

## TECHNICAL DATA SHEET

# KFX Polyester Resin - With Styrene (300ml)

## High Performance Chemical Anchor

Classic Composite Injection Mortar System

For Standard Applications in Concrete, Masonry and Perforated Brick

Fast Curing in Normal Conditions

Universal Formulation

Suitable For Use in Natural Stone (Styrene)



Order Code 03000

## APPROVALS

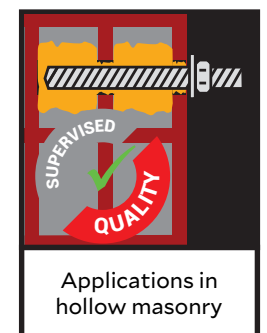
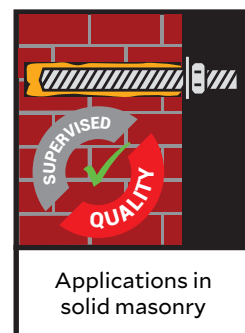
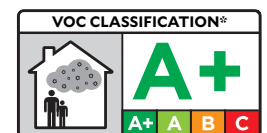
### Approvals

ETA Approval: ETA-11/0286

- For use in non-cracked concrete.
- For bonded fasteners acc. to ETAG 001-Part 1 and Part 5, used as European Assessment Document (Option 7); See DoP Annex C1 to C5.

### Base Material

Non-cracked concrete, light-concrete, porous-concrete, solid masonry, hollow brick, natural stone (Attention! natural stone, can discolour; shall be checked in advance; solid anchoring base: hammer drilled bore holes, perforated bricks: rotary drilled bore holes).



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## Product Overview

### Description

KFX RPT is a 2-component reaction resin mortar based on polyester and will be delivered in a 2 component cartridge system. This product may be used in combination of a hand-, battery-, or pneumatic tool and a static mixer. It was designed as a cost effective alternative for the anchoring of threaded rods for approved applications. By using a perforated sleeve, an easy and save application in hollow bricks is guaranteed. KFX RPT is characterised by manifold applications with an ambient temperature up to 80°C.

### Properties & Benefits

- European Technical Assessment for bonded fasteners acc. to ETAG 001-Part 1 and Part 5, used as European Assessment Document (Option 7): ETA-11/0286.
- Performance data for use in masonry based on In-house tests.
- Overhead application.
- Suitable for attachment points with small edge- and axial distances due to an anchoring free of expansion forces.
- Reduced chemical resistance.
- High bending and pressure strength.
- Cartridge can be reused up to the end of the shelf life by replacing the static mixer or resealing cartridge with the sealing cap.

### Applications Samples

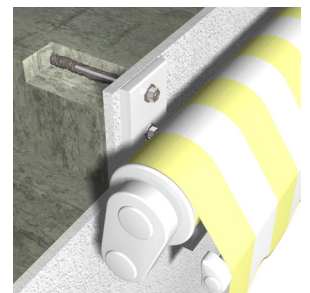
Suitable for the fixation of facades, roofs, wood constructions, metal constructions; metal profiles, columns, beams, consoles, railings, sanitary devices, cable trays, piping, etc.

### Handling & Storage

- Storage: store in a cold and dark place, storage temperature: from +5°C up to +25 °C
- Shelf life: 12 months for cartridges.

### Applications & Intended Use

- **Base Material:**  
Non-cracked concrete, light-concrete, porous-concrete, solid masonry, hollow brick, natural stone (Attention! natural stone, can discolour; shall be checked in advance; solid anchoring base: hammer drilled bore holes, perforated bricks: rotary drilled bore holes.
- **Anchor Elements:**  
Threaded rods (zinc plated or hot dip, stainless steel and high corrosion resistance steel), profiled rod, steel section with undercuts (e.g. perforated section). *See page 6 for recommended studs.*
- **Temperature Range:**  
Installation temperature: *See table: Reactivity*  
Cartridge temperature: : *See table: Reactivity*
- Anchoring base temperature after complete curing: -40°C to +80°C



