked	Nrec,c,ucr	[kN]	7.18	8.98						
		Cracked	Nrec,c,cr		3.23	4.12						
	70	Non-Cracked	Nrec,c,ucr	[kN]	8.38	10.48	11.74*					
		Cracked	Nrec,c,cr		3.77	4.80	5.76					
	80	Non-Cracked	Nrec,c,ucr	[kN]	9.58	11.97	14.34*	14.34*				
		Cracked	Nrec,c,cr		4.31	5.49	6.59	8.78				
	90	Non-Cracked	Nrec,c,ucr	[kN]	10.78	13.47	16.16	17.11*	17.11*			
		Cracked	Nrec,c,cr		4.85	6.17	7.41	9.88	12.20*			
	100	Non-Cracked	Nrec,c,ucr	[kN]	11.97	14.97	17.96	20.04*	20.04*	20.04*		
		Cracked	Nrec,c,cr		5.39	6.86	8.23	10.98	13.72	14.29*		
	125	Non-Cracked	Nrec,c,ucr	[kN]	14.97	18.71	22.45	28.01*	28.01*	28.01*	28.01*	28.01*
		Cracked	Nrec,c,cr		6.73	8.57	10.29	13.72	17.15	19.96*	19.96*	19.96*
	150	Non-Cracked	Nrec,c,ucr	[kN]	17.96	22.45	26.94	35.92	36.82*	36.82*	36.82*	36.82*
		Cracked	Nrec,c,cr		8.08	10.29	12.35	16.46	20.58	24.69	26.24*	26.24*
	175	Non-Cracked	Nrec,c,ucr	[kN]		26.19	31.43	41.90	46.39*	46.39*	46.39*	46.39*
		Cracked	Nrec,c,cr			12.00	14.40	19.21	24.01	28.81	33.07*	33.07*
	200	Non-Cracked	Nrec,c,ucr	[kN]		29.93	35.92	47.89	56.68*	56.68*	56.68*	56.68*
		Cracked	Nrec,c,cr			13.72	16.46	21.95	27.44	32.93	40.41*	40.41*
	250	Non-Cracked	Nrec,c,ucr	[kN]				59.86	74.83	79.21*	79.21*	79.21*
		Cracked	Nrec,c,cr					27.44	34.30	41.16	54.72	56.47*
	300	Non-Cracked	Nrec,c,ucr	[kN]				71.84	89.80	98.78	101.02	101.02
		Cracked	Nrec,c,cr					32.93	41.16	49.39	65.66	72.96
	350	Non-Cracked	Nrec,c,ucr	[kN]					104.76	115.24	117.86	117.86
		Cracked	Nrec,c,cr						48.02	57.62	76.61	85.12
	400	Non-Cracked	Nrec,c,ucr	[kN]					119.73	131.70	134.69	134.69
		Cracked	Nrec,c,cr						54.88	65.85	87.55	97.28
	450	Non-Cracked	Nrec,c,ucr	[kN]						148.16	151.53	151.53
		Cracked	Nrec,c,cr							74.08	98.49	109.44
	500	Non-Cracked	Nrec,c,ucr	[kN]							168.37	168.37
		Cracked	Nrec,c,cr								109.44	121.60
	550	Non-Cracked	Nrec,c,ucr	[kN]								185.20
		Cracked	Nrec,c,cr									133.76
	600	Non-Cracked	Nrec,c,ucr	[kN]								202.04
		Cracked	Nrec,c,cr									145.92

*Concrete cone failure; [1)] Resistance in cracked concrete is not part of the European Technical Assessment

Recommended tension resistance for steel failure ($N_{rec,s}$):

Metrical Thread Size			[mm]	M8	M10	M12	M16	M20	M24	M27	M30
Steel property class	Zinc Plated 4.6	Nrec,s	[kN]	5.23	8.27	12.04	22.42	34.97	50.40	65.51	80.13
	Zinc Plated 5.8	Nrec,s	[kN]	8.72	13.79	20.06	37.37	58.29	84.00	109.19	133.54
	Zinc Plated 8.8	Nrec,s	[kN]	13.95	22.07	32.10	59.79	93.27	134.40	174.70	213.67
	Stainless steel A4-70	Nrec,s	[kN]	9.79	15.49	22.53	41.97	65.46	94.33	–	–
	Stainless steel HCR, class 70	Nrec,s	[kN]	9.79	15.49	22.53	41.97	65.46	94.33	–	–

Recommended tension resistance for steel failure ($N_{rec,s}$) can be applied for cracked or non-cracked concrete.

