FRIMEDA LIFTING ANCHOR SYSTEM

PRODUCT INFORMATION TECHNICS

FRIMEDA LIFTING ANCHOR SYSTEM

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FRIMEDA LIFTING ANCHOR SYSTEM

Product Information

FRIMEDA offers with its lifting anchor system a proven, safe, robust and economical system for the transport and installation of prefabricated concrete components. The system is easy to use, and its functional capability is easy to check by visual inspection. Thanks to the large range of special transport anchors available and a comprehensive range of accessories, the FRIMEDA lifting anchor system can be adapted to almost all transport and installation applications.

As for all lifting anchor systems, the safe use of our system requires a basic knowledge of the selection and use of the individual system components. This brochure is intended to serve as a dimensioning aid and installation instructions. Please read these instructions carefully, and ensure that they are kept available at the point of use. The conscientious use of our system will ensure at all times the safe and reliable transport of your prefabricated concrete components.

Software support

To ease anchor selection and the dimensioning of the required anchors, we will be happy to provide you with our free dimensioning programme TPA-WIN. After entering the required anchor type, the component dimensions and the transport conditions (traverse, inclination etc.), this program calculates the matching anchor and the additional reinforcement required. Scale drawings and parts lists can also be printed out.

Technical consultation

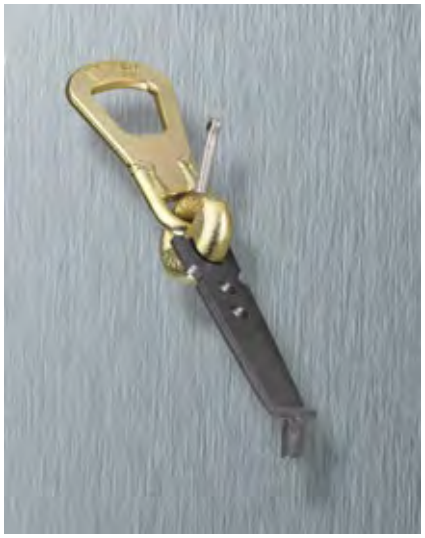
The staff of our Technical Office and our special sales consultants will advise and assist you in the solution of any special questions in connection with the FRIMEDA lifting anchor system. The relevant addresses can be found on the rear cover of the brochure.

Some of the advantages of the FRIMEDA lifting anchor system

- Wide range of anchor types
- Manual ring couplings and ring couplings with manual or pneumatic remote release
- Easy, safe and quick connection and disconnection of the ring clutches
- No confusing of load groups possible
- No preferential direction, ring clutches remain mobile all round under load
- System proven over many years
- Positive engagement of locking bolt into the anchor.
- CE-Marking
- Hot-dip galvanised version available

The Quality Management System of Halfen GmbH is certified for the locations in Germany, Austria, Poland, Switzerland and the Czech Republic according to **DIN EN ISO 9001:2008**, Certificate No. QS-281 HH.

GLC CERTIFIED ISO 9001



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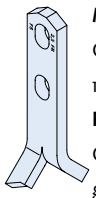
FRIMEDA TPA-Anchor

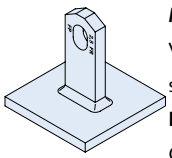
Spread anchor TPA-FS



Main applications:
Columns, beams, trusses, wall units, π-slabs
Parameters:
Component thickness, concrete grade, reinforcement

see page 19

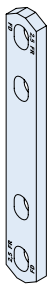
Plate anchor TPA-FP



Main applications:
Very thin ceiling slabs with surface-embedded anchors
Parameters:
Component thickness, concrete grade, reinforcement

see page 30

Double ended column anchor TPA-FD

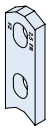


Main applications:
Columns

Parameters:
Component thickness, concrete grade, reinforcement

see page 34

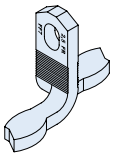
Two hole anchor TPA-FZ



Main applications:
Prestressed concrete trusses, thinwalled elements, low strength concrete (e.g. lightweight concrete)
Parameters:
Component thickness, concrete grade, reinforcement

see page 24

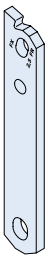
Flat foot anchor TPA-FF



Main applications:
Ceiling slabs with surface-embedded
anchors, tubes
Parameters:
Component thickness, concrete grade, reinforcement

see page 31

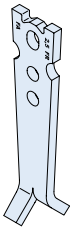
Sandwich panel anchor TPA-FX



Main applications:
Sandwich panels
Parameters:
Component thickness, concrete grade, reinforcement

see page 36

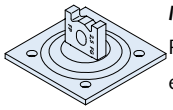
Erection anchor TPA-FA



Main applications:
Thin-walled concrete elements, being lifted from a horizontal to a perpendicular position.
Parameters:
Component thickness, concrete grade, reinforcement

see page 27

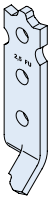
Garage anchor TPA-FG



Main applications:
Precast concrete garages, embedding in floor or ceiling slab
Parameters:
Component thickness, concrete grade

see page 33

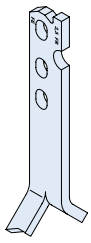
Universal anchor TPA-FU



Main applications:
see TPA-FS, TPA-FZ and TPA-FA
Parameters:
Component thickness, concrete grade, reinforcement

see page 37

Unilateral erection anchor TPA-FE



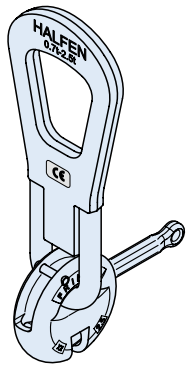
Main applications:
Thin-walled concrete elements, being lifted from a horizontal to a perpendicular position.
Parameters:
Component thickness, concrete grade, reinforcement

see page 27

FRIMEDA attachment links

Ring clutch TPA-R1

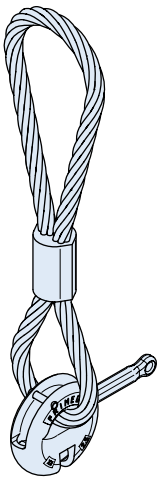
with shackle for manual release
Load group 2,5 - 26,0



see page 42

Ring clutch TPA-R2

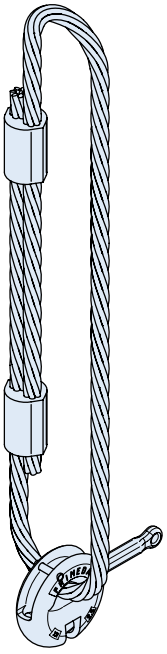
with wire cables for manual release
Load group 1,25 - 10,0



see page 42

Ring clutch TPA-R3

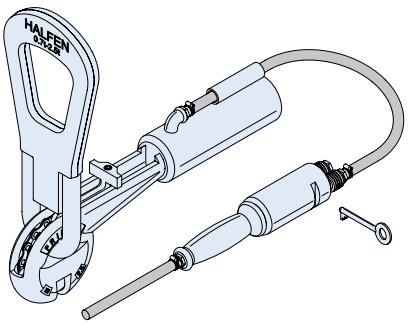
with wire cables for manual release
Load group 26,0



see page 42

Ring clutch TPA-F1

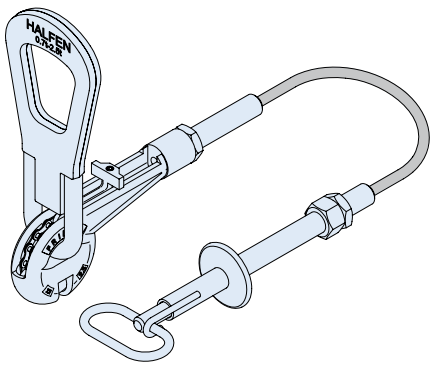
with pneumatic remote-control release
Load group 2,5 - 26,0



see page 44

Ring clutch TPA-F2

with manual remote control by bowden cable
Load group 2,5 - 26,0

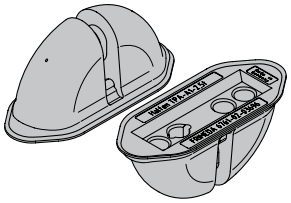


see page 46

FRIMEDA recess former (see page 38/39)

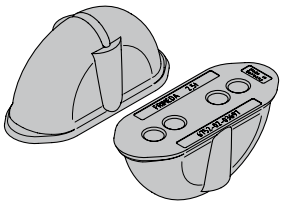
TPA-A1

Material: Plastic
Application: For all anchors except TPA-FU and TPA-FG
Installation: Holding plates H1, H2, H4, HM; holding bolts S1 or S2
Special features: High durability and good resistance to formwork treatment agents.



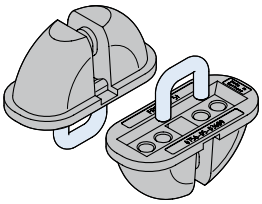
TPA-A2

Material: Rubber
Application: For anchors TPA-FS, TPA-FZ, TPA-FD, TPA-FP and TPA-FF
Installation: Holding plate H3; holding bolt S1 in combination with holding plate H3
Special features: High durability and good resistance to formwork treatment agents.



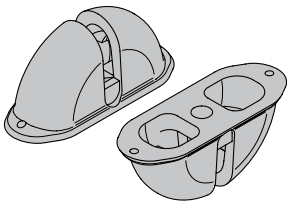
TPA-A3

Material: Rubber
Application: For anchor TPA-FG
Installation: By locking bracket
Special features: High durability and good resistance to formwork treatment agents.