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## Mortar Properties

Properties	Test Method	Result
UV resistance	-	Pass
Watertightness	DIN EN 12390-8	0 mm
Temperature stability	-	80 °C
Density	-	1,77 kg / dm <sup>3</sup>
Compressive strength	EN 196 Teil1	89 N / mm <sup>2</sup>
Flexural strength	EN 196 Teil1	33 N / mm <sup>2</sup>
E modulus	EN 196 Teil1	14000 N / mm <sup>2</sup>
Shrinkage	-	< 0,3 %
Electrical resistance	IEC 93	1,6 10 <sup>8</sup> Ω m
Thermal conductivity	ICE 60093	0,54 W/m·K

## Reactivity

Concrete temperature			RPT Polyester Resin	
			Max. working time	Min. curing time <sup>1)</sup>
0 °C	to	+4°C	45 min	180 min
+5 °C	to	+9°C	25 min	120 min
+10 °C	to	+14°C	20 min	100 min
+15 °C	to	+19°C	15 min	80 min
+20 °C	to	+29°C	6 min	45 min
+30 °C	to	+34°C	4 min	25 min
+35 °C	to	+39°C	2 min	20 min
+40 °C	to	+44°C	-	-
+45°C			-	-
Cartridge temperature			+5 °C to +40 °C	

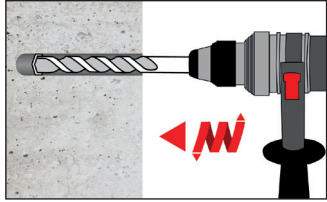
<sup>1)</sup> The curing times in wet concrete has to be doubled.

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## Anchorage in Concrete

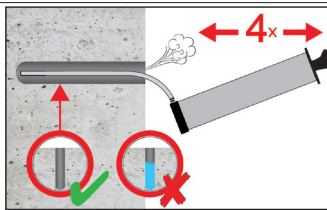
### Installation Instructions

#### Drilling of the bore hole



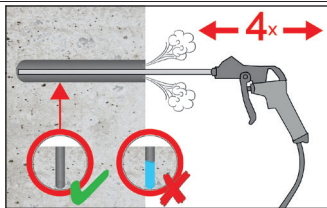
- 1a. Drill with hammer drill (HD) a hole into the base material to the size and embedment depth required by the selected anchor (see page 7), with hammer (HD). In case of aborted drill hole: the drill hole shall be filled with mortar.

Attention! Standing water must be removed before cleaning.

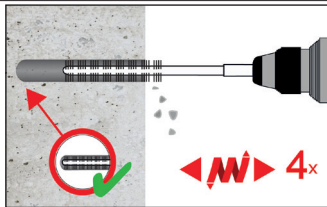


- 2a. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) or a hand pump (see page 6) a minimum of four times. If the bore hole ground is not reached an extension shall be used.

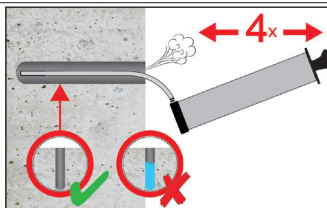
or



The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm. For bore holes larger than 20 mm or deeper than 240 mm, compressed air (min. 6 bar) must be used.

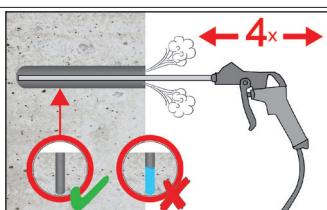


- 2b. Check brush diameter and attach the brush to a drilling machine or a battery screwdriver. Brush the hole with an appropriate sized wire brush  $> d_{b,min}$  (see page 6) a minimum of four times. If the bore hole ground is not reached with the brush, a brush extension shall be used.



- 2c. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used.

