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Properties:

AKEMI® BF 200 UP Injection Mortar is a 2-component reaction resin mortar based on unsaturated polyester resins dissolved in styrene.

The product is characterized by the following properties:

- Approval as injection system for anchoring in uncracked concrete according to ETAG 001 part 1 and part 5; ETA 17/0852
- safe and reliable processing and application due to the cartridge system
- suitable for natural stone, masonry and uncracked concrete
- uniform load transmission on account of a non-splaying anchorage system
- also suitable for anchoring close to edges
- excellent interconnection and tight fit between the injection mortar, mesh sleeve, anchor (tie) rod and the surrounding embedment material
- overhead application
- good surface drying
- bonded parts are impermeable to water and have a reliable long-term behaviour
- long-term heat resistance from -40°C up to +50°C, short-term resistance up to +80°C

Application Area:

AKEMI® BF 200 UP Injection Mortar is mainly used to fix anchor rods (zinc plated or hot dip, stainless steel A4 or high corrosion resistance steel), threaded sleeves, reinforcing bars, profiled rods or the like for fixing to uncracked concrete, light-weight concrete, aerated concrete, solid brick, perforated brick, natural stone for facades, canopies, wooden and metal constructions, metal profile sections, brackets, balustrades, gratings, heating and sanitary installations, piping, cable runways, high racks, lighting etc.

Instructions for Use:

1. Drill the hole (rotary or impact drilling) without cooling liquid in accordance with the characteristic value table; in the case of light-weight or aerated concrete, drill a tapered hole.
2. Standing water must be removed before cleaning. The manual pump may only be used for boreholes up to a depth of 240 mm. Clean the drill hole (concrete, solid brick: starting from the bottom, blow out the drill hole with a manual pump or with compressed air for at least 4x, brush with a suitable wire brush mechanically for at least 4x, starting from the bottom, blow out the drill hole with a manual pump or with compressed air for at least 4x; perforated brick: starting from the bottom, blow out the drill hole for at least twice, brush with a suitable wire brush for at least twice, starting from the bottom, blow out for at least twice).
3. In the case of masonry, insert a mesh sleeve.
4. Working temperature of the cartridge +20°C, object temperature +5°C up to +35°C.
5. Prior to inserting the anchor rod into the mortar filled drill hole, the position of the embedment depth shall be marked on the anchor rods.
6. Open the sealing cap and remove the clip from the foil bags. Insert the cartridge into the gun, screw on the mixer, squeeze out and discard approx. 10 cm of the mortar (at least 3 full strokes). Pay attention to the working times in the reaction table!

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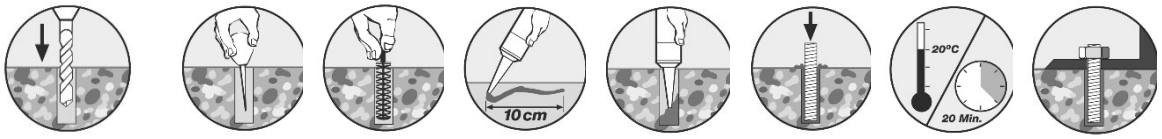
7. Insert the mixer to the bottom of the drill hole and fill from bottom to top with the reaction mortar. If using a mesh sleeve, use the mixer attachment to fill.
8. Insert he threaded rod or the reinforcing iron bar to the marking by turning it with the hand, check the filling level (some material must emerge from the drill hole when the anchor rod is fully screwed in).
9. Refer to the reaction table for the hardening times.
10. Attach the component and apply the torque in accordance with the characteristic value table after complete hardening time.

Concrete or solid brick



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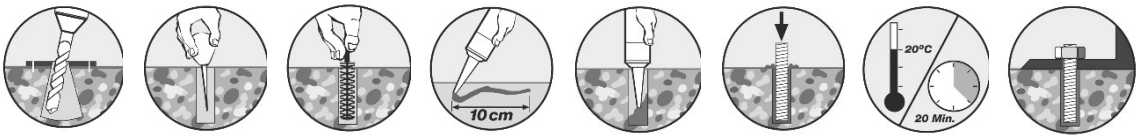
Aerated or light-weight concrete



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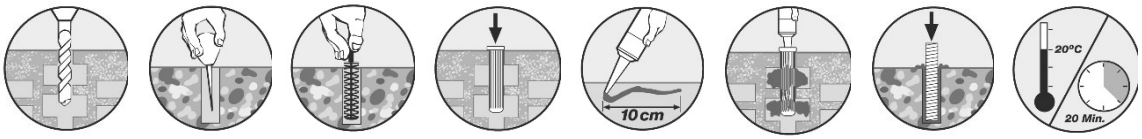
Masonry (solid and vertically perforated brick, solid sand-lime and perforated sand-lime brick)



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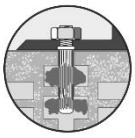

see 10.