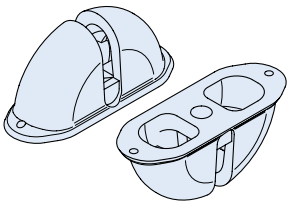
TPA-A4

Material: Plastic (hard)
Application: For all anchors except TPA-FU and TPA-FG
Installation: Holding bolts S1
Special features: High durability and good resistance to formwork treatment agents.



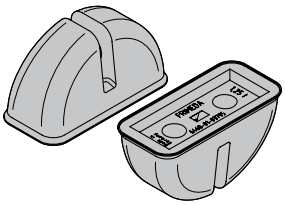
TPA-A5

Material: Steel
Application: For all anchors except TPA-FU and TPA-FG
Installation: Holding bolts S1
Special features: High durability and good resistance to formwork treatment agents.



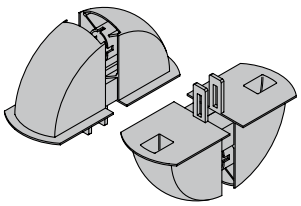
TPA-A7

Material: Plastic
Application: For Universal anchor TPA-FU
Installation: Holding plate H1 and holding bolt S1
Special features: Only for load group 1,25 !
Specially small recess
High durability and good resistance to formwork treatment agents.



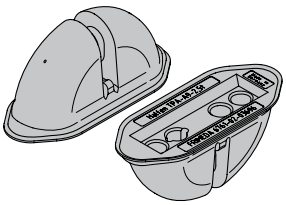
TPA-A8

Material: Plastic
Application: For anchors of load group 2,5
Installation: Consists of two parts, which are pressed together above the anchor head. Attachment to the formwork with a wedge, which is pressed between the two attachment tabs
Special features: For one-time use only!



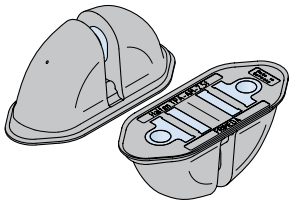
TPA-A9

Material: Plastic
Application: Specially suitable for TPA-FS, TPA-FZ, TPA- FF und TPA-FD,
not suitable for TPA-FA, TPAFE, TPA-FU, TPA-FG and TPA-FX
Installation: Holding plates H1, H2, HM; Holding bolts S1 or S2
Special features: As for TPA-A1, but for recesses without protruding concrete tongues.



TPA-AM

Material: Plastic
Application: For all anchors except TPA-FU and TPA-FG
Installation: Magnetic
Special features: High durability and good resistance to formwork treatment agents.

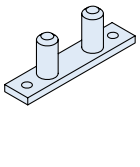


FRIMEDA holding plates and holding bolts (see page 38/40)

TPA-H1

Application: For recess formers TPA-A1, TPA-A7 and TPA-A9
load groupe 1,25 for TPA-A7

Installation: Fixing to the form work

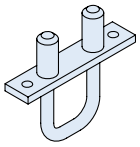


Load group 1,25

TPA-H2

Application: For recess former TPA-A1 and TPA-A9

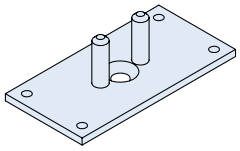
Installation: For floating installation



TPA-H3

Application: For recess former TPA-A2

Installation: For attachment to the formwork with retaining bolt S1 or by nailing

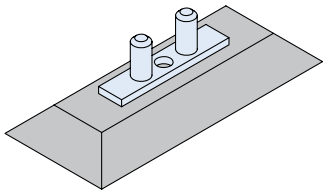


TPA-HM

Application: For recess formers TPA-A1, TPA-A9 to load group 10t

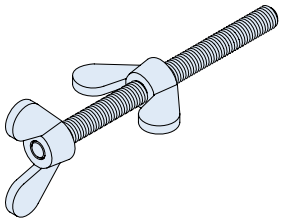
Installation: Fixing to the steel form work

Note: Magnetic.



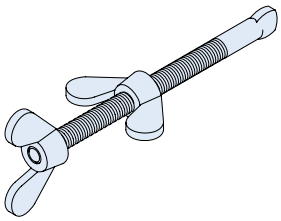
TPA-S1

Application: For recess formers TPA-A1, TPA-A7, TPA-A4, TPA-A5, TPA-A9, TPA-A2 only in combination with holding plate TPA-H3



TPA-S2

Application: For recess formers TPA-A1 and TPA-A9

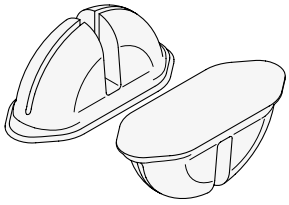


TPA-V1

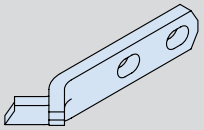
Material: Polystyrene

Application: Recess filler to keep the recess clean during starge

Installation: TPA-A1, TPA-A2, TPA-A3, TPA-A4, TPA-A5, TPA-A9 and TPA-AM

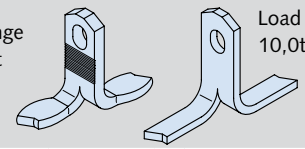


Spread anchor TPA-FS



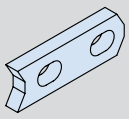
Load group [t]		Designation	Order No. 0070.010-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FS 0,7-11	00001	hot-dip galvanised	TPA-FS 0,7-11 FV	00032
		TPA-FS 1,4-11	00002		TPA-FS 1,4-11 FV	00033
		TPA-FS 1,4-16	00003		TPA-FS 1,4-16 FV	00034
		TPA-FS 2,0-13	00004		TPA-FS 2,0-13 FV	00035
		TPA-FS 2,0-16	00005		TPA-FS 2,0-16 FV	00036
		TPA-FS 2,0-21	00006		TPA-FS 2,0-21 FV	00037
		TPA-FS 2,5-15	00007		TPA-FS 2,5-15 FV	00038
		TPA-FS 2,5-20	00008		TPA-FS 2,5-20 FV	00039
		TPA-FS 2,5-25	00009		TPA-FS 2,5-25 FV	00040
5		TPA-FS 3,0-16	00010		TPA-FS 3,0-16 FV	00041
		TPA-FS 3,0-20	00011		TPA-FS 3,0-20 FV	00042
		TPA-FS 3,0-28	00012		TPA-FS 3,0-28 FV	00043
		TPA-FS 4,0-18	00013		TPA-FS 4,0-18 FV	00044
		TPA-FS 4,0-24	00014		TPA-FS 4,0-24 FV	00045
		TPA-FS 4,0-32	00015		TPA-FS 4,0-32 FV	00046
		TPA-FS 5,0-18	00016		TPA-FS 5,0-18 FV	00047
		TPA-FS 5,0-24	00017		TPA-FS 5,0-24 FV	00048
		TPA-FS 5,0-40	00018		TPA-FS 5,0-40 FV	00049
10		TPA-FS 7,5-26	00022		TPA-FS 7,5-26 FV	00053
		TPA-FS 7,5-30	00023		TPA-FS 7,5-30 FV	00054
		TPA-FS 7,5-42	00024		TPA-FS 7,5-42 FV	00055
		TPA-FS 10,0-30	00025		TPA-FS 10,0-30 FV	00056
		TPA-FS 10,0-37	00026		TPA-FS 10,0-37 FV	00057
		TPA-FS 10,0-52	00027		TPA-FS 10,0-52 FV	00058
26		TPA-FS 14,0-37	00028		TPA-FS 14,0-37 FV	00059
		TPA-FS 14,0-46	00029		TPA-FS 14,0-46 FV	00060
		TPA-FS 22,0-50	00030		TPA-FS 22,0-50 FV	00061
		TPA-FS 22,0-62	00031		TPA-FS 22,0-62 FV	00062

Flat Foot anchor TPA-FF



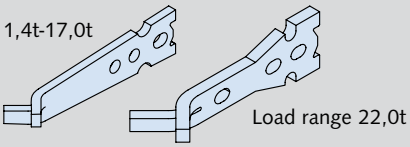
Load group [t]		Designation	Order No. 0070.070-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FF 0,7- 6	00001	hot-dip galvanised	TPA-FF 0,7- 6 FV	00019
		TPA-FF 1,4- 6	00002		TPA-FF 1,4- 6 FV	00020
		TPA-FF 2,0- 7	00003		TPA-FF 2,0- 7 FV	00021
		TPA-FF 2,5- 7	00004		TPA-FF 2,5- 7 FV	00022
5		TPA-FF 3,0- 9	00005		TPA-FF 3,0- 9 FV	00023
		TPA-FF 4,0-11	00006		TPA-FF 4,0-11 FV	00024
		TPA-FF 5,0-12	00007		TPA-FF 5,0-12 FV	00025
10		TPA-FF 7,5-17	00009		TPA-FF 7,5-17 FV	00027
		TPA-FF 10,0-20	00010		TPA-FF 10,0-20 FV	00028
26		TPA-FF 12,5-22	00011		TPA-FF 12,5-22 FV	00029
		TPA-FF 17,0-27	00012		TPA-FF 17,0-27 FV	00030
		TPA-FF 22,0-31	00013		TPA-FF 22,0-31 FV	00031