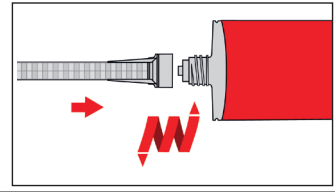
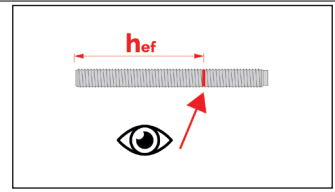
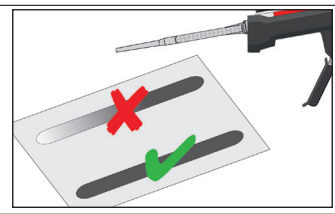
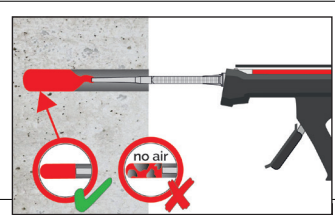
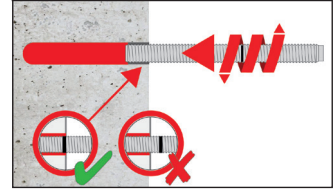
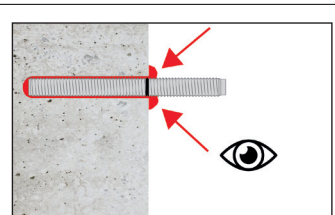
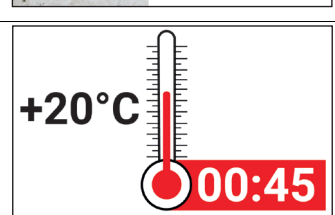
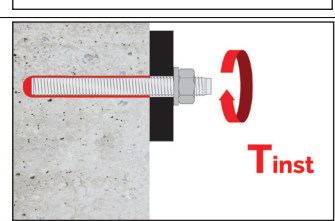
or



The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm. For bore holes larger than 20 mm or deeper than 240 mm, compressed air (min. 6 bar) must be used.

After cleaning, the bore hole has to be protected against re-contamination until the mortar is injected. If necessary, the cleaning has to be repeated directly before dispensing the mortar. In-flowing water must not contaminate the bore hole again.


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	<p>3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut off the foil tube clip before use. For every working interruption longer than the recommended working time (see page 3) as well for new cartridges, a new static-mixer shall be used.</p>
	<p>4. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods.</p>
	<p>5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour. For foil tube cartridges it must be discarded a minimum of six full strokes.</p>
	<p>6. Starting from the bottom / back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw of the static mixing nozzle as the hole is filled avoids creating air pockets. If the bore hole ground is not reached with the static-mixing nozzle, a appropriate extension must be used. Observe the gel-/ working times given (see page 3).</p>
	<p>7. 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.</p> <p>The anchor should be free of dirt, grease, oil or other foreign material.</p>
	<p>8. Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed.</p> <p>For overhead application the anchor rod shall be fixed (e. g. wedges).</p>
	<p>9. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured.</p>
	<p>10. After full curing, the add-on part can be installed with the max. torque by using a calibrated torque wrench.</p>

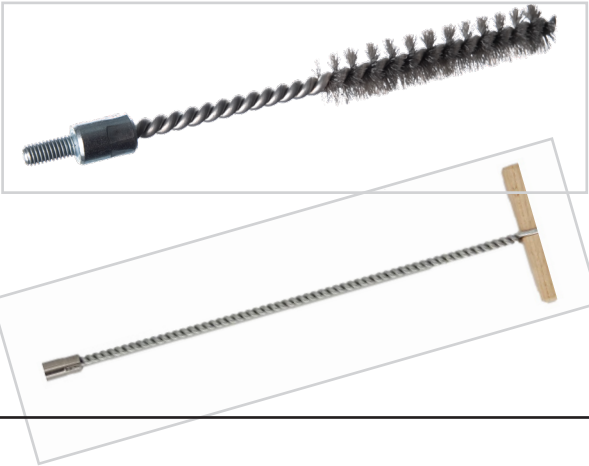
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## Installation Accessories

Blow Out Pump	
Order Code	Description
03079	Hand held blow out pump. For use with Hole Cleaning Brush for hole preparation prior to resin injection.

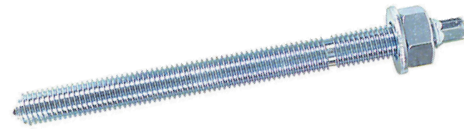


Hole Cleaning Brush	
Order Code	Description
03081	Wire Brush for 10mm Hole
03082	Wire Brush for 12mm Hole
03083	Wire Brush for 14mm Hole
03084	Wire Brush for 16mm Hole
03085	Wire Brush for 18mm Hole
03086	Wire Brush for 20mm Hole
03087	Wire Brush for 22mm Hole
03088	Wire Brush for 24mm Hole
03089	Wire Brush Handle



## Anchor Studs

The following studs must be used with KFX Resin to guarantee the anchor loadings on Page 7