Special Notes:

- For professional use only.
- If the drill holes are damp or badly cleaned, the strength of the bond will be reduced.
- Application conditions: components under the condition of dry rooms inside (anchor rods made of galvanized, non-corrosive and highly corrosive-resistant steel); components outside and in humid areas, if no especially aggressive conditions are given (anchor rods made of non-corrosive and highly corrosive-resistant steel); components outside and in humid areas, if especially aggressive conditions are given (anchor rods made of highly corrosive-resistant steel).
- Mortar which has already started to jellify may no longer be used.

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- At temperatures below +5°C hardening will be significantly delayed.
- Mortar which has already hardened can no longer be removed with solvents, but only mechanically or using higher temperatures (>200°C).
- Drill holes may not be made with diamond drills because the surface of the hole would be too smooth, thus considerably reducing mechanical interlocking with the injection mortar.
- Within the EU: subject to the self-service prohibition regulation and shall only be sold by specialized sales outlets.
- For proper waste disposal the container must be completely emptied.
- Recycling in accordance with the guidelines of EU Decision 97/129 EC on the Packaging Directive 94/62/EC.

Technical Data:

1. Reactivity

Object temperature	*Working time*	*Hardening time on dry surfaces*	*Hardening time on humid surfaces*
5°C	20 - 25 min	120 min	240 min
10°C	10 - 15 min	80 min	160 min
20°C	5 - 6 min	45 min	90 min
30°C	3 - 4 min	25 min	50 min
35°C	1 - 2 min	20 min	40 min

The temperature of the material in which the anchoring is to take place may not fall below 5°C during hardening.

2. Cleaning - concrete

Threaded rod (mm)	*Drill hole - ø* (mm)	*Brush - ø* d_b (mm)	*min. brush - ø* $d_{b,min}$ (mm)	*Brush length* L (mm)
M 8	10.0	12.0	10.5	170
M 10	12.0	14.0	12.5	170
M 12	14.0	16.0	14.5	200
M 14	18.0	20.0	18.5	300
M 20	24.0	26.0	24.5	300

3. Setting parameter - concrete

Anchor size				M8	M10	M12	M16	M20
Edge distance	1.0 x h_{ef}	c_{cr1N}	[mm]	80	90	110	125	170
Min. edge distance	5.0 x d	c_{min}	[mm]	40	50	60	80	100
Axial distance	2.0 x h_{ef}	s_{cr1N}	[mm]	160	180	220	250	340
Min. axial distance	5.0 x d	s_{min}	[mm]	40	50	60	80	100
Embedment depth		h_{ef}	[mm]	80	90	110	125	170
Min. part thickness		h_{min}	[mm]	h_{ef} + 30 mm			h_{ef} + 2 d_0	
Anchor diameter		d	[mm]	8	10	12	16	20
Drill diameter		d_0	[mm]	10	12	14	18	24
Installation torque		T_{inst}	[Nm]	10	20	40	60	120

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4. Performance data - concrete

TENSION LOADS – Design method A according to ETAG 001 annex C, characteristic values for tension loading

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
Steel failure							
Characteristic tension resistance, steel zinc plated or hot dip, property class 5.8	$N_{Rk,s}$	[kN]	18	29	42	78	122
Characteristic tension resistance, non-corrosive steel A4 and HCR	$N_{Rk,s}$	[kN]	29	46	67	125	196
Partial safety factor	$\gamma_{Ms,N}$		1.50				
Characteristic tension resistance, steel zinc plated or hot dip, property class 8.8	$N_{Rk,s}$	[kN]	26	41	59	110	172
Partial safety factor	$\gamma_{Ms,N}$		1.87				
Pull out and concrete cone failure[1)]							
Characteristic bond resistance in concrete C 20/25							
50°C/80°C [2)] uncracked concrete	$N_{Rk,P}=N^0_{Rk,c}$	[kN]	11	17	24	27	46
Partial safety factor (dry and wet)	$\gamma_{Mp} = \gamma_{Mc}$		1.8				
Embedment depth	h_{ef}	[mm]	80	90	110	125	170
Edge distance	$c_{cr,N}$	[mm]	80	90	110	125	170
Axial distance	$s_{cr,N}$	[mm]	$2 \times c_{cr,N}$				
Increasing factor for uncracked concrete Ψ_c			$(f_{ck}{}^{0.30})/2.63$				
Splitting failure							
Edge distance	$c_{cr,sp}$	[mm]	$c_{cr,N} \le 2\ h_{ef}\ (2.5 - h/h_{ef}) \le 2.4\ h_{ef}$				
Axial distance	$s_{cr,sp}$	[mm]	$2 \times c_{cr,sp}$				
Partial safety factor (dry and wet)	γ_{Msp}		1.8				

These values are intended to be used together with the design provisions of ETAG 001 Annex C.

