Sormat ITH-Pe

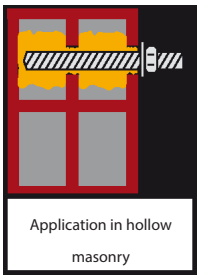
Polyester based injection resin, styrene free

ITH 165 Pe
art. 72900

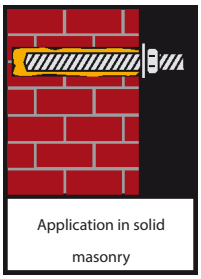
ITH 300 Pe
art. 72940

ITH 410 Pe
art. 72941

Application in non-cracked concrete



Application in hollow masonry



Application in solid masonry

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Product description

The ITH-Pe is a 2-component reaction resin mortar based on a styrene free polyester and will be delivered in foil-tube (art. 72900; 165 ml or 72940; 300 ml) and a coaxial cartridge system (72941; 410 ml) . 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 and internal threaded rod sleeves for several applications. By using a sieve, an easy and save application in hollow bricks is guaranteed. The ITH-Pe mortar is characterised by good applications with an ambiance temperature up to 80 °C.

European Technical Assessment - Option 7 for non-cracked concrete
ETA-15/0220

VOC

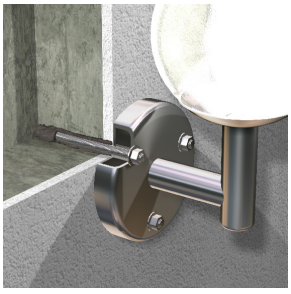
ÉMISSIONS DANS L'AIR INTÉRIEUR
A+
A+ A B C

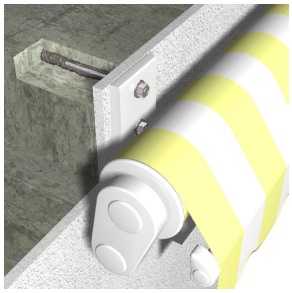
Properties and benefits

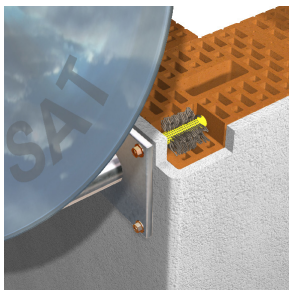
- European Technical Assessment in non-cracked concrete (ETA-15/0220, Opt 7, M8 - M24).
- Applications in non-cracked concrete, solid brick and hollow brick with threaded rods
- Overhead applications
- Suitable for attachment points close to the edge, since anchoring is free of expansion forces
- Reduced chemical resistance
- Low VOC content (A+), LEED tested
- 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 screw cap
- Mechanical properties acc. to EN 196 Part 1
  - Density: 1,74 kg/dm^2
  - Compressive strength: 75 N/mm^2
  - Bending strength: 30 N/mm^2
  - Dynamic modulus of elasticity: 4000 N/mm^2

Sample applications

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







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Applications and intended use

- Base materials:
  non-cracked concrete, light-concrete, porous-concrete, solid masonry, hollow brick, natural stone (Attention! natural stone, can discolour; shall be checked in advance); hammer drilled holes
- Anchor elements:
  Threaded rods (zinc plated or hdg, stainless steel and high corrosion resistant steel), reinforcement bars, internal threaded rods, profiled rods, steel section with undercuts (e.g. perforated section)
- Temperature range:
  5 °C up to +35 °C installation temperature
  cartridge temperature min. +5 °C; optimal +20 °C
  -40 °C to +80 °C base material temperature after full curing

Handling and storage

- Storage:
  store in a cold and dark place, storage temperature: from +5 °C up to +25 °C
- Shelf life:
  12 months for foil tubes (165, 300) and 18 months for coaxial cartridge (410)
- Expiry date marked on the cartridges
  (e.g. 234 SEP16 = September 2016)