Order Code	Size (mm)	Finish	Hole Cleaning Brush Req'd	Box Qty
03060	M8 x 110	BZP	03081	10
03061	M10 x 130	BZP	03082	10
03062	M12 x 160	BZP	03083	10
03063	M16 x 190	BZP	03085	10
03064	M20 x 260	BZP	03087	5
03090	M8 x 110	HDG	03081	10
03091	M10 x 130	HDG	03082	10
03092	M12 x 160	HDG	03083	10
03093	M16 x 190	HDG	03085	10
03094	M20 x 260	HDG	03087	5
03071	M8 x 110	A4 S/S	03081	10
03072	M10 x 130	A4 S/S	03082	10
03073	M12 x 160	A4 S/S	03083	10
03074	M16 x 190	A4 S/S	03085	10
03075	M20 x 260	A4 S/S	03087	5

See Page 7 for Loadings & Setting Parameters

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## Anchor Studs (Continued)

### Setting Parameters

Anchor size			M8	M10	M12	M16	M20
Outer diameter of anchor	$d = d_{nom}$	[mm]	8	10	12	16	20
Nominal drill hole diameter	$d_0$	[mm]	10	12	14	18	24
Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90
	$h_{ef,max}$	[mm]	160	200	240	320	400
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14	18	22
Maximum torque moment	$T_{inst} \leq$	[Nm]	10	20	40	80	120
Minimum thickness of member	$h_{min}$	[mm]	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$			$h_{ef} + 2d_0$	
Minimum spacing	$S_{min}$	[mm]	40	50	60	80	100
Minimum edge distance	$C_{min}$	[mm]	40	50	60	80	100

## Recommended Loads

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

- $c \geq 1,5 \times h_{ef}$      $s \geq 3,0 \times h_{ef}$      $h \geq 2 \times h_{ef}$
- $\psi_{sus} = 1,0$ ; percentage of dead load  $\leq \psi_{sus}^0$  see table below
- The recommended loads have been calculated using the partial safety factors for resistances stated in the ETA and with a partial safety factor for actions of  $\gamma_f=1.4$ .  
The partial safety factor for seismic action is  $\gamma_1 = 1,0$ .

If the conditions are not fulfilled the loads must be calculated acc. to EN 1992-4.  
For further details observe the specifications of ETA-11/0286.

<ul style="list-style-type: none"> <li>• Property class 8.8</li> <li>• Concrete - C20/25</li> <li>• Hammer drilling (HD)</li> <li>• Dry, wet concrete</li> </ul>				M8	M10	M12	M16	M20	
Recommended tension load	40°C / 24°C <sup>1)</sup>	uncracked	$N_{rec,stat}$	[kN]	9,1	12,1	16,8	21,2	33,9
	80°C / 50°C <sup>1)</sup>		$N_{rec,stat}$	[kN]	7,7	10,8	14,8	18,7	29,7
Recommended shear load without lever arm <sup>2)</sup>			$V_{rec,stat}$	[kN]	9,7	11,9	16,5	20,8	34,1
Embedment depth		$h_{ef}$	[mm]	80	90	110	125	170	
Edge distance		$c \geq$	[mm]	120	135	165	187,5	255	
Axial distance		$s \geq$	[mm]	240	270	330	375	510	

<sup>1)</sup> Short term temperature/ Long term temperature.