Two hole anchor TPA-FZ



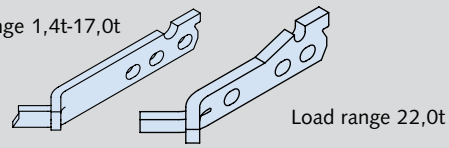
Load group [t]		Designation	Order No. 0070.020-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FZ 1,4- 9	00002	hot-dip galvanised	TPA-FZ 1,4- 9 FV	00064
		TPA-FZ 2,0- 9	00003		TPA-FZ 2,0- 9 FV	00065
		TPA-FZ 2,5- 9	00004		TPA-FZ 2,5- 9 FV	00066
5		TPA-FZ 3,0-12	00005		TPA-FZ 3,0-12 FV	00067
		TPA-FZ 4,0-12	00006		TPA-FZ 4,0-12 FV	00068
		TPA-FZ 5,0-12	00007		TPA-FZ 5,0-12 FV	00069
10		TPA-FZ 7,5-16	00009		TPA-FZ 7,5-16 FV	00071
		TPA-FZ 10,0-17	00010		TPA-FZ 10,0-17 FV	00072
26		TPA-FZ 14,0-24	00011		TPA-FZ 14,0-24 FV	00073
		TPA-FZ 22,0-30	00013		TPA-FZ 22,0-30 FV	00075
		TPA-FZ 26,0-30	00012		TPA-FZ 26,0-30 FV	00074

Erection anchor TPA-FA



Load group [t]		Designation	Order No. 0070.030-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FA 1,4-20	00001	hot-dip galvanised	TPA-FA 1,4-20 FV	00001
		TPA-FA 2,5-23	00002		TPA-FA 2,5-23 FV	00002
5		TPA-FA 4,0-27	00003		TPA-FA 4,0-27 FV	00003
		TPA-FA 5,0-29	00004		TPA-FA 5,0-29 FV	00004
10		TPA-FA 7,5-32	00005		TPA-FA 7,5-32 FV	00005
		TPA-FA 10,0-39	00006		TPA-FA 10,0-39 FV	00006
26		TPA-FA 12,5-50	00007		TPA-FA 12,5-50 FV	00007
		TPA-FA 17,0-50	00008		TPA-FA 17,0-50 FV	00008
		TPA-FA 22,0-50	00009		TPA-FA 22,0-50 FV	00009

Unilateral erection anchor TPA-FE

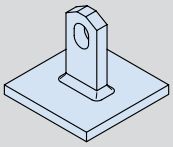


Load group [t]		Designation	Order No. 0070.040-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FE 1,4-20	00001	hot-dip galvanised	TPA-FE 1,4-20 FV	00010
		TPA-FE 2,5-23	00002		TPA-FE 2,5-23 FV	00011
5		TPA-FE 4,0-27	00003		TPA-FE 4,0-27 FV	00012
		TPA-FE 5,0-29	00004		TPA-FE 5,0-29 FV	00013
10		TPA-FE 7,5-32	00005		TPA-FE 7,5-32 FV	00014
		TPA-FE 10,0-39	00006		TPA-FE 10,0-39 FV	00015
26		TPA-FE 12,5-50	00007		TPA-FE 12,5-50 FV	00016
		TPA-FE 17,0-50	00008		TPA-FE 17,0-50 FV	00017
		TPA-FE 22,0-50	00009		TPA-FE 22,0-50 FV	00018

THE RANGE

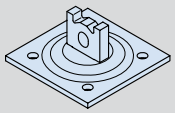
TPA-Anchor / TPA-Attachment links

Plate anchor TPA-FP



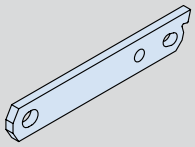
Load group		Designation	Order No. 0070.050-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FP 1,4- 5	00001	hot-dip galvanised	TPA-FP 1,4- 5 FV	00076
		TPA-FP 2,5- 8	00002		TPA-FP 2,5- 8 FV	00077
5		TPA-FP 5,0-12	00003		TPA-FP 5,0-12 FV	00078
10		TPA-FP 10,0-16	00004		TPA-FP 10,0-16 FV	00079

Garage anchor TPA-FP



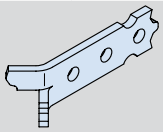
Load group	Designation **mill finish**	Order No. 0070.060-	Designation **hot-dip galvanised**	Order No. 0070.110-
5,0	TPA-FG 4,0 - 7	00001	TPA-FG 4,0 - 7 FV	00076

Sandwich panel anchor TPA-FX



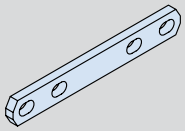
Load group		Designation	Order No. 0070.090-		Designation	Order No. 0070.090-
2,5	mill finish	TPA-FX 2,5-25	00001	hot-dip galvanised	TPA-FX 2,5-25 FV	00006
5		TPA-FX 5,0-30	00002		TPA-FX 5,0-30 FV	00007
10		TPA-FX 7,5-35	00003		TPA-FX 7,5-35 FV	00008
		TPA-FX 10,0-35	00004		TPA-FX 10,0-35 FV	00009
26		TPA-FX 17,0-40	00005		TPA-FX 17,0-40 FV	00010

Universal anchor TPA-FU



Load group	Designation **mill finish**	Order No. 0070.100-	**Material**
1,25	TPA-FU 1,25-12	00001	**mill finish**
1,25	TPA-FU 1,25-12 FV	00003	**hot-dip galvanised**
1,25	TPA-FU 1,25-12 A2	00002	**stainless steel A2** (W 1.4301)

Double ended column anchor TPA-FD

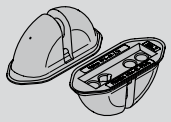
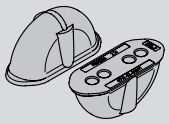
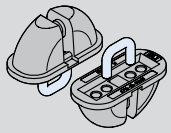
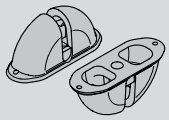
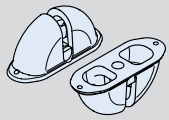
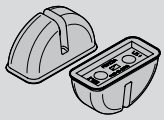


Load group		Designation	Order No. 0080.010-		Designation	Order No. 0070.110-
2,5	mill finish	TPA-FD 2,5-23	00001	hot-dip galvanised	TPA-FD 2,5-23	00080
		TPA-FD 2,5-28	00002		TPA-FD 2,5-28	00081
		TPA-FD 2,5-33	00003		TPA-FD 2,5-33	00082
5		TPA-FD 5,0-23	00004		TPA-FD 5,0-23	00083
		TPA-FD 5,0-28	00005		TPA-FD 5,0-28	00084
		TPA-FD 5,0-33	00006		TPA-FD 5,0-33	00085
		TPA-FD 5,0-38	00007		TPA-FD 5,0-38	00086
		TPA-FD 5,0-43	00008		TPA-FD 5,0-43	00087
		TPA-FD 5,0-48	00009		TPA-FD 5,0-48	00088
10		TPA-FD 7,5-26	00010		TPA-FD 7,5-26	00089
		TPA-FD 7,5-31	00011		TPA-FD 7,5-31	00090
		TPA-FD 7,5-36	00012		TPA-FD 7,5-36	00091
		TPA-FD 7,5-41	00013		TPA-FD 7,5-41	00092
		TPA-FD 7,5-46	00014		TPA-FD 7,5-46	00093
		TPA-FD 10,0-26	00015		TPA-FD 10,0-26	00094
		TPA-FD 10,0-31	00016		TPA-FD 10,0-31	00095
		TPA-FD 10,0-36	00017		TPA-FD 10,0-36	00096
		TPA-FD 10,0-41	00018		TPA-FD 10,0-41	00097
		TPA-FD 10,0-46	00019		TPA-FD 10,0-46	00098
26		TPA-FD 12,5-36	00020		TPA-FD 12,5-36	00099
		TPA-FD 12,5-41	00021		TPA-FD 12,5-41	00100
		TPA-FD 12,5-46	00022		TPA-FD 12,5-46	00101
		TPA-FD 17,5-36	00023		TPA-FD 17,5-36	00102
		TPA-FD 17,0-41	00024		TPA-FD 17,0-41	00103
		TPA-FD 17,0-46	00025		TPA-FD 17,0-46	00104
		TPA-FD 22,0-41	00026		TPA-FD 22,0-41	00105
		TPA-FD 22,0-46	00027		TPA-FD 22,0-46	00106
		TPA-FD 22,0-56	00028		TPA-FD 22,0-56	00107

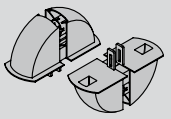
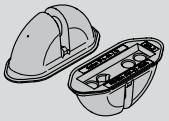
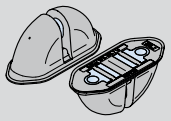
THE RANGE

Recess former and accessories

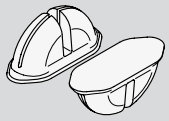
Recess former

Load group [t]	TPA-A1		TPA-A2		TPA-A3		TPA-A4		TPA-A5		TPA-A7	
							 incl. TPA-A-E1		 incl. TPA-A-E1			
	Designation	Order No. 0072.010-	Designation	Order No. 0072.020-	Designation	Order No. 0072.030-	Designation	Order No. 0072.040-	Designation	Order No. 0072.050-	Designation	Order No. 0072.070-
1,25	-	-	-	-	-	-	-	-	-	-	TPA-A7 1,25	00001
2,5	TPA-A1 2,5	00001	TPA-A2 2,5	00001	-	-	TPA-A4 2,5	00001	TPA-A5 2,5	00001	-	-
5	TPA-A1 5,0	00002	TPA-A2 5,0	00002	TPA-A3 5,0	00001	TPA-A4 5,0	00002	TPA-A5 5,0	00002	-	-
10	TPA-A1 10,0	00003	TPA-A2 10,0	00003	-	-	TPA-A4 10,0	00003	TPA-A5 10,0	00003	-	-
26	TPA-A1 26,0	00004	-	-	-	-	TPA-A4 26,0	00004	TPA-A5 26,0	00004	-	-