Curing times

Temperature of base material	Gel- and working time	Full curing time in dry base material	Full curing time in wet base material
-5 °C	90 min	360 min	720 min
0 °C	45 min	180 min	360 min
+5 °C	25 min	120 min	240 min
+10 °C	15 min	80 min	160 min
+20 °C	6 min	45 min	90 min
+30 °C	4 min	25 min	50 min
+35 °C	2 min	20 min	40 min

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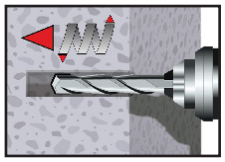
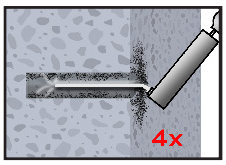
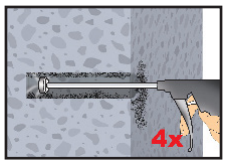
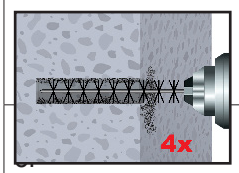
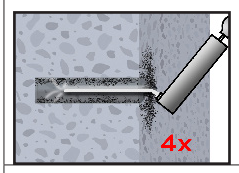
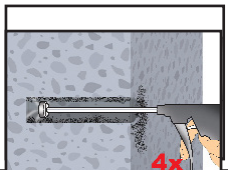
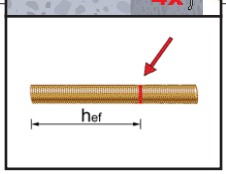
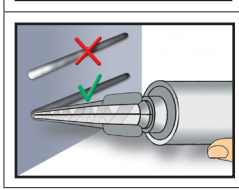
Installation instructions - concrete

	1. Drill with hammer drill mode a hole into the base material to the size and embedment depth required by the selected anchor.
 or 	2a. Standing water must be removed bevor cleaning. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used. The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm. For bore holes larger then 20 mm or deeper then 240 mm, compressed air (min. 6 bar) must be used.
	2b. Check brush diameter and brush the hole with an appropriate sized wire brush of four times. If the bore hole ground is not reached with the brush, a brush extension shall be used.
	2c. Finally blow the hole clean again with compressed air or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used. The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm. For bore holes larger then 20 mm or deeper then 240 mm, compressed air (min. 6 bar) must be used.
	3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool (cut open the cartridge if needed before attaching the mixing nozzle). For every working interruption or pause longer than the recommended working time as well as for new cartridges, a new static-mixer shall be used.
	4. Prior to inserting the anchor rod into the mortar filled bore hole, the position of the embedment depth shall be marked on the anchor rods.
	5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes (≥ 10 cm) and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.

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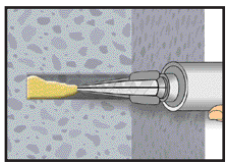
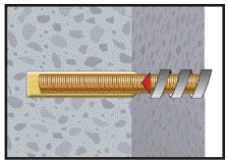
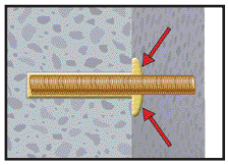
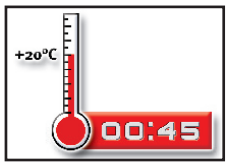
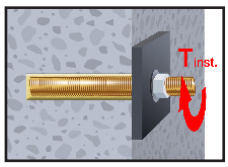
Installation instructions - concrete

	6. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately 2/3 with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. Observe the gel-/ working times given.
	7. Push the threaded rod or reinforcement bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor should be free of dirt, grease, oil or other foreign material.
	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.
	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.
	10. After full curing, the fixture part can be installed with the max. torque by using a calibrated torque wrench.