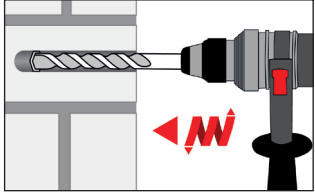
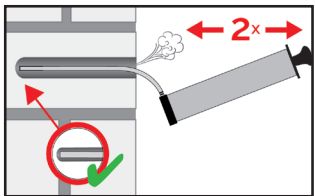
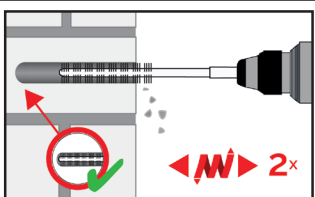
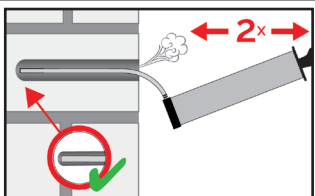
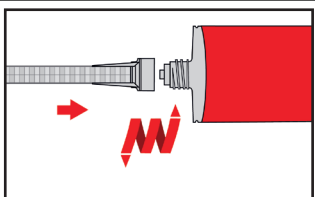
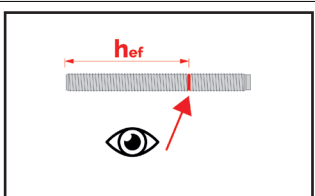
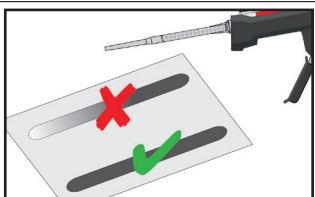
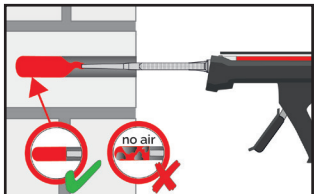
<sup>2)</sup> Shear loads are valid for all specified temperature ranges.

$N_{rec,stat}$ ,  $V_{rec,stat}$  = Recommended load under static and quasi-static action.

# TECHNICAL DATA SHEET

## Anchorage in Masonry

### Installation Instructions

Installation in solid masonry (without sleeve)	
	<p>1. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, with drilling method (according to page 12 &amp; 14), into the base material. Ensure nominal drill hole diameter and bore hole depth match the size and embedment depth required by the selected anchor. In case of aborted drill hole the drill hole shall be filled with mortar.</p>
	<p>2a. Starting from the bottom or back of the bore hole, blow the hole clean with handpump a minimum to two times.</p>
	<p>2b. Attach an appropriate sized wire brush <math>&gt; d_{b,min}</math> (see page 11) to a drill or a cordless screwdriver and brush the hole clean with a minimum of two times in a twisting motion. If the bore hole ground is not reached with the brush, a brush extension must be used.</p>
	<p>2c. Finally blow the hole clean again with handpump a minimum of two times.</p>
	<p>3. Remove the cap and attach the supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. For every working interruption longer than the recommended working time (see page 3) as well as for new cartridges, a new static-mixer shall be used.</p>
	<p>4. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods.</p>
	<p>5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.</p>
	<p>6. Starting from the bottom / back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw of the static mixing nozzle as the hole is filled avoids creating air pockets. Observe the gel-/ working times given (see page 3).</p>

# TECHNICAL DATA SHEET

## Installation in solid masonry (without sleeve) - Continued

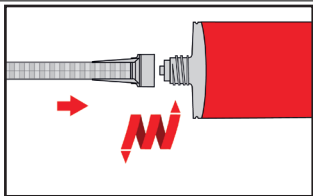
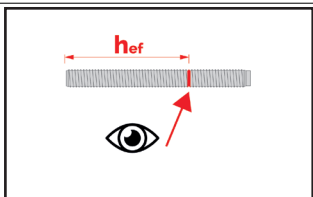
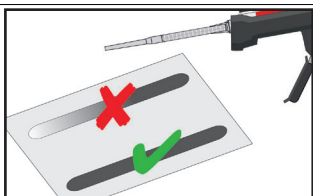
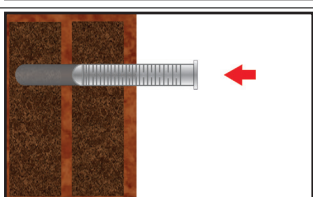
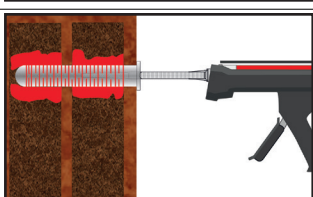
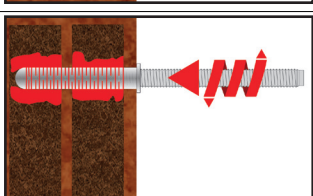
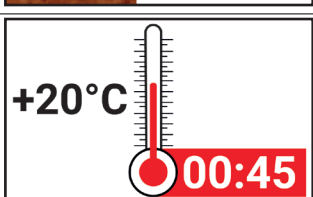
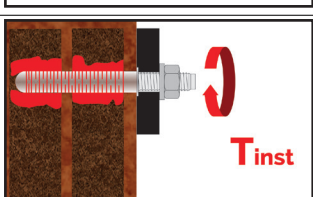
	<p>7. Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached.</p> <p>The anchor should be free of dirt, grease, oil or other foreign material.</p>
	<p>8. Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed.</p>
	<p>9. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured.(see page 3).</p>
	<p>10. After full curing, the fixture can be installed with up to the max. installation torque (see page 7) by using a calibrated torque wrench.</p>

