

Injection mortar FIS EM

The high-performance mortar for concrete.

OVERVIEW



Injection mortar
FIS EM 390 S



Injection mortar
FIS EM 1100 S



Static mixer
FIS SE

Suitable for:

- Non-cracked concrete
- Reinforcement bars



For fixing of:

- Steel constructions
- Consoles
- Machines
- Staircases
- High-racks
- Wooden constructions
- Reinforcement bars

DESCRIPTION

- Best performance mortar in the shuttle cartridge based on epoxy resin.
- Optimum solution for concrete (anchor rods and reinforcement bars).
- Resin and hardener are stored in two separate chambers and are not mixed and activated until pushed through the static mixer.
- Partially used cartridges can easily be reused by changing the static mixer.

Advantages/Benefits

- Very good bonding of the mortar ensures highest loads in concrete.
- Suitable for underwater installations.
- Suitable for diamond drilled holes.
- Expansion-free anchoring allows low axial spacings and edge distances.
- Ergonomic application guns for quick and easy installation.



Accessories/Recommended loads

- For fixing in concrete, see page 81 et seq.
- Appropriate application guns, see page 111/112

TECHNICAL DATA



Injection mortar
FIS EM 390 S



Static mixer **FIS SE**



Injection mortar
FIS EM 390 S HWK

Type	Art.No.	ID	languages on the label	contents	Qty. per box
FIS EM 390 S HWK	40038	8	D, GB, F, I, NL, E	20 cartridge 390 ml + 40 static mixer	1
FIS EM 390 S	93048	9	D, GB, F, I, NL, E	1 cartridge 390 ml + 2 static mixer	6
FIS EM 390 S	93049	6	GB, PRC, JP, ROK, CZ, PL	1 cartridge 390 ml + 2 static mixer	6
FIS EM 1100 S	96865	9	D, NL, GB, F, U, E, PRC, JP, ROK	1 cartridge 1100 ml + 2 static mixer	6
FIS SE	96448	4	-	1 static mixer	10

FIXING PRINCIPLES

In detail: The general principles for installation, the correct drilling procedure and much more on page 26.

CURING TIME

Gelling and curing time of fischer FIS EM

Cartridge temperature (mortar)	Gelling time	temperature at anchoring base	Curing time
- 5°C – + 5°C	4 hrs.	- 5°C – + 5°C	80 hrs.
+ 5°C – + 10°C	2 hrs.	+ 5°C – + 10°C	40 hrs.
+ 10°C – + 20°C	30 min.	+ 10°C – + 20°C	18 hrs.
+ 20°C – + 30°C	14 min.	+ 20°C – + 30°C	10 hrs.
+ 30°C – + 40°C	7 min.	+ 30°C – + 40°C	5 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.

For installation, the cartridge temperature must be at least +5°C. With temperatures above +30°C to +40°C the cartridges have to be cooled down to +15°C or +20°C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS EM used with fischer threaded rods with large spacing and edge distance.