1) Shall be determined acc. to this table or acc. to 5.2.2.4, Annex C of ETAG 001. The smaller value is decisive.
2) Short-term temperature / long-term temperature. Long-term temperature is roughly constant over significant periods of time.
Short-term elevated temperatures are those that occur over brief intervals (diurnal cycling).

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SHEAR LOADS – Design method A according to ETAG 001 Annex C, characteristic values for shear loading

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
Steel failure without leaver arm							
Characteristic shear resistance, Steel zinc plated or hot dip property class 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61
Characteristic shear resistance, Steel zinc plated or hot dip property class 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98
Partial safety factor	$\gamma_{Ms,V}$		1.25				
Characteristic shear resistance, Stainless steel A4 and HCR	$V_{Rk,s}$	[kN]	13	20	30	55	86
Partial safety factor	$\gamma_{Ms,V}$		1.56				
Steel failure with leaver arm							
Characteristic bending moment, Steel, zin plated or hot dip, property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324
Characteristic bending moment, Steel, zin plated or hot dip, property class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519
Partial safety factor	$\gamma_{Ms,V}$		1.25				
Characteristic bending moment, Stainless steel A4 and HCR	$M^0_{Rk,s}$	[Nm]	26	52	92	232	454
Partial safety factor	$\gamma_{Ms,V}$		1.56				
Concrete Pryout failure							
Factor k			2.0				
Partial safety factor	γ_{Mcp}		1.5				
Concrete edge failure							
Effective length of anchor in shear loading	l_f	[mm]	80	90	110	125	170
Outside diameter of anchor	d_{nom}	[mm]	10	12	14	18	24
Partial safety factor	γ_{Mc}		1.5				

The data in this table is intended to be used together with the design provisions of ETAG 001 Annex C.

5. Recommended loads - concrete

The recommended loads are only valid for single anchor for a roughly design, if the following conditions are valid:

$c \geq c_{cr,N}$

$s \geq s_{cr,N}$

$h \geq 2 \times h_{ef}$

If the conditions are not fulfilled the loads must be calculated according to ETAG 001 Annex C.
The safety factors are already included in the recommended loads.

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**
Embedment depth	h_{ef}	[mm]	80	90	110	125	170
Edge distance	$c_{cr,N}$	[mm]	$1.5 \times h_{ef}$				
Axial distance	$s_{cr,N}$	[mm]	$3.0 \times h_{ef}$				
Recommended tension load 50°C/80°C[2)]	N_{Rec}	[kN]	4.5	6.9	9.6	10.8	18.1
Recommended tension load without leaver arm for Steel property class 5.8[1)]	V_{Rec}	[kN]	5.1	8.6	12.0	22.3	34.9

[1)] Shear load with leaver arm Annex C of ETAG 001

[2)] Short-term temperature / Long- term temperature. Long-term concrete temperatures are roughly constant over significant periods of time. Short-term elevated temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

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6. Performance data - masonry

Stone	Strength class	Recommended loads		Standard sleeves				Wing sleeve	
				M6	M8	M10	M12	M8	M10
Hollow brick	Hlz 4	F_{rec}	[kN]	0.3	0.3	0.3	0.3	0.3	0.3
	Hlz 6			0.4	0.4	0.4	0.4	0.4	0.4
	Hlz 12			0.7	0.8	0.8	0.8	0.8	0.8
Sand-lime hollow brick	KSL 4	F_{rec}	[kN]	0.3	0.3	0.3	0.3	0.3	0.3
	KSL 6			0.4	0.4	0.4	0.4	0.4	0.4
	KSL 12			0.7	0.8	0.8	0.8	0.8	0.8
Sand-lime solid brick[1)]	KS 12	F_{rec}	[kN]	0.5	1.7	1.7	1.7	1.7	1.7
Solid brick[1)]	Mz 12	F_{rec}	[kN]	0,5	1,7	1,7	1,7	1,7	1,7
Light concrete hollow brick	Hbl 2	F_{rec}	[kN]	0,3	0,3	0,3	0,3	-	-
	Hbl 4			0,5	0,6	0,6	0,6	-	-
Concrete hollow brick	Hbn 4	F_{rec}	[kN]	0,5	0,6	0,6	0,6	-	-