## Installation in solid and hollow masonry (with sleeve)

	<p>1. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, with drill method according to page 11, into the base material. Ensure nominal drill hole diameter and bore hole depth match to the size and embedment depth required by the selected anchor. In case of aborted drill hole the drill hole shall be filled with mortar.</p>
	<p>2a. Starting from the bottom / back of the bore hole, blow the hole clean with handpump a minimum of two times.</p>
	<p>2b. Attach an appropriate sized wire brush <math>&gt; d_{b,min}</math> (see page 11) to a drill or a cordless screwdriver and brush the hole clean with a minimum of two times in a twisting motion. If the bore hole ground is not reached with the brush, a brush extension must be used.</p>
	<p>2c. Finally blow the hole clean again with handpump a minimum of two times.</p>

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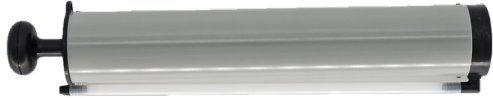
## Installation in solid and hollow masonry (with sleeve) - Continued

	<p>3. Remove the cap and attach the supplied static mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. For every working interruption longer than the recommended working time (see page 3) as well as for new cartridges, a new static-mixer should be used.</p>
	<p>4. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth should be marked on the anchor rods.</p>
	<p>5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.</p>
	<p>6. Insert the perforated sleeve flush with the surface of the masonry or plaster. Only use sleeves that have the right length. Never cut the sleeve.</p>
	<p>7. Starting from the bottom / back fill the sleeve with adhesive. For quantity of mortar attend cartridges label or installation instructions.</p> <p>Observe the gel-/working times given in table on page 3</p>
	<p>8. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor must be free of dirt, grease, oil or other foreign material.</p>
	<p>9. Allow the adhesive to cure to the specified curing time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend tables on page 3).</p>
	<p>10. After full curing, the fixture can be installed with up to the max. installation torque (see parameters of brick on page 12 &amp; 14) by using a calibrated torque wrench.</p>


# TECHNICAL DATA SHEET

## Installation Accessories


Blow Out Pump	
Order Code	Description
03079	Hand held blow out pump.



Hole Cleaning Brush	
Order Code	Description
03081	Wire Brush for 10mm Hole
03082	Wire Brush for 12mm Hole
03083	Wire Brush for 14mm Hole
03084	Wire Brush for 16mm Hole
03085	Wire Brush for 18mm Hole
03086	Wire Brush for 20mm Hole
03087	Wire Brush for 22mm Hole
03088	Wire Brush for 24mm Hole
03089	Wire Brush Handle



Mesh Resin Sleeves				
Order Code	Type	Size (mm)	Drill Hole Ø (mm)	Stud Ø
03013	Plastic	16 x 85	16	M8/M10
03015	Plastic	20 x 85	20	M12/M16
03023	Wire	16 x 1000	22	M16
03024	Wire	20 x 1000	28	M20



# TECHNICAL DATA SHEET

## Setting Parameters

Axial distance plug group		$S_{cr,N \text{ Group}}$	[mm]	Hlz, KSL, MZ, KS = 100 Hbl, Hbn = 200				100	
Min. axial distance plug group <sup>1)</sup>		$S_{min \text{ Group}}$	[mm]	Hlz, KSL, MZ, KS = 50 Hbl, Hbn = 200				50	
Axial distance between single plugs		$S_{cr,N \text{ Single}}$	[mm]	250				250	
Edge distance		$C_{cr,N}$	[mm]	250				200 (250) <sup>2)</sup>	
Min. edge distance <sup>3)</sup>		$c_{min}$	[mm]	250				50 (60) <sup>2)</sup>	
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	$h_o$	[mm]	55	90	90	90	105	105
	without sleeve	$h_o$	[mm]	65	85	95	115	85	95
Minimum part thickness		$h_{min}$	[mm]	110				125	110
Drill diameter		$d_o$	[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
<sup>1)</sup> 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. <sup>2)</sup> Value in brackets applies to solid bricks (Mz and KS). <sup>3)</sup> Applies to masonry with top load or proof of tilt. Does not apply to shear loads directed towards a free edge.									