Anchor size		Non-cracked concrete																							
		M 8					M 10					M 12					M 16								
Kind of steel		gvz			A4	C	gvz			A4	C	gvz			A4	C	gvz			A4	C				
Steel grade		5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529				
Effektive anchorage depth	$h_{ef,min}$ [mm]	40					40					48					64								
	$h_{ef,max}$ [mm]	120					150					180					240								
Drill hole depth	h_D [mm]	$h_D = h_{ef}$																							
Drill hole diameter	d_D [mm]	10					12					14					18								
Mean ultimate loads N_U and V_U [kN]																									
Tensile	0° N_U [kN]	$h_{ef,min}$	17.1					17.1					22.4					34.6							
		$h_{ef,max}$	19.0*	29.0*	37.0*	26.0*	30.0*	46.0*	58.0*	41.0*	44.0*	67.0*	84.0*	59.0*	82.0*	126.0*	157.0*	110.0*							
Shear	90° V_U [kN]	$h_{ef,min}$	9.2*	14.6*	17.0*	12.8*	14.5*	17.1					21.1*	22.4					39.2*	62.8*	69.1	54.8*			
		$h_{ef,max}$	9.2*	14.6*	17.0*	12.8*	14.5*	23.2	27.0*	20.3*	21.1*	33.7*	40.0*	29.5*	39.2*	62.8*	74.0*	54.8*							
Design resistant loads N_{Rd} and V_{Rd} [kN]																									
Tensile	0° N_{Rd} [kN]	$h_{ef,min}$	7.1					7.1					9.3					14.4							
		$h_{ef,max}$	12.8	19.3	22.5	13.9	17.3	20.3	30.7	35.1	21.9	27.3	29.7	44.7	50.5	31.6	39.9	55.4	84.0	89.8	58.8	73.3			
Shear	90° V_{Rd} [kN]	$h_{ef,min}$	7.4	8.5	8.2	8.5	8.5					11.2					31.4	34.5							
		$h_{ef,max}$	7.4	11.7	11.3	8.2	10.2	11.6	18.6	18.0	13.0	16.2	16.9	27.0	26.7	18.9	23.6	31.4	50.2	49.3	35.1	43.8			
Recommended loads N_{rec} and V_{rec} [kN]																									
Tensile	0° N_{rec} [kN]	$h_{ef,min}$	5.1					5.1					6.7					10.3							
		$h_{ef,max}$	9.2	13.8	16.0	9.9	12.4	14.5	21.9	25.1	15.7	19.5	21.2	31.9	36.1	22.5	28.1	39.6	60.0	64.1	42.0	52.4			
Shear	90° V_{rec} [kN]	$h_{ef,min}$	5.3	6.1	5.9	6.1	6.1					8.0					22.4	24.6							
		$h_{ef,max}$	5.3	8.3	8.1	5.9	7.3	8.3	13.3	12.9	9.3	11.6	12.1	19.3	19.0	13.5	16.9	22.4	35.9	35.2	25.1	31.3			
Recommended bending moment M_{rec} [Nm]																									
	M_{rec} [Nm]	11.4	17.1	17.6	11.9	14.9	22.3	34.3	35.7	23.8	29.7	38.9	60.0	62.4	42.1	52.6	98.8	152.0	158.1	106.7	133.1				
Component dimensions, minimum axial spacings and edge distances																									
Characteristic axial spacing	$s_{cr,Np}$ [mm]	220					270					330					430								
Characteristic edge distance	$c_{cr,Np}$ [mm]	110					135					165					215								
Minimum axial spacing ¹⁾	s_{min} [mm]	40					45					55					65								
Minimum edge distance ¹⁾	c_{min} [mm]	40					45					55					65								
Minimum structural component thickness	h_{min} [mm]	$h_{ef,min}$					70					70					78								
	h_{min} [mm]	$h_{ef,max}$					150					180					210					272			
Clearance-hole in fixture to be attached for pre-positioned installation	$d_f \leq$ [mm]	9					12					14					18								
Clearance-hole in fixture to be attached for push-trough installation	$d_f \leq$ [mm]	11					14					16					20								
Required torque	T_{inst} [Nm]	10					20					40					60								
Required mortar volume FIS EM	[Scale units]	$h_{ef,min}$					2					2					4								
	[Scale units]	$h_{ef,max}$					4					6					8					14			

* Steel failure decisive.

¹⁾ For minimum axial spacing and minimum edge distance the above described loads have to be reduced (See "fischer Technical Handbook" or design software "CC-COMPUFIX")!

Values given above are valid under the following assumptions:

- Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range from - 40 °up to + 43 °C .

All values apply for concrete C20/25 without edge or spacing influences. Design resistant loads: Recommended loads:

material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor. material safety factor γ_M and safety factor for load $\gamma_L = 1.4$ are included.

Continued next page.

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LOADS

Mean ultimate loads, design resistant and recommended loads for single anchors of fischer Injection system FIS EM used with fischer threaded rods with large axial spacing and edge distance.