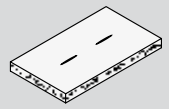
Recess former

Load group [t]	TPA-A8		TPA-A9		TPA-AM	
						
	Designation	Order No. 0072.080-	Designation	Order No. 0072.090-	Designation	Order No. 0072.100-
1,25	-	-	-	-	-	-
2,5	TPA-A8 2,5	00001	TPA-A9 2,5	00001	TPA-AM 2,5	00001
5	-	-	TPA-A9 5,0	00002	TPA-AM 5,0	00002
10	-	-	TPA-A9 10,0	00003	-	-
26	-	-	TPA-A9 26,0	00004	-	-

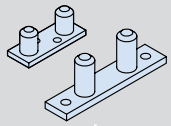
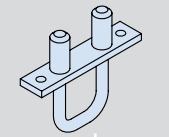
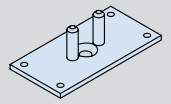
Recess filler

Load group [t]	TPA-V1	
		
	Designation	Order No. 0073.080-
1,25	-	-
2,5	TPA-V1 2,5	00001
5	TPA-V1 5,0	00002
10	TPA-V1 10,0	00003
26	TPA-V1 26,0	00004

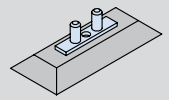
Asseccories

Load group [t]	TPA-A-Z1		TPA-A-E1	
				
	Designation	Order No. 0072.120-	Designation	Order No. 0072.120-
1,25	-	-	-	-
2,5	TPA-A-Z1 2,5	00006	TPA-A-E1 2,5	00002
5	TPA-A-Z1 5,0	00007	TPA-A-E1 5,0	00003
10	TPA-A-Z1 10,0	00008	TPA-A-E1 10,0	00004
26	TPA-A-Z1 26,0	00009	TPA-A-E1 26,0	00005

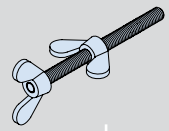
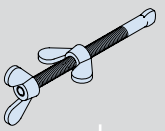
Holding plates

Load group [t]	TPA-H1		TPA-H2		TPA-H3	
						
	Designation	Order No. 0073.010-	Designation	Order No. 0073.020-	Designation	Order No. 0073.030-
1,25	TPA-H1 1,25	00001	-	-	-	-
2,5	TPA-H1 2,5	00002	TPA-H2 2,5	00001	TPA-H3 2,5	00001
5	TPA-H1 5,0	00003	TPA-H2 5,0	00002	TPA-H3 5,0	00002
10	TPA-H1 10,0	00004	TPA-H2 10,0	00003	TPA-H3 10,0	00003
26	TPA-H1 26,0	00005	TPA-H2 26,0	00004	-	-

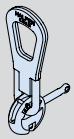
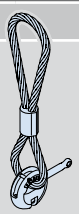
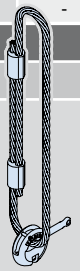
Holding plates

Load group [t]	TPA-HM	
		
	Designation	Order No. 0073.050-
1,25	-	-
2,5	TPA-HM 2,5	00001
5	TPA-HM 5,0	00002
10	TPA-HM 10,0	00003
26	-	-

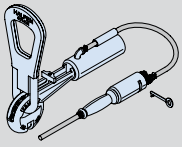
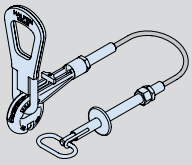
Holding bolts

Load group [t]	TPA-S1		TPA-S2	
				
	Designation	Order No. 0073.060-	Designation	Order No. 0073.070-
1,25			-	-
2,5	TPA-S1-M 8	00001	TPA-S2-M 8	00001
5				
10	TPA-S1-M12	00002	TPA-S2-M12	00002
26	TPA-S1-M16	00003		

Ring clutches

Load group [t]	TPA-R1		TPA-R2		TPA-R3	
						
	Designation	Order No. 0071.010-	Designation	Order No. 0071.020-	Designation	Order No. 0071.020-
1,25	-	-	TPA-R2 1,25	00001	-	-
2,5	TPA-R1 2,5	00001	TPA-R2 2,5	00002	-	-
5	TPA-R1 5,0	00002	TPA-R2 5,0	00003	-	-
10	TPA-R1 10,0	00003	TPA-R2 10,0	00004	-	-
22/26	TPA-R1 26,0	00004	-	-	TPA-R3 26,0	00005

Ring clutches with remote control release

Load group [t]	TPA-F1		TPA-F2	
				
	Designation	Order No. 0071.030-	Designation	Order No. 0071.040-
1,25	-	page 44	-	page 46
2,5	TPA-F1 2,5		TPA-F2 2,5	
5	TPA-F1 5,0		TPA-F2 5,0	
10	TPA-F1 10,0		TPA-F2 10,0	
22/26	TPA-F1 22,0		TPA-F2 22,0	

Spares

Load group [t]	TPA-R-E1	
	Spare locking bolt  zi = galvanised version	
	Designation	Order No. 0071.060-
1,25	TPA-R-E1 1,25-Zi	00001
2,5	TPA-R-E1 2,5-Zi	00002
5	TPA-R-E1 5,0-Zi	00003
10	TPA-R-E1 10,0	00004
22/26	TPA-R-E1 26,0	00005

Description of the system

The FRIMEDA lifting anchor system consists of a steel component inset into the concrete (the anchor) and a lifting component (the ring clutch). The prefabricated concrete component is lifted and transported by means of a ring clutch, which is locked to the anchor casted into concrete. The design and shape of the ring clutch and anchor enable the lifting of the load in almost any load direction. The ring clutch can be unlocked either manually, direct at the clutch head, or by remote release.

The load group system

The components of the FRIMEDA lifting anchor system are classified in terms of load groups. Every load group corresponds to the permissible load of a ring clutches to which anchors of the different load rates of a load group can be connected. The anchor loads available in each load are shown in the table below.
Incorrect connection is safely prevented, since the ring clutches cannot be connected to anchors of the wrong load group.

Load group system	
Load group Ring clutches [t]	Anchor loads [t]
2,5	0,7 1,4 2,0 2,5
5,0	3,0 4,0 5,0
10,0	7,5 10,0
26,0	12,5 14,0 17,0 22,0 26,0

The anchors

The anchors are made of special-quality flat steel. The shape of the anchor foot is described under the corresponding anchor types. The anchor head is provided with a hole, into which is fitted the locking bolt of the ring clutch. Each anchor carries a clearly visible, stamped manufacturer's designation, which designates the product brand FRIMEDA (FR) and the system designation (F), the anchor type (e.g. S), the anchor length (e.g. 13) and the anchor load (e.g. 2.0).

The ring clutches

The ring clutch is inserted into the recess of the cast-in anchor and the locking bolt is closed by hand. The ring clutch is thus secured to the anchor in a matter of seconds. The ring clutch can now be subjected to loads in any direction: turning, rotating and tilting can all be carried out. There is no preferred direction of pull (Fig. 1). To disengage, the locking bolt is simply opened to free the ring clutch. If the access is more difficult (see German safety code „Unfallverhütungsvorschriften" (UVV)) ring clutches with pneumatic or manual remote-control release can be usedeasily (TPA-F1, TPA-F2).

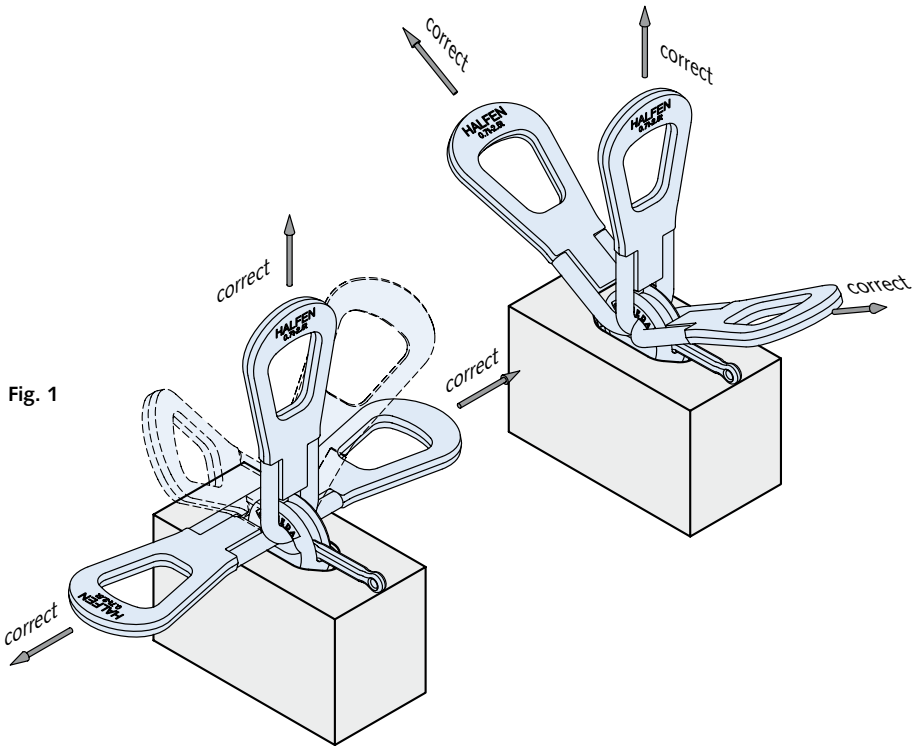


Fig. 1

The load range shows the maximum load bearing of the anchor at the point of steel failure.