# TECHNICAL DATA SHEET

## Calculation of Recommended Loads

The recommended loads given are for preliminary planning purposes only and do not replace dimensioning.

The following conditions must be met:

- Dry environment
- Temperature range 24/40°C (long-term/short-term)
- Spacing distance  $s \geq scr$
- Edge distance  $c \geq ccr$
- Strength class of masonry mortar at least M2.5
- Brick strength as well as density and dimensions
- Joints are visible
- Vertical joint is mortared
- Strength class of the threaded rod is min. 5.8 oder higher

The recommended loads take into account all partial safety factors (resistance 2.5; action 1.4) and all failure modes. An interaction between tension and transverse tension was not taken into account.

Reduced permissible loads with reduced axial spacing per anchor in anchor groups

$$s_{cr,N \text{ Group}} \geq s > s_{\min}$$

Anchor pairs:

$$\text{red } F = c_s \cdot F_{\text{rec}}$$

$$c_s = \frac{1}{2} \left( 1 + \frac{s}{s_{cr,N \text{ Group}}} \right) \leq 1,0$$

Groups of four:

$$\text{red } F = c_{s1} \cdot c_{s2} \cdot F_{\text{rec}}$$

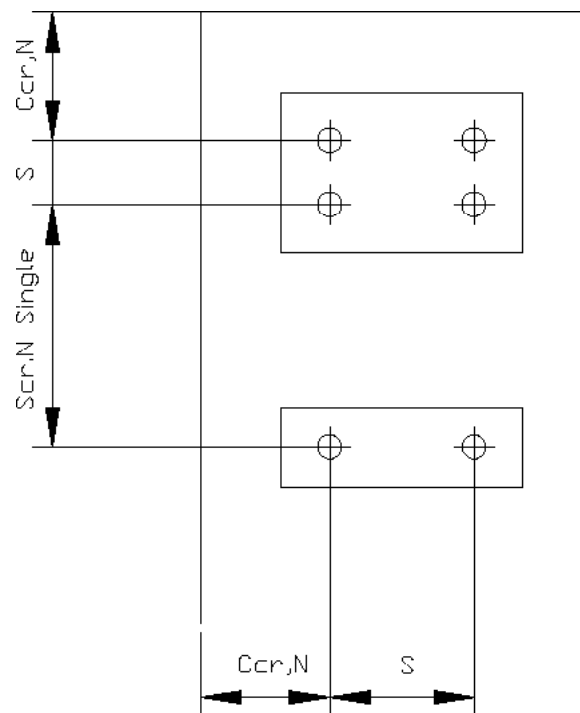
$$c_{s1,2} = \frac{1}{2} \left( 1 + \frac{s_{1,2}}{s_{cr,N \text{ Group}}} \right) \leq 1,0$$

$F_{\text{rec}}$  = Permissible load per anchor

red F = Reduced load per anchor

$s_{cr,N \text{ Group}}$  = Axial spacing

s = Reduced axial spacing



Permissible load in [kN] for each single brick				
Brick format		< 4 DF	4 to 10 DF	≥ 10DF
Without top load	max F [kN]	1,0	1,4	2,0
With top load	max F [kN]	1,4	1,7	2,5

# TECHNICAL DATA SHEET

## Recommended Loads - 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 <sup>1)</sup>	KS 12	$F_{rec}$	[kN]	0,5	1,7	1,7	1,7	1,7	1,7
Solid brick <sup>1)</sup>	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	-	-

<sup>1)</sup> Anchoring in masonry of solid lime-sand bricks (KS) and masonry bricks (Mz) does not require perforated sleeve.

Note: This technical data sheet replaces all previous versions. The instructions in this documentation are based on tests and experience and have been prepared to the best of our knowledge and conscience. Due to the variety of different materials and substrates and the many different possible applications beyond our control, we assume no responsibility for the results achieved. Since the construction and nature of the substrate and the processing conditions are beyond our control, we do not accept any liability for this publication. In any case, it is recommended to carry out appropriate tests before use.