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4.2 Recommended tension resistance ($N_{rec,c}$) for combined pull-out and concrete cone failure (cracked or non-cracked concrete C20/25 with reinforcing bar (REBAR))

Rebar Size				[mm]	Ø8[1)]	Ø10[1)]	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Setting Depth h_{ef} [mm]	60	Non-Cracked	$N_{rec,c,ucr}$	[kN]	7.18	8.98							
		Cracked	$N_{rec,c,cr}$		3.23	4.12							
	70	Non-Cracked	$N_{rec,c,ucr}$	[kN]	8.38	10.48	11.74*						
		Cracked	$N_{rec,c,cr}$		3.77	4.80	5.76						
	80	Non-Cracked	$N_{rec,c,ucr}$	[kN]	9.58	11.97	14.34*	14.34*	14.34*				
		Cracked	$N_{rec,c,cr}$		4.31	5.49	6.59	7.68	8.78				
	90	Non-Cracked	$N_{rec,c,ucr}$	[kN]	10.78	13.47	16.16	17.11*	17.11*	17.11*			
		Cracked	$N_{rec,c,cr}$		4.85	6.17	7.41	8.64	9.88	12.20*			
	100	Non-Cracked	$N_{rec,c,ucr}$	[kN]	11.97	14.97	17.96	20.04*	20.04*	20.04*	20.04*		
		Cracked	$N_{rec,c,cr}$		5.39	6.86	8.23	9.60	10.98	13.72	14.29*		
	125	Non-Cracked	$N_{rec,c,ucr}$	[kN]	14.97	18.71	22.45	26.19	28.01*	28.01*	28.01*	28.01*	28.01*
		Cracked	$N_{rec,c,cr}$		6.73	8.57	10.29	12.00	13.72	17.15	19.96*	19.96*	19.96*
	150	Non-Cracked	$N_{rec,c,ucr}$	[kN]	17.96	22.45	26.94	31.43	35.92	36.82*	36.82*	36.82*	36.82*
		Cracked	$N_{rec,c,cr}$		8.08	10.29	12.35	14.40	16.46	20.58	25.72	26.24*	26.24*
	175	Non-Cracked	$N_{rec,c,ucr}$	[kN]		26.19	31.43	36.67	41.90	46.39*	46.39*	46.39*	46.39*
		Cracked	$N_{rec,c,cr}$			12.00	14.40	16.81	19.21	24.01	30.01	33.07*	33.07*
	200	Non-Cracked	$N_{rec,c,ucr}$	[kN]		29.93	35.92	41.90	47.89	56.68*	56.68*	56.68*	56.68*
		Cracked	$N_{rec,c,cr}$			13.72	16.46	19.21	21.95	27.44	34.30	40.41*	40.41*
	250	Non-Cracked	$N_{rec,c,ucr}$	[kN]				52.38	59.86	74.83	79.21*	79.21*	79.21*
		Cracked	$N_{rec,c,cr}$					24.01	27.44	34.30	42.87	56.47*	56.47*
	300	Non-Cracked	$N_{rec,c,ucr}$	[kN]					71.84	89.80	102.89	104.13*	101.77
		Cracked	$N_{rec,c,cr}$						32.93	41.16	51.45	68.10	74.23*
	350	Non-Cracked	$N_{rec,c,ucr}$	[kN]						104.76	120.04	122.22	118.73
		Cracked	$N_{rec,c,cr}$							48.02	60.02	79.44	90.79
	400	Non-Cracked	$N_{rec,c,ucr}$	[kN]						119.73	137.19	139.68	135.69
		Cracked	$N_{rec,c,cr}$							54.88	68.59	90.79	103.76
	450	Non-Cracked	$N_{rec,c,ucr}$	[kN]							154.34	157.14	152.65
		Cracked	$N_{rec,c,cr}$								77.17	102.14	116.73
	500	Non-Cracked	$N_{rec,c,ucr}$	[kN]								174.60	169.61
		Cracked	$N_{rec,c,cr}$									113.49	129.71
	550	Non-Cracked	$N_{rec,c,ucr}$	[kN]									186.58
		Cracked	$N_{rec,c,cr}$										142.68
	600	Non-Cracked	$N_{rec,c,ucr}$	[kN]									203.54
		Cracked	$N_{rec,c,cr}$										155.65

*Concrete cone failure

[1)]Resistance in cracked concrete not part of the European Technical Assessment

Recommended tension resistance for steel failure ($N_{rec,s}$):

Rebar Size		[mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Steel property BSt 500 S	$N_{rec,s}$	[kN]	14.10	22.03	31.72	43.18	56.39	88.11	137.68	172.70	225.57

Recommended tension resistance for steel failure ($N_{rec,s}$) can be applied for cracked or non-cracked concrete.