The installation conditions in concrete (concrete grade, edge distances, etc.) can reduce load capacity.

Marking of ring clutches

The marking of the clutch heads is the same for all types.

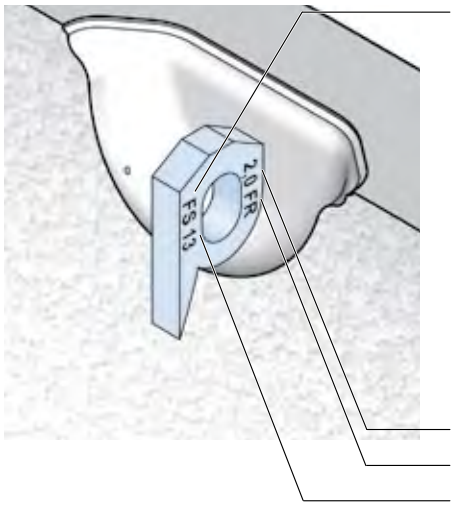
It consists of:
- The manufacturer's quality mark "FRIMEDA"
- Factory code, e.g. "81"
- Load capacity, e.g. "3,0 - 5,0 t" (range of anchor loads in the group)

Additionally, on the reverse side the position of the locking bolt is marked "A - Z" (A = open - Z = close).

The quality mark (F), the type designation (e.g. R1) and production date (month/year) are hard stamped on the shackle (Type R1, F1 and F2) alternatively, on the aluminium clips of the cable wires (Type R2 und R3). Example: „F - R1 - 04/05".

The ring clutches are clearly matched to the anchors by compatible design as well as by marking the anchor types and load groups. Only matching components will fit together.

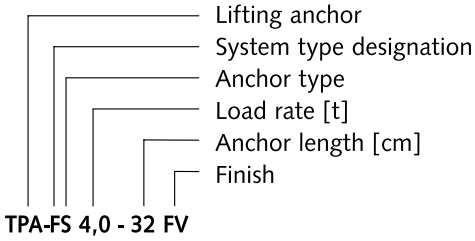
Marking of transport anchors

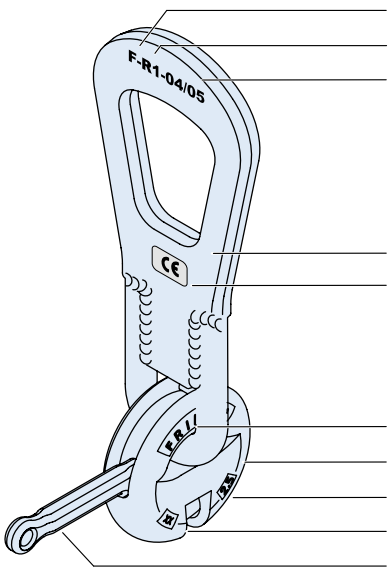


- **System type designation**
- **Anchor type**
  - S = Spread anchor
  - Z = Two hole anchor
  - P = Plate anchor
  - A = Erection anchor
  - E = Unilateral erection anchor
  - G = Garage anchor
  - F = Flate foot anchor
  - D = Double ended column anchor
  - X = Sandwich panel anchor
  - U = Universal anchor
- **Loadrate [t]**
- **Manufacturer´s sign FRIMEDA**
- **Anchor length**

Anchor designation

Example:





- FRIMEDA Quality mark
- Type
- Production date
- Shackle
- CE-Marking
- FRIMEDA Quality mark
- Clutch head
- Load group
- Factory code
- Locking bolt

All lifters are designated with the CE symbol in accordance with the machinery directive.
(Machinery Directive 98/37/EG)

Safety rules

A lifting anchor system consists of the transport anchors permanently anchored in the prefabricated concrete component and the temporarily attached lifting clutch. The "Hauptverband der gewerblichen Berufsgenossenschaften" has issued "Safety rules for transport anchors and systems of prefabricated concrete components" (BGR 106), which represent the generally acknowledged status of the technology.

These safety rules require the following breakage strengths:

Breakage strengths	
Steel breakage of anchors:	$\gamma = 3$
Breaking of concrete:	$\gamma = 2.5$
Breakage of lifters:	$\gamma = 4$

In order to ensure safe use of the FRIMEDA lifting anchor system, this catalogue must be kept available at the place of use.

Load capacity

The load capacity of the anchor depends on:

- The strength of the concrete at the time of lifting
- The embedded depth of the anchor
- The edge distance and spacings of the anchors
- The load direction
- The arrangement of reinforcements

The calculation of the force acting on the anchors is made according to the following load assumptions:

① Surface of the prefabricated concrete component in contact with the formwork prior to lifting.

Deadweight

For the calculation of the weight (G) of a normally precast reinforced concrete unit in accordance with DIN 1055-1 (06/2002), a specific weight of $\gamma = 25$ kN/m^3 can be assumed.

G = Total weight of the precast unit

Adhesion to formwork

Adhesion forces between the formwork and the concrete vary according to the type of formwork used. The following may be taken as a guide:

Adhesion to formework	
Oiled steel formwork	$q = 1$ kN/m^2
Varnished timber formwork	$q = 2$ kN/m^2
Rought timber formwork	$q = 3$ kN/m^2

The value (H_a) of adhesion to the mould is thus calculated by the following equation:

$$H_a = q \times A \text{ ①}$$

Higher adhesion to the formwork is to be expected for double T-slabs and coffered units. For ease of calculation, a multiple of the mass is used:

Increased formwork adhesion	
Douple T-slabs	$H_a = 2 \times G$
Ripped slabs	$H_a = 3 \times G$
Coffered units	$H_a = 4 \times G$

In the same way as for ribbed slabs and coffered units, in which parts of the formwork lie parallel or almost parallel to the lifting direction, substantial load increases can also be encountered in the case of other components lifted parallel to the formwork, such as vertically concreted supports or slabs.

Adhesion to the formwork should be minimised before lifting out of the mould by removing as many parts of the formwork as possible.

Dynamic forces

When a precast unit is moved by lifting gear, dynamic forces which depend considerably on the type of lifting gear used are generated. These are taken into account in dimensioning, through the lifting load coefficient f. Lifting load coefficients to DIN 15018 are summarised in the following table.

Dynamic forces acc. DIN 15018		
Lifting class	Lifting load coefficient f at lifting speed V_H	
	up to 90 m/min	over 90 m/min
H 1	1.1 + 0,0022 V_H	1.3
H 2	1.2 + 0,0044 V_H	1.6
H 3	1.3 + 0,0066 V_H	1.9
H 4	1.4 + 0,0088 V_H	2.2

Lifting load coefficients of f = 1.1 to 1.3 are to be expected for cranes with precision lifting, such as those used in manufacturing plants and on construction sites. The application of a lifting load coefficient for lifting out of the formwork at the manufacturing plant is unnecessary if a suitably cautious approach is adopted.
Care must be taken when transporting suspended precast units over uneven terrain. In the interests of safety, a lifting load coefficient of f > 2 should be used.

Total load

The total load of the precast unit for dimensioning the anchor is determined as follows:

1. During lifting:

$$V_1 = G + H_a$$

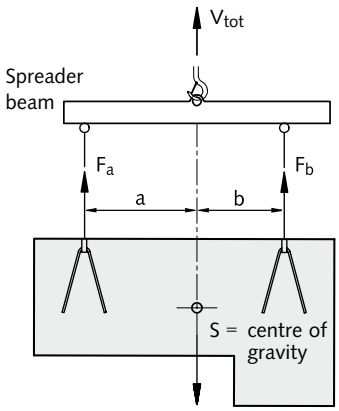
2. During transporting

$$V_2 = G \times f$$

Asymetrical anchor arrangement

If the arrangement of the anchors is asymmetrical in relation to the centre of gravity, the load of the individual anchors must be calculated using the rod method.

Unequal anchor loads when the suspension points are not symmetrical in relation to the centre of gravity:



The load will always balance under the crane hook. If the anchors are in an asymmetrical arrangement, the load of each anchor is calculated as follows:

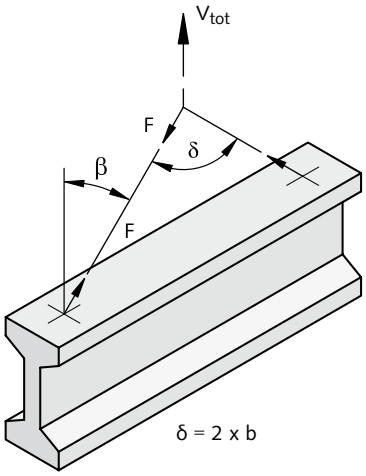
$$F_a = V_{tot} \times b / (a + b)$$

$$F_b = V_{tot} \times a / (a + b)$$

Transport without spreader beam

If no spreader beam is used, the cable angle β depends on the length of the suspending cable. The resulting horizontal component increases the tensile force on the anchor by a further factor:

$$z = 1 / \cos \beta$$



Spread angle factor		
Cable angle β	Spread angle factor δ	Factor z
0°	-	1,00
7,5°	15,0°	1,01
15,0°	30,0°	1,04
22,5°	45,0°	1,08
30,0°	60,0°	1,16
37,5°	75,0°	1,26
45,0°	90,0°	1,41
52,5°	105,0°	1,64
60,0°	120,0°	2,00

For a symmetrical arrangement, the tensile force on the anchor is:

$$F = z \times V_{tot} / n$$

n = number of load-bearing anchors
(see also section „Multiple slings“)

Note:

To avoid tilting of the unit during lifting, the load should be suspended from the spreader beam such that its centre of gravity S is directly below the crane hook.