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Cleaning of the drill hole - concrete

Brush

Blower

Threaded rod	Bore hole Ø	Brush Ø	Min. brush Ø
(mm)	(mm)	d_b (mm)	$d_{b,min}$ (mm)
M 8	10,0	12,0	10,5
M 10	12,0	14,0	12,5
M 12	14,0	16,3	14,5
M 16	18,0	20,0	18,5
M 20	24,0	26,0	24,5
M 24	28,0	30,0	28,5

Installation parameters - concrete

Anchor size				M8	M10	M12	M16	M20	M24
Edge distance	1,0 x h_{ef}	$C_{cr,N}$	[mm]	80	90	110	125	170	210
Min. edge distance	5,0 x d	C_{min}	[mm]	40	50	60	80	100	120
Spacing	2,0 x h_{ef}	$S_{cr,N}$	[mm]	160	180	220	250	340	420
Min. spacing	5,0 x d	S_{min}	[mm]	40	50	60	80	100	120
Embedment depth		h_{ef}	[mm]	80	90	110	125	170	210
Min. base material thickness		h_{min}	[mm]	110	120	140	160	215	260
Anchor diameter		d	[mm]	8	10	12	16	20	24
Drill diameter		d_0	[mm]	10	12	14	18	24	28
Installation torque		T_{inst}	[Nm]	10	20	40	60	120	150

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Capacities - concrete

TENSION LOADS - Design method A acc. to ETAG 001 Annex C, characteristic values for tension loading

Anchor size				M8	M10	M12	M16	M20	M24
Steel failure									
Characteristic tension resistance, steel, zinc plated or hdg, property class 5.8		$N_{Rk,s}$	[kN]	18	29	42	78	122	177
Characteristic tension resistance, steel, zinc plated or hdg, property class 8.8		$N_{Rk,s}$	[kN]	29	46	67	125	196	282
Partial safety factor		$\gamma_{Ms,N}$		1,50					
Characteristic tension resistance, stainless steel A4 and HCR		$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor		$\gamma_{Ms,N}$		1,87					
Pullout and concrete cone failure [1]									
Characteristic bond resistance in concrete C20/25									
40 °C / 24 °C [2]	non-cracked concrete	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	16	35	35	50	75	95
80 °C / 50 °C [2]	non-cracked concrete	$N_{Rk,p} = N^0_{Rk,c}$	[kN]	14	20	30	34	54	78
Partial safety factor (dry and wet)		$\gamma_{Mp} = \gamma_{Mc}$		1,8					
Embedment depth		h_{ef}	[mm]	80	90	110	125	170	210
Edge distance		$c_{cr,N}$	[mm]	80	90	110	125	170	210
Spacing		$s_{cr,N}$	[mm]	$2 \times c_{cr,N}$					
Increasing factors for non-concrete concrete y_c				$(f_{ck}{}^{0,30})/2,63$					
Splitting failure									
Edge distance		$c_{cr,sp}$	[mm]	$c_{cr,N} \le 2\, h_{ef}\, (2,5 - h/h_{ef}) \le 2,4\, h_{ef}$					
Spacing		$s_{cr,sp}$	[mm]	$2 \times c_{cr,sp}$					
Partial safety factor (dry and wet)		γ_{Msp}		1,8					

The data in this table are intended to use together with the design provisions of ETAG 001 Annex C.

[1] Shall be determined acc. 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 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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Capacities - concrete

SHEAR LOADS - Design method A acc. to ETAG 001 Annex C, characteristic values for shear loading

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure without lever arm								
Characteristic shear resistance, steel, zinc plated or hdg, property class 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88
Characteristic shear resistance, steel, zinc plated or hdg, property class 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
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	124
Partial safety factor	$\gamma_{Ms,V}$		1,56					
Steel failure with lever arm								
Characteristic bending moment, steel, zinc plated or hdg, property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	560
Characteristic bending moment, steel, zinc plated or hdg, property class 8.8	$M^0_{Rk,s}$	[kN]	30	60	105	266	519	896
Partial safety factor	$\gamma_{Ms,V}$		1,25					
Characteristic bending moment, stainless steel A4 and HCR	$M^0_{Rk,s}$	[kN]	26	52	92	232	454	784
Partial safety factor	$\gamma_{Ms,V}$		1,56					
Concrete pry-out failure								
Factor k			2,0					
Partial safety factor	γ_{Mcp}		1,5					
Concrete edge failure								
Partial safety factor	γ_{Mc}		1,5					

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

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Recommended loads - concrete