5 RECOMMENDED SHEAR RESISTANCE

Basic performance data for MIT-SE Plus system in cracked and non-cracked concrete C20/25 without influence of edge distance, spacing and splitting failure due to dimensions of the concrete member

REQUIRED PROOFS FOR RECOMMENDED SHEAR RESISTANCE:

For design shear resistance with chemical system MIT-SE Plus the minimum value for concrete pry-out failure and steel failure needs to be considered:

For use in non-cracked concrete: $V_{rec,ucr} = \min(V_{rec,cp,ucr}; V_{rec,s})$

For use in cracked concrete: $V_{rec,cr} = \min(V_{rec,cp,cr}; V_{rec,s})$

5.1 Recommended shear resistance for concrete pry-out failure (Vrec,cp) (cracked or non-cracked concrete C20/25 with threaded rod)

Metrical Thread Size				[mm]	M8[1)]	M10[1)]	M12	M16	M20	M24	M27	M30
Setting Depth h_{ef} [mm]	60	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	14.37	21.55						
		Cracked	$V_{rec,cp,cr}$		6.47	9.88						
	70	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	16.76	25.14	28.17					
		Cracked	$V_{rec,cp,cr}$		7.54	11.52	13.83					
	80	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	19.16	28.73	34.41	34.41				
		Cracked	$V_{rec,cp,cr}$		8.62	13.17	15.80	21.07				
	90	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	21.55	32.33	38.79	41.06	41.06			
		Cracked	$V_{rec,cp,cr}$		9.70	14.82	17.78	23.71	29.27			
	100	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	23.95	35.92	43.10	48.10	48.10	48.10		
		Cracked	$V_{rec,cp,cr}$		10.78	16.46	19.76	26.34	32.93	34.29		
	125	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	29.93	44.90	53.88	67.22	67.22	67.22	67.22	67.22
		Cracked	$V_{rec,cp,cr}$		13.47	20.58	24.69	32.93	41.16	47.92	47.92	47.92
	150	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	35.92	53.88	64.65	86.20	88.36	88.36	88.36	88.36
		Cracked	$V_{rec,cp,cr}$		16.16	24.69	29.63	39.51	49.39	59.27	62.99	62.99
	175	Non-Cracked	$V_{rec,cp,ucr}$	[kN]		62.86	75.43	100.57	111.34	111.34	111.34	111.34
		Cracked	$V_{rec,cp,cr}$			28.81	34.57	46.10	57.62	69.14	79.37	79.37
	200	Non-Cracked	$V_{rec,cp,ucr}$	[kN]		71.84	86.20	114.94	136.03	136.03	136.03	136.03
		Cracked	$V_{rec,cp,cr}$			32.93	39.51	52.68	65.85	79.02	96.97	96.97
	250	Non-Cracked	$V_{rec,cp,ucr}$	[kN]				143.67	179.59	190.11	190.11	190.11
		Cracked	$V_{rec,cp,cr}$					65.85	82.31	98.78	131.33	135.53
	300	Non-Cracked	$V_{rec,cp,ucr}$	[kN]				172.41	215.51	237.06	242.45	242.45
		Cracked	$V_{rec,cp,cr}$					79.02	98.78	118.53	157.59	175.10
	350	Non-Cracked	$V_{rec,cp,ucr}$	[kN]					251.43	276.57	282.86	282.86
		Cracked	$V_{rec,cp,cr}$						115.24	138.29	183.86	204.29
	400	Non-Cracked	$V_{rec,cp,ucr}$	[kN]					287.35	316.08	323.27	323.27
		Cracked	$V_{rec,cp,cr}$						131.70	158.04	210.12	233.47
	450	Non-Cracked	$V_{rec,cp,ucr}$	[kN]						355.59	363.67	363.67
		Cracked	$V_{rec,cp,cr}$							177.80	236.39	262.65
	500	Non-Cracked	$V_{rec,cp,ucr}$	[kN]							404.08	404.08
		Cracked	$V_{rec,cp,cr}$								262.65	291.84
	550	Non-Cracked	$V_{rec,cp,ucr}$	[kN]								444.49
		Cracked	$V_{rec,cp,cr}$									321.02
	600	Non-Cracked	$V_{rec,cp,ucr}$	[kN]								484.90
		Cracked	$V_{rec,cp,cr}$									350.20

[1)] Resistance in cracked concrete not part of the European Technical Assessment

Recommended shear resistance for steel failure ($V_{rec,s}$):