If no spreader beam is used during lifting, the anchors must be embedded symmetrically to the load.

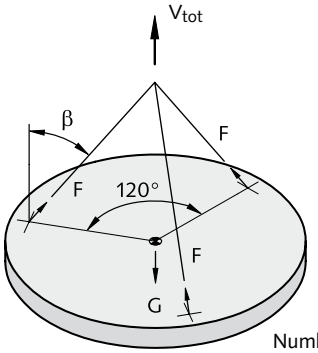
Multiple slings

For a beam with more than two suspension points and for a panel with more than three, it is impossible to work out the load per anchor precisely, even if the anchors are arranged symmetrically to the load centre. As a result of unavoidable tolerances in the suspension system and in the position of the anchors, it can never be determined whether the load on each anchor is equal.

The use of tolerance-compensating suspension systems (e.g. articulated lifting beam combinations, multiple slings with compensating rig, etc.) permits exact load distribution, but should only be used by experienced specialists, moreover bearing in mind that such a system must be used both in plant and on site. In case of doubt, only two anchors should be assumed to be load bearing (BGR 500 Ch. 2.8 Point 3.5.3). The use of two anchors is recommended for trusses and upright slabs, and four anchors installed symmetrically to the load centre is recommended for horizontal slabs. In both instances, it can be assumed that two anchors will be bearing equal loads.

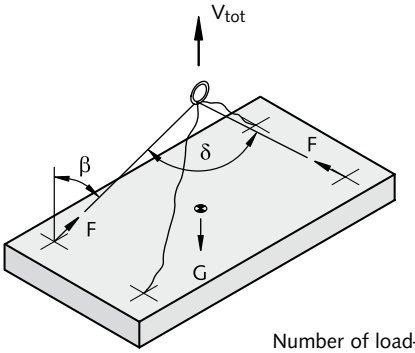
Examples:

The use of three anchors ensures that the static load ist shared evenly.



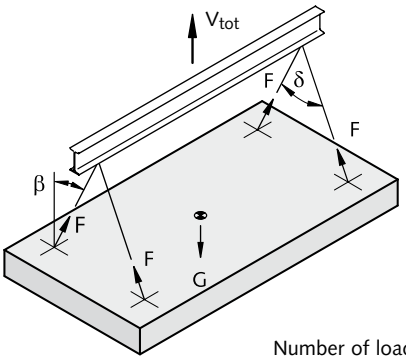
Number of load-bearing anchors:
n = 3

For an arrangement of four independent cable runs or continous diagonal cable runs, only two anchors can be assumed to be load-bearing.



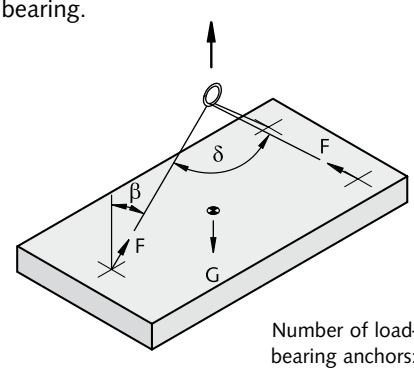
Number of load-bearing anchors:
n = 2

A perfect static weight distribution can be obtained by the use of a spreader beam and two pairs of anchors set out symmetrically.



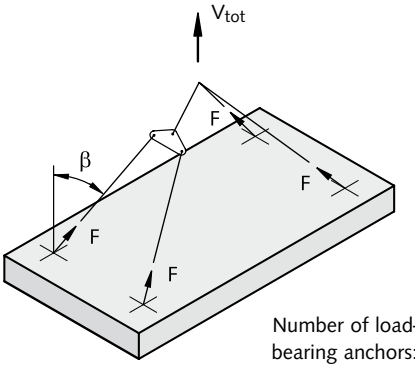
Number of load-bearing anchors:
n = 4

Due to the fact that the anchors are arranged asymmetricaly, only two anchors can be assumed to be load-bearing.



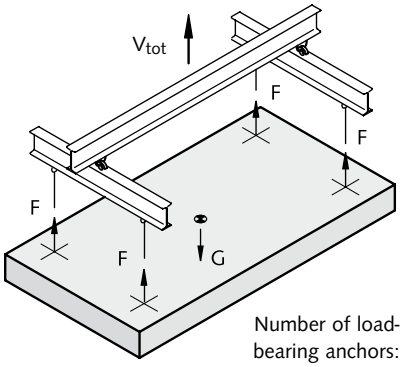
Number of load-bearing anchors:
n = 2

The system with compensating rig makes it possible to distribute the load evenly over 4 anchors.



Number of load-bearing anchors:
: n = 4

A perfect static weight distribution can be obtained using a crossed spreader beam, which avoids angle pull.



Number of load-bearing anchors:
: n = 4

Dimensioning example slab unit

For dimensioning the anchor, a distinction can be made between the situation in the manufacturing plant and on the construction sites. Oversizing of anchors as a result of superimposition of all detrimental factors is avoided.

Example slab unit:
Lifting, transporting in the plant and on site

Lifting at the plant:

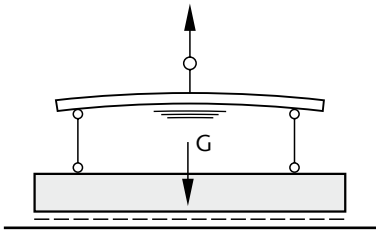
$$F = (G + q \times A) \times z/n$$

Transport at the plant:

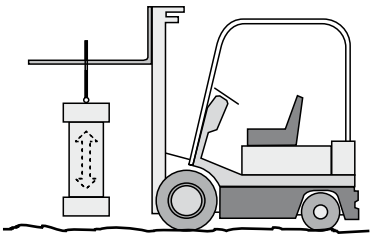
$$F = G \times f \times z/n$$

Transport on the constr. site:

$$F = G \times f \times z/n$$



Adhesion to formework



Lifting load

Calculation parameters for this example

	Example Slap unit	Manufacturing plant Lifting	Manufacturing plant Transport	On site
G	Mass	10 t (~ 100 kN)		10 t (~ 100 kN)
A	Mould area	20 m²		-
q	Adhesion to formework	2 kN/m²	-	-
f	Lifting load coefficient	-	1.1	1.4
z	Cable angle factor	1.04 (β = 15°)		1.41 (β = 45°)
β_w	Concrete strenght	15 N/mm²		35 N/mm²

With ² supporting anchors, the angled pull force F per anchor is as follows:

$$F = (100kN + 2\ kN/m^2 \times 20\ m^2) \times 1,04/2 = 72,8\ kN$$

$$F = 100\ kN \times 1,1 \times 1,04/2 = 57,2\ kN$$

$$F = 100\ kN \times 1,4 \times 1,41/2 = 98,7\ kN$$

An anchor in the ¹⁰ t load range is just adequate.

If all detrimental factors were superimposed, the result would be

$$F = (100kN + 20m^2 \times 2\ kN/m^2) \times 1,4 \times 1,41/2 = 138\ kN$$

e.g. an anchor in the load group ¹⁴ would have to be used.

The loads occurring on site are often higher than in the manufacturing plant as a result of greater cable spread and possibly higher lifting force coefficients. In this instance, it is beneficial that the concrete's strength is usually likewise higher, and that the anchor's load capacity in the concrete is thus higher.

In the above example, the result for a TPA-FS (see p. 20) would be as follows:

At the manufacturing plant (β_W = 15 N/mm², cable angle 15°):
Angled pull 15° < 30°
- full permissible load at angled pull, even with β_W = 15N/mm²

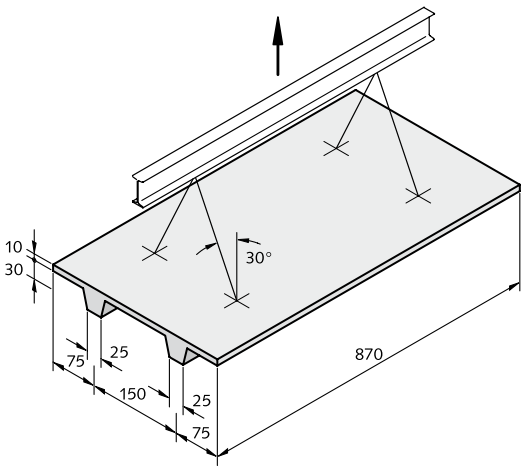
On the construction site (β_W = 35 N/mm², cable angle 45°):
Angled pull 45° > 30°
- full permissible load at angled pull for concrete strength of β_W = 35 N/mm² > 23 N/mm², with angled pull reinforcement

π-slab

Lifting and transporting at the manufacturing plant:

All dimensions in cm

Concrete strength when lifted: $\beta_W \geq$ 25N/mm²
Cable angle: b = 30°
Cable angle factor: z = 1,16
Lifting load coefficient (transporting) f = 1,1
Lifting load coefficient (lifting) f = 1,0



Loads:
Dead weight: G = (0,1 x 3,0 + 2 x 0,3²) x 8,7 x 25 = 104,4 kN
Adhesion to mould: H_a = 2 x G = 208,8 kN
Total load: Q = H_a + G = 313,2 kN

Load per anchor during lifting:
F = 1,16 x 1,0 x (313,2 / 4) = **90,8 kN**

Load per anchor during transporting:
F = 1,16 x 1,1 x (104,4 / 4) = **33,3 kN**

Anchor selected: TPA-FS 10,0-30
(acc. to table page 21)
$F_{perm,\ lifting}$ 100 kN
$F_{perm,\ transporting}$ 100 kN

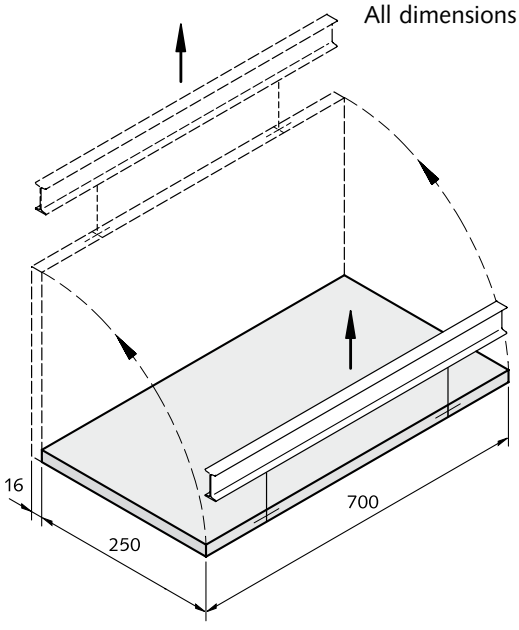
Structural reinforcement: no additional reinforcement required

Wall slab

Lifting at the manufacturing plant and transporting on the constructions site

All dimensions in cm

Concrete strength when lifting: $\beta_W \geq$ 15N/mm²
Adhesion to formwork: q = 1kN/m²
Lifting load coefficient of the crane:
f = 1,1 (lifting at the plant)
f = 1,3 (transporting on the site)



Loads:
Dead weight: G = 0,16 x 7,0 x 2,5 x 25 = 70,0 kN
Adhesion to formwork: H_a = 2,5 x 7,0 x 1 = 17,5 kN
Total load: Q = G + H_a = 87,5 kN

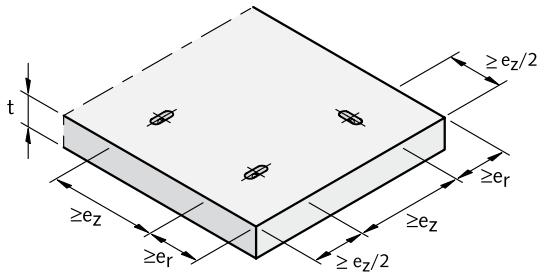
Load per anchor during lifting:
F_1 = 1,1 x (87,5 / 2) x 0,5 = **24,1 kN**

Load per anchor during transporting:
F_1 = 1,3 x (70 / 2) = **45,5 kN**

Anchor selected: TPA-FA 5,0-29
(acc. to table page 28)
$F_{perm,\ lifting}$ 25kN > 24,1 kN
$F_{perm,\ transporting}$ 50kN > 45,5 kN

Additional reinforcement for pull: Ø 16 l = 1500 mm
Tilting reinforcement: Ø 16 l = 1000 mm

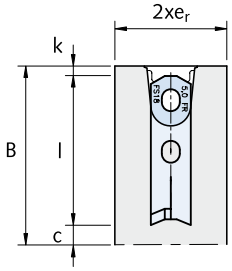
Spread anchors for large-area precast units



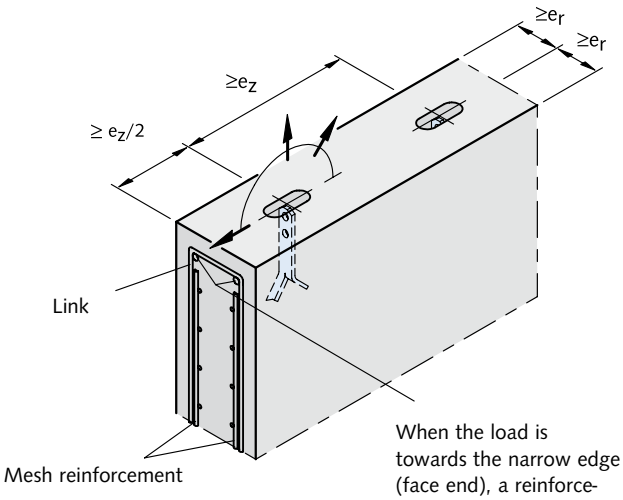
Minimum thickness of precast units

$$B = l + k + c$$

l = Anchor length
k = Cover to anchor head
c = Concrete cover acc. to DIN 1045-1



Spread anchors for thin-walled preacast unit



When the load is towards the narrow edge (face end), a reinforcement for angled pull must be designed and installed in accordance with DIN 1045-1.

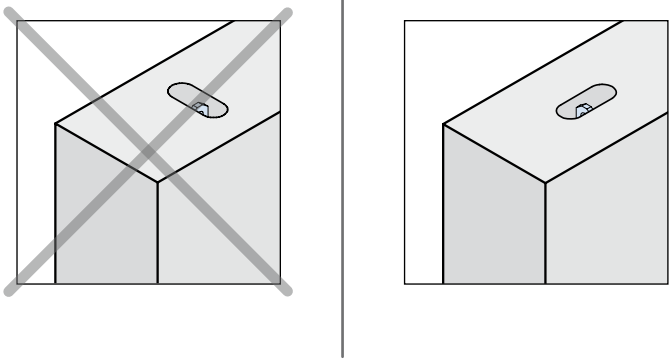
Basic principles for the load capacitiy tables

The values for loads and edge distances in the following tables have been calculated in accordance with the applicable regulations, a calculation process adapted to the anchors and corresponding trials.

Symbols used in this cataloge	
Load direction	Symbol
Central pull in direction of anchor axis	
Transverse pull perpendicular to the anchor surface	
Transverse pull parallel to the anchor surface	
Angled pull, transverse component perpendicular to the anchor surface	
Angled pull, transverse component parallel to the anchor surface	

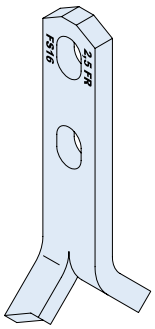
Anchor arrangement for thin-walled units

Spread, erection and two hole anchors may only be installed in thin-walled elements with the flat steel at right-angles to the slab.

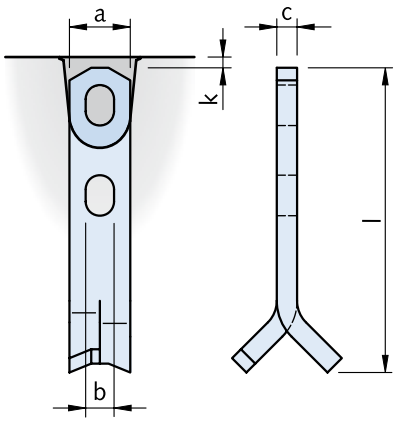


Incorrect **Correct**

Anchor dimensions



The spread anchor is very versatile. It provides an efficient anchorage in both thin panels and slabs. For special applications additional reinforcement can be combined with the spread anchor by utilising the extra hole.