Anchor size		Non-cracked concrete																	
		M 20					M 24					M 30							
Kind of steel		gvz			A4	C	gvz			A4	C	gvz			A4	C			
Steel grade		5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529	5.8	8.8	10.9	A4-70	1.4529			
Effektive anchorage depth	$h_{ef,min}$ [mm]	80					96					120							
	$h_{ef,max}$ [mm]	300					360					450							
Drill hole depth	h_D [mm]																		
Drill hole diameter	d_0 [mm]	24					28					35							
Mean ultimate loads N_u and V_u [kN]																			
Tensile	0° N_u [kN]	$h_{ef,min}$	48.3					63.5					88.7						
		$h_{ef,max}$	127.0*	196.0*	245.0*	171.0*	183.0*	282.0*		247.0*	292.0*	449.0*	561.0*	392.0*					
Shear	90° V_u [kN]	$h_{ef,min}$	61.2*			96.6		85.7*		88.2*		127.0		123.4*		140.2*		177.5	
		$h_{ef,max}$	61.2*	98.0*	115.0*	85.7*	88.2*	141.2*	166.0*	123.4*	140.2*	224.4*	264.0*	196.2*					
Design resistant loads N_{Rd} and V_{Rd} [kN]																			
Tensile	0° N_{Rd} [kN]	$h_{ef,min}$	20.1					26.4					36.9						
		$h_{ef,max}$	85.8	125.7	91.4	114.0	123.6	171.9	132.1	164.7	197.3	267.8	209.6	261.3					
Shear	90° V_{Rd} [kN]	$h_{ef,min}$	48.2					63.3					88.5						
		$h_{ef,max}$	49.0	78.4	76.7	54.9	68.6	70.6	113.0	110.7	79.1	98.7	112.2	179.5	176.0	125.8	157.0		
Recommended loads N_{rec} and V_{rec} [kN]																			
Tensile	0° N_{rec} [kN]	$h_{ef,min}$	14.3					18.8					26.3						
		$h_{ef,max}$	61.3	89.8	65.3	81.4	88.3	122.8	94.3	117.6	140.9	191.3	149.7	186.7					
Shear	90° V_{rec} [kN]	$h_{ef,min}$	34.4					45.2					63.2						
		$h_{ef,max}$	35.0	56.0	54.8	39.2	49.0	50.4	80.7	79.0	56.5	70.5	80.1	128.2	125.7	89.8	112.1		
Recommended bending moment M_{rec} [Nm]																			
	M_{rec} [Nm]	193.1	296.6	308.6	207.9	259.4	333.1	512.0	533.3	359.4	448.6	668.0	1026.9	1070.0	720.7	899.4			
Component dimensions, minimum axial spacings and edge distances																			
Characteristic axial spacing	$s_{cr,Np}$ [mm]	510					600					740							
Characteristic edge distance	$c_{cr,Np}$ [mm]	255					300					370							
Minimum axial spacing ¹⁾	s_{min} [mm]	85					105					140							
Minimum edge distance ¹⁾	c_{min} [mm]	85					105					140							
Minimum structural component thickness	h_{min} [mm]	$h_{ef,min}$					144					180							
		$h_{ef,max}$					408					510							
Clearance-hole in fixture to be attached for pre-positioned installation	$d_f \leq$ [mm]	22					26					33							
Clearance-hole in fixture to be attached for push-through installation	$d_f \leq$ [mm]	26					30					40							
Required torque	T_{inst} [Nm]	120					150					300							
Required mortar volume	[Scale units]	$h_{ef,min}$					10					14							
		$h_{ef,max}$					36					52							
FIS EM	[Scale units]	$h_{ef,max}$					36					52							

* Steel failure decisive.

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- Sufficient mechanical cleaning of the drill hole using stainless steel brushes.
- Dry concrete, temperature range from - 40 °C up to + 43 °C .

All values apply for concrete C20/25 without edge or spacing influences.

Design resistant loads: material safety factor γ_M is included. Material safety factor γ_M depends on the type of anchor.

Recommended loads: material safety factor γ_M and safety factor for load $\gamma_L = 1.4$ are included.