Metrical Thread Size			[mm]	M8	M10	M12	M16	M20	M24	M27	M30
Steel property class	Zinc Plated 4.6	$V_{rec,s}$	[kN]	3.85	5.99	8.55	16.25	25.24	36.36	47.05	57.74
	Zinc Plated 5.8	$V_{rec,s}$	[kN]	5.14	8.57	12.00	22.29	34.86	50.29	65.71	80.00
	Zinc Plated 8.8	$V_{rec,s}$	[kN]	8.57	13.14	19.27	35.89	56.00	80.69	104.91	128.23
	Stainless steel A4-70	$V_{rec,s}$	[kN]	5.87	9.29	13.51	25.16	39.26	56.57	–	–
	Stainless steel HCR, class 70	$V_{rec,s}$	[kN]	5.87	9.29	13.51	25.16	39.26	56.57	–	–

Recommended tension resistance for steel failure ($V_{rec,s}$) can be applied for cracked or non-cracked concrete.

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5.2 Recommended shear resistance for concrete pry-out failure ($V_{rec,cp}$) (cracked or non-cracked concrete C20/25 with reinforcing bar (REBAR)):

Rebar Size				[mm]	Ø8[1)]	Ø10[1)]	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Setting Depth h_{ef} [mm]	60	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	14.38	21.55							
		Cracked	$V_{rec,cp,cr}$		6.47	9.88							
	70	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	16.76	25.14	28.17						
		Cracked	$V_{rec,cp,cr}$		7.54	11.52	13.83						
	80	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	19.24	28.73	34.41	34.41	34.41				
		Cracked	$V_{rec,cp,cr}$		8.62	13.17	15.80	18.44	21.07				
	90	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	21.62	32.33	38.79	41.06	41.06	41.06			
		Cracked	$V_{rec,cp,cr}$		9.70	14.82	17.78	20.74	23.71	29.27			
	100	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	24.00	35.92	43.10	48.10	48.10	48.10	48.10		
		Cracked	$V_{rec,cp,cr}$		10.78	16.46	19.76	23.05	26.34	32.93	34.29		
	125	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	30.00	44.90	53.88	62.86	67.22	67.22	67.22	67.22	67.22
		Cracked	$V_{rec,cp,cr}$		13.47	20.58	24.69	28.81	32.93	41.16	47.92	47.92	47.92
	150	Non-Cracked	$V_{rec,cp,ucr}$	[kN]	36.00	53.88	64.65	75.43	86.20	88.36	88.36	88.36	88.36
		Cracked	$V_{rec,cp,cr}$		16.16	24.69	29.63	34.57	39.51	49.39	61.73	62.99	62.99
	175	Non-Cracked	$V_{rec,cp,ucr}$	[kN]		62.86	75.43	88.00	100.57	111.34	111.34	111.34	111.34
		Cracked	$V_{rec,cp,cr}$			28.81	34.57	40.33	46.10	57.62	72.02	79.37	79.37
	200	Non-Cracked	$V_{rec,cp,ucr}$	[kN]		71.84	86.20	100.57	114.94	136.03	136.03	136.03	136.03
		Cracked	$V_{rec,cp,cr}$			32.93	39.51	46.10	52.68	65.85	82.31	96.97	96.97
	250	Non-Cracked	$V_{rec,cp,ucr}$	[kN]				125.71	143.67	179.59	190.11	190.11	190.11
		Cracked	$V_{rec,cp,cr}$					57.62	65.85	82.31	102.89	135.53	135.53
	300	Non-Cracked	$V_{rec,cp,ucr}$	[kN]					172.41	215.51	246.94	249.91	244.24
		Cracked	$V_{rec,cp,cr}$						79.02	98.78	123.47	163.43	178.15
	350	Non-Cracked	$V_{rec,cp,ucr}$	[kN]						251.43	288.10	293.33	284.95
		Cracked	$V_{rec,cp,cr}$							115.24	144.05	190.67	217.90
	400	Non-Cracked	$V_{rec,cp,ucr}$	[kN]						287.35	329.25	335.24	325.66
		Cracked	$V_{rec,cp,cr}$							131.70	164.63	217.90	249.03
	450	Non-Cracked	$V_{rec,cp,ucr}$	[kN]							370.41	377.14	366.37
		Cracked	$V_{rec,cp,cr}$								185.20	245.14	280.16
	500	Non-Cracked	$V_{rec,cp,ucr}$	[kN]								419.05	407.07
		Cracked	$V_{rec,cp,cr}$									272.38	311.29
	550	Non-Cracked	$V_{rec,cp,ucr}$	[kN]									447.78
		Cracked	$V_{rec,cp,cr}$										342.42
	600	Non-Cracked	$V_{rec,cp,ucr}$	[kN]									488.49
		Cracked	$V_{rec,cp,cr}$										373.55

[1)] Resistance in cracked concrete not part of the European Technical Assessment

Recommended shear resistance for steel failure ($V_{rec,s}$):

Rebar Size		[mm]	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Steel property BSt 500 S	$V_{rec,s}$	[kN]	6.58	10.28	14.80	20.15	26.32	41.12	64.25	80.59	105.26

Recommended tension resistance for steel failure ($V_{rec,s}$) can be applied for cracked or non-cracked concrete.