Dimensions, Spread anchor TPA-FS

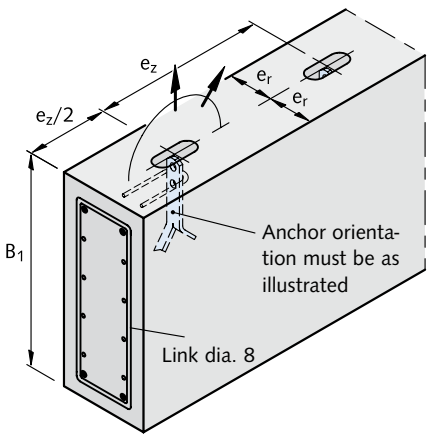
Designation **mill finish**	Order No. 0070.010-	Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	b [mm]	c [mm]	l [mm]	k [mm]
TPA-FS 0,7-11	00001	TPA-FS 0,7-11 FV	00032	2,5	30	14	5	110	10
TPA-FS 1,4-11	00002	TPA-FS 1,4-11 FV	00033		30	14	6	110	
TPA-FS 1,4-16	00003	TPA-FS 1,4-16 FV	00034		30	14	6	160	
TPA-FS 2,0-13	00004	TPA-FS 2,0-13 FV	00035		30	14	8	130	
TPA-FS 2,0-16	00005	TPA-FS 2,0-16 FV	00036		30	14	8	160	
TPA-FS 2,0-21	00006	TPA-FS 2,0-21 FV	00037		30	14	8	210	
TPA-FS 2,5-15	00007	TPA-FS 2,5-15 FV	00038		30	14	10	150	
TPA-FS 2,5-20	00008	TPA-FS 2,5-20 FV	00039		30	14	10	200	
TPA-FS 2,5-25	00009	TPA-FS 2,5-25 FV	00040		30	14	10	250	
TPA-FS 3,0-16	00010	TPA-FS 3,0-16 FV	00041	5,0	40	18	10	160	10
TPA-FS 3,0-20	00011	TPA-FS 3,0-20 FV	00042		40	18	10	200	
TPA-FS 3,0-28	00012	TPA-FS 3,0-28 FV	00043		40	18	10	280	
TPA-FS 4,0-18	00013	TPA-FS 4,0-18 FV	00044		40	18	12	180	
TPA-FS 4,0-24	00014	TPA-FS 4,0-24 FV	00045		40	18	12	240	
TPA-FS 4,0-32	00015	TPA-FS 4,0-32 FV	00046		40	18	12	320	
TPA-FS 5,0-18	00016	TPA-FS 5,0-18 FV	00047		40	18	15	180	
TPA-FS 5,0-24	00017	TPA-FS 5,0-24 FV	00048		40	18	15	240	
TPA-FS 5,0-40	00018	TPA-FS 5,0-40 FV	00049		40	18	15	400	
TPA-FS 7,5-26	00022	TPA-FS 7,5-26 FV	00053	10,0	60	26	16	260	15
TPA-FS 7,5-30	00023	TPA-FS 7,5-30 FV	00054		60	26	16	300	
TPA-FS 7,5-42	00024	TPA-FS 7,5-42 FV	00055		60	26	16	420	
TPA-FS 10,0-30	00025	TPA-FS 10,0-30 FV	00056		60	26	20	300	
TPA-FS 10,0-37	00026	TPA-FS 10,0-37 FV	00057		60	26	20	370	
TPA-FS 10,0-52	00027	TPA-FS 10,0-52 FV	00058		60	26	20	520	
TPA-FS 14,0-37	00028	TPA-FS 14,0-37 FV	00059	26,0	80	35	20	370	15
TPA-FS 14,0-46	00029	TPA-FS 14,0-46 FV	00060		80	35	20	460	
TPA-FS 22,0-50	00030	TPA-FS 22,0-50 FV	00062		90	35	28	500	
TPA-FS 22,0-62	00031	TPA-FS 22,0-62 FV	00063		90	35	28	620	

Spread anchor TPA-FS

Load capacity, installation dimensions for large-area or thick-walled precast elements

Designation	Load-group	Anchor lenght	Permitted load	Minimum height of beams	Minimum edge distances **beams** e_r			Minimum thickness of slabs	Minimum edge distances **slabs** $e_{z/2}$			Minimum spacing-between centres
		l	F_{perm}	B_1 ④	for β_W ≥15N/mm²	for β_W ≥25N/mm²	for β_W ≥35N/mm²	B_2 ⑤	for β_W ≥15N/mm²	for β_W ≥25N/mm²	for β_W ≥35N/mm²	e_z
	[t]	[mm]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
TPA-FS 0,7 - 11	2,5	110	7	200	35	35	35	145	35	35	35	280
TPA-FS 1,4 - 11		110	14	190	55	40	35	145	70	50	40	380
TPA-FS 1,4 - 16		160	14	290	35	35	35	195	50	35	35	530
TPA-FS 2,0 - 13		130	20	225	75	55	45	165	100	70	55	450
TPA-FS 2,0 - 16		160	20	285	60	40	35	195	80	60	45	570
TPA-FS 2,0 - 21		210	20	385	45	35	35	245	65	45	35	770
TPA-FS 2,5 - 15		150	25	260	90	65	50	185	120	85	70	520
TPA-FS 2,5 - 20		200	25	360	65	45	35	235	90	65	50	720
TPA-FS 2,5 - 25		250	25	460	50	35	35	285	75	50	40	920
TPA-FS 3,0 - 16	5,0	160	30	275	105	75	60	195	145	100	80	550
TPA-FS 3,0 - 20		200	30	350	80	60	45	235	115	85	65	710
TPA-FS 3,0 - 28		280	30	510	55	40	40	315	85	60	50	1025
TPA-FS 4,0 - 18		180	40	310	140	100	80	215	190	135	105	610
TPA-FS 4,0 - 24		240	40	425	100	70	55	275	145	100	80	850
TPA-FS 4,0 - 32		320	40	590	70	50	40	355	110	75	60	1175
TPA-FS 5,0 - 18		180	50	300	190	135	110	215	260	180	145	600
TPA-FS 5,0 - 24		240	50	420	135	95	75	275	195	140	110	840
TPA-FS 5,0 - 40		400	50	740	75	55	45	435	115	85	65	1480
TPA-FS 7,5 - 26	10,0	260	75	450	210	150	120	300	300	215	175	900
TPA-FS 7,5 - 30		300	75	530	180	125	100	340	265	190	150	1060
TPA-FS 7,5 - 42		420	75	770	120	85	70	460	190	135	110	1540
TPA-FS 10,0 - 30		300	100	515	270	190	150	340	390	275	220	1030
TPA-FS 10,0 - 37		370	100	655	210	150	120	410	315	225	180	1310
TPA-FS 10,0 - 52		520	100	955	140	100	80	560	225	160	130	1910
TPA-FS 14,0 - 37	26,0	370	140	615	350	250	200	410	500	355	285	1230
TPA-FS 14,0 - 46		460	140	795	265	190	150	500	400	285	230	1590
TPA-FS 22,0 - 50		500	220	850	450	320	260	540	675	480	385	1700
TPA-FS 22,0 - 62		620	220	1090	350	250	200	660	540	385	310	2180

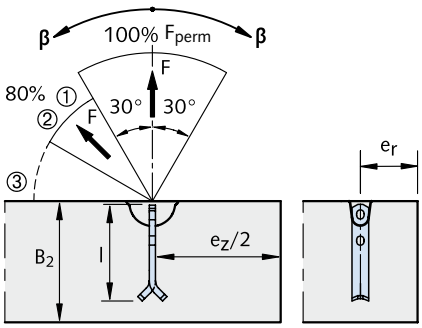
- Required reinforcement: minimum standard reinforcement
- ④ Straight-line interpolation may be made between minimum beam height B_1 and minimum plate thickness B_2.
- ⑤ The concrete cover at the foot is 25mm. Smaller plate thicknesses B_2 are only possible with suitable corrosion protection.
- The upper reinforcement must be dimensioned for transport purposes.



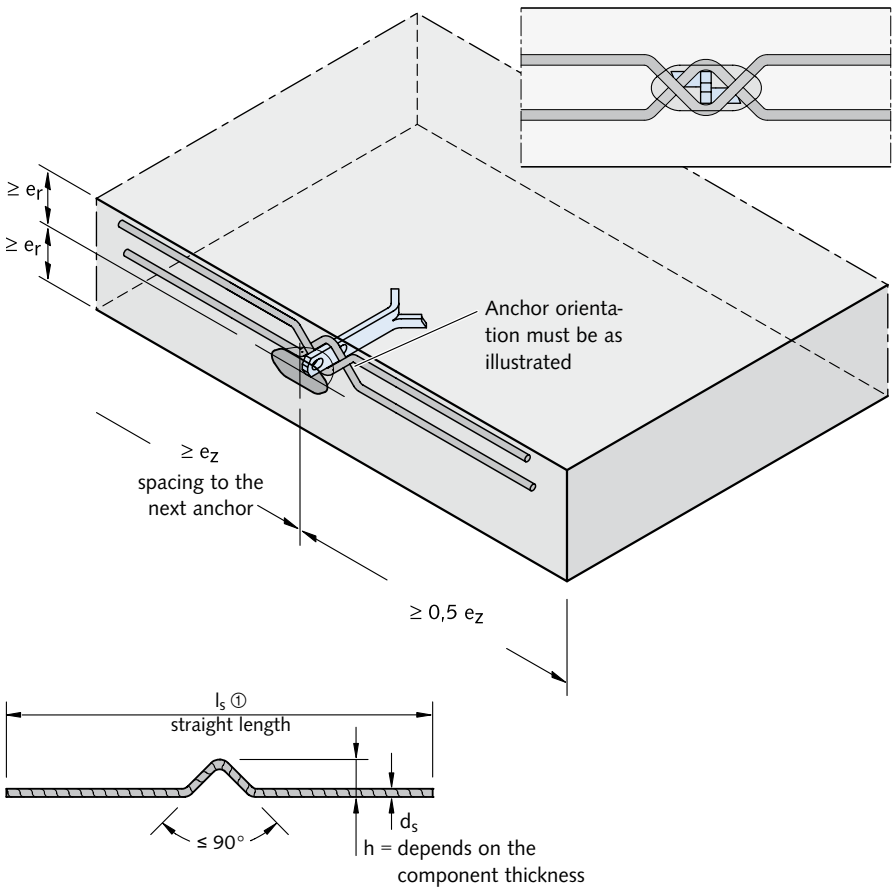
① Angled pull at 30° < β ≤ 60° without angled pull reinforcement only permissible when:
β_W ≥ 15 N/mm² + 3-fold min. thickness of unit
β_W ≥ 25 N/mm² + 2,5-fold min. thickness of unit
β_W ≥ 35 N/mm² + 2-fold min. thickness of unit
(minimum thickness of unit: $e = 2 \times e_r$)

② Where concrete strength β_W ≥ 23 N/mm² F_{perm} can be taken as 100%.

③ Angle of β > 60° due to cable spread are impermissible!



Load capacity, installation dimensions for tilting and turning



The horizontal legs of the tilting and turning reinforcement are located directly