The recommended loads are only valid for single anchor for a roughly design, if the following conditions are valid:
dry or wet bore hole, non-cracked concrete C20/25, steel 5.8
$c \geq c_{cr,N}$
$s \geq s_{cr,N}$
$h \geq 2 \times h_{ef}$

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

Anchor size			M8	M10	M12	M16	M20	M24
Embedment depth	h_{ef}	[mm]	80	90	110	125	170	210
Edge distance	$c_{cr,N}$	[mm]	$1,5 \times h_{ef}$					
Spacing	$s_{cr,N}$	[mm]	$3,0 \times h_{ef}$					
Recommended tension load 40 °C / 24 °C [2)]	N_{Rec}	[kN]	6,3	13,8	13,9	19,8	29,8	37,7
Recommended tension load 80 °C / 50 °C [2)]	N_{Rec}	[kN]	5,6	7,9	11,9	13,5	21,4	31,0
Recommended shear load without lever arm for steel property class 5.8 [1)]	V_{Rec}	[kN]	5,1	8,6	12,0	22,0	34,9	50,3

[1)] Shear load with leaer arm acc. 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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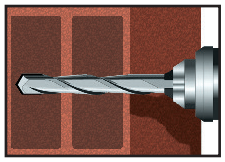
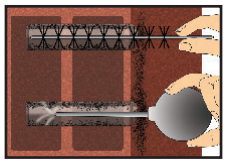
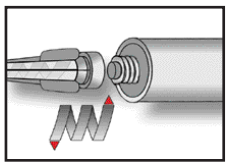
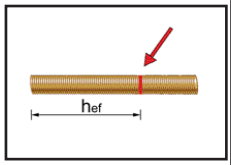
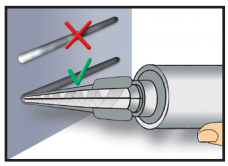
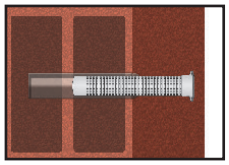
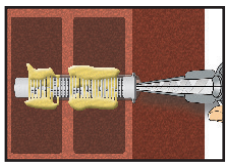
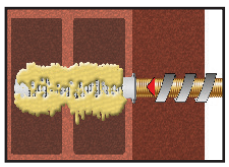
Installation instructions - hollow bricks

	1. Drill without hammer drill mode a hole into the base material to the size and embedment depth required by the selected anchor.
	2. In case of a water filled bore hole, the water has to be removed from the hole (e.g. by compressed air or vacuum cleaner). Starting from the bottom or back of the hole, blow the hole clean with a hand pump a minimum of two times. Then brush the hole with a brush a minimum of two times. Finally clean the hole again with a hand pump a minimum of two times.
	3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool (cut open the cartridge if needed before attaching the mixing nozzle). After every working interruption longer than the recommended working time as well as for new cartridges, a new static-mixer shall be used.
	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.
	5. Prior to dispensing the mortar into the bore hole, squeeze out separately a minimum of three full strokes (≥ 10 cm) and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.
	6. Insert the perforated sieve (e.g. IOV, IOV-M) into the bore hole. Make sure that the sieves fit well into the hole. Never cut the plastic sieve! Only use sieves that have the right length.
	7. Starting from the back fill the sleeve completely with adhesive. Observe the gel-/working times.
	8. Push the threaded rod or reinforcement bar into the sieve while turning it slightly to ensure a distribution of the adhesive until the back of the sleeve is reached. The anchor should be free of dirt, grease, oil or other foreign material.

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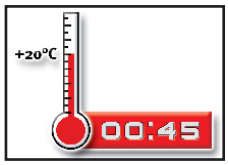
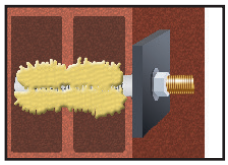
	9. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured.
	10. After full curing, the fixture can be installed with the max. torque by using a calibrated torque wrench.