6 MORTAR PROPERTIES

6.1 Mortar properties data for MIT-SE Plus system:

Properties	Test Method	Result
UV resistance		Pass
Watertightness	DIN EN 12390-8	0 mm
Temperature stability		120 °C
pH-value		> 12
Density		1,77 kg / dm^3
Compressive strength	EN 196 Teil1	100 N/mm^2
Flexural strength	EN 196 Teil1	15 N/mm^2
E modulus	EN 196 Teil1	14000 N/mm^2
Shrinkage		< 0,3 %
Hardness Shore D		90
Electrical resistance	IEC 93	3,6 10^9 Ωm
Thermal conductivity	IEC 60093	0,65 W/m·K

6.2 Chemical resistance data for MIT-SE Plus system:

Chemical Agent	Concentration	Resistant	Not Resistant
Accumulator acid		*	
Acetic acid	40		*
Acetic acid	10	*	
Acetone	10		*
Ammonia, aqueous solution	5	*	
Aniline	100		*
Beer		*	
Benzene (kp 100-140°F)	100	*	
Benzol	100		*
Boric Acid, aqueous solution		*	
Calcium carbonate, suspended in water	all	*	
Calcium chloride, suspended in water		*	
Calcium hydroxide, suspended in water		*	
Carbon tetrachloride	100	*	
Caustic soda solution	10	*	
Citric acid	all	*	
Chlorine water, swimming pool	all	*	
Diesel oil	100	*	
Ethyl alcohol, aqueous solution	50		*
Formic acid	100		*
Formaldehyde, aqueous solution	30	*	
Freon		*	
Fuel Oil		*	
Gasoline (premium grade)	100	*	
Glycol (Ethylene glycol)		*	
Hydraulic fluid	conc.	*	
Hydrochloric acid (Muriatic Acid)	conc.		*
Hydrogen peroxide	30		*
Isopropyl alcohol	100		*
Lactic acid	all	*	
Linseed oil	100	*	
Lubricating oil	100	*	
Magnesium chloride, aqueous solution	all	*	
Methanol	100		*
Motor oil (SAE 20 W-50)	100	*	
Nitric acid	10		*
Oleic acid	100	*	
Perchloroethylene	100	*	
Petroleum	100	*	
Phenol, aqueous solution	8		*
Phosphoric acid	85	*	
Potash lye (Potassium hydroxide)	10	*	
Potassium carbonate, aqueous solution	all	*	
Potassium chlorite, aqueous solution	all	*	
Potassium nitrate, aqueous solution	all	*	
Sea water, salty	all	*	
Sodium carbonate	all	*	
Sodium Chloride, aqueous solution	all	*	
Sodium phosphate, aqueous solution	all	*	
Sodium silicate	all	*	
Standard Benzine	100	*	
Sulfuric acid	10	*	
Sulfuric acid	70		*
Tartaric acid	all	*	
Tetrachloroethylene	100	*	
Toluene			*
Trichloroethylene	100		*
Turpentine	100	*	

Results shown in the table are applicable to brief periods of chemical contact with full cured adhesive (e.g. temporary contact with adhesive during a spill).

7 IMPORTANT NOTICE

Values given above are valid under the assumptions of sufficient cleaning of the drill hole (ETA/10-0130, Annex B3 and B4) and anchoring in non-cracked or cracked concrete (strength classes C20/25 to C50/60 according to EN 206-1:2000). For the design the complete technical assessment ETA/10-0130 from 13 December 2016 has to be considered. Recommended resistance data in this document, do not consider the influence of edge distance, spacing and splitting failure due to limited dimensions of concrete member and in case of such influence, the above values should be reduced. In recommended resistance the partial safety factor as regulated in the ETA and partial safety factor of the load γ_F = 1.4 are considered. For combination of tensile loads, shear loads, bending moments as well as well as reduced edge distances or spacing's (anchor groups) see ETA or Mungo design software. The data above must be checked by the user under the responsibility of an engineer experienced in anchorage and concrete work. This is to ensure there are no errors and all data is complete and accurate and complies with all rules and regulations for the actual conditions and application.

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