Installation parameters									
Axial distance plug (group)		$s_{cr,N\ Group}$	[mm]	Hlz, KSL, MZ, KS = 100 Hbl, Hbn = 200				100	
Min. axial distance plug (group)[2)]		$s_{min\ Group}$	[mm]	Hlz, KSL, Mz, KS = 50 Hbl, Hbn = 100				50	
Min. distance (single plug)		$s_{cr,N\ Single}$	[mm]	250				250	
Edge distance		$c_{cr,N}$	[mm]	250				200(250)[3)]	
Min. edge distance[4)]		c_{min}	[mm]	250				50(60)[3)]	
Embedment depth of rod	with sleeve	h_{ef}	[mm]	50	85	85	85	80	90
	without sleeve	h_{ef}	[mm]	60	80	90	110	80	90
Drilling depth	with sleeve	h_0	[mm]	55	90	90	90	105	105
	without sleeve	h_0	[mm]	65	85	95	115	85	95
Minimum part thickness		h_{min}	[mm]	110			125	110	
Drill diameter		d_0	[mm]	11	16	16	16	14	16
Hole diameter in fixed element		d_f	[mm]	7	9	12	14	9	12
Installation torque		T_{inst}	[Nm]	3	8	8	8	2	2

1) Anchoring in masonry of solid lime-sand bricks (KS) and masonry bricks (Mz) does not require perforated sleeve.
2) It is permissible to go below the axial spacing to the minimum value for anchor pairs and groups of four, if the permissible loads are reduced. The maximum loads must not be exceeded.
3) Value in brackets applies to solid bricks (Mz and KS).
4) Applies to masonry with top load or proof of tilt. Does not apply to shear loads directed towards a free edge.

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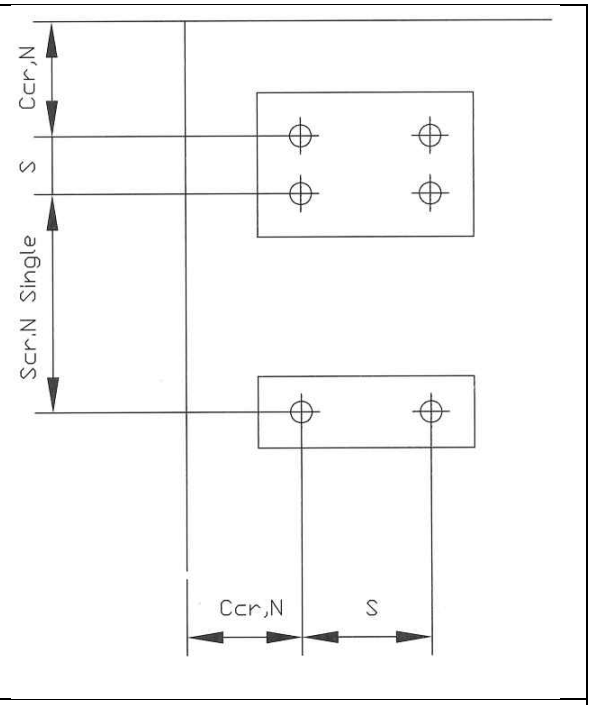
Reduced permissible loads with reduced axial spacing per anchor in anchor groups
$s_{cr,N\ Group} \geq s > s_{min}$

Anchor pairs:
red F = χs * F rec
$\chi s = ½ (1 + s/ s_{cr,N\ Group}) \leq 1.0$

Groups of four:
red F = χs_1 * χs_2 * F rec
$\chi s_{1,2} = ½ (1 + s/ s_{cr,N\ Group}) \leq 1.0$

F rec = permissible load per anchor
red F = reduced load per anchor
$s_{cr,N\ Group}$ = axial distance anchor groups
s = reduced axial spacing



Permissible load in [kN] for each single brick				
Brick format		< 4 DF	4 bis 10 DF	≥ 10 DF
Without top load	max F [kN]	1.0	1.4	2.0
With top load	max F [kN]	1.4	1.7	2.5

Storage: If stored in dry and cool condition (5-25°C/41-77°F) in its closed original container at least 9 months from production.

Health & Safety: Read Safety Data Sheet before handling or using this product.

Important Notice: The above information is based on the latest stage of development and application technology. Due to a multiplicity of different influencing factors, this information – as well as other oral or written technical advises – must be considered as non-binding hints. The user is obliged in each particular case to conduct performance tests, including but not limited to trails of the product, in an inconspicuous area or fabrication of a sample piece.

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