Cleaning - masonry

- Brush

- Blower

Sormat ITH-Pe

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Capacities - masonry

with standard perforated plastic sieve sleeve IOV

Stone	Strength class	Standard sleeves		IOV 12x50	IOV 16x85	IOV 16x135	IOV 20x85
		Anchor size		M6 / M8	M8 / M10		M12 / M16
Hollow brick	Hlz 4	F_{rec}	[kN]	0,3	0,3	0,3	0,3
	Hlz 6			0,4	0,4	0,4	0,4
	Hlz 12			0,7	0,8	0,8	0,8
Sand -lime hollow brick	KSL 4	F_{rec}	[kN]	0,3	0,3	0,3	0,3
	KSL 6			0,4	0,4	0,4	0,4
	KSL 12			0,7	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
Solid brick [1]	Mz 12	F_{rec}	[kN]	0,5 / 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							
Spacing plug group		$s_{cr,N\ Group}$	[mm]	Hlz, KSL, MZ, KS = 100 Hbl, Hbn = 200			
Min. spacing plug group [2]		$s_{min\ Group}$	[mm]	Hlz, KSL, MZ, KS = 50 Hbl, Hbn = 200			
Spacing between single plugs		$s_{cr,N\ Single}$	[mm]	250			
Edge distance		$c_{cr,N}$	[mm]	250			
Min. edge distance [4]		c_{min}	[mm]	250			
with sleeve	Embedment depth of rod	h_{ef}	[mm]	50	85	135	85
	Drilling depth	h_0	[mm]	55	90	140	90
	Min. base material thickness	h_{min}	[mm]	110	110	160	110
	Drill diameter	d_o	[mm]	12	16		20
without sleeve	Embedment depth of rod	h_{ef}	[mm]	60	90		90
	Drilling depth	h_0	[mm]	65	95		95
	Min. base material thickness	h_{min}	[mm]	85	110		110
	Drill diameter	d_o	[mm]	8 / 10	10 / 12		14 / 18
Hole diameter in fixture		d_f	[mm]	7 / 9	9 / 12		14 / 18
Installation torque		T_{inst}	[Nm]	3 / 8	8		

[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 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.

[4] Applies to masonry with top load or proof of tilt. Does not apply to shear loads directed towards a free edge.

Sormat ITH-Pe

Polyester based injection resin, styrene free

Parameters - masonry

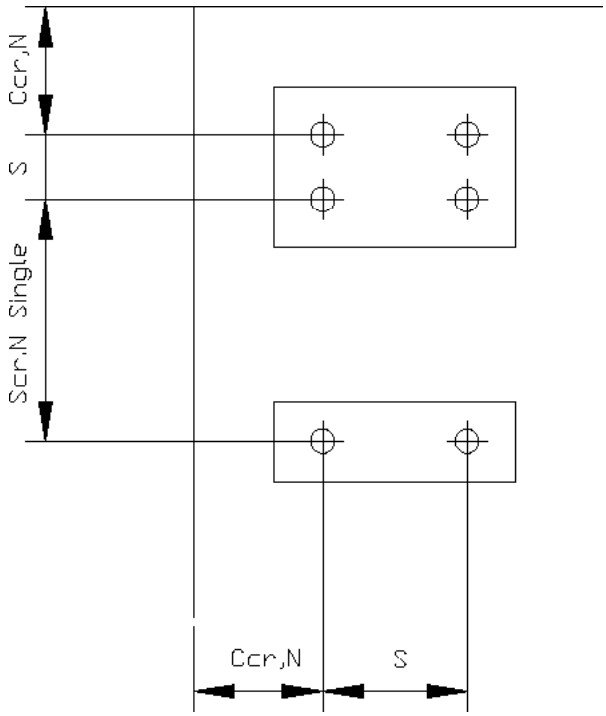
with standard perforated plastic sieve sleeve IOV

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

Anchor pairs:
red $F = \chi s \cdot F_{rec}$
$\chi s = ½ (1 + s/s_{cr,N\ Group}) \leq 1,0$

Groups of four:
red $F = \chi s_1 \cdot \chi s_2 \cdot F_{rec}$
$\chi s_{1,2} = ½ (1 + s_{1,2}/s_{cr,N\ Group}) \leq 1,0$

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



Permissible load in [kN] for each single brick				
Brick format		< 4 DF	from 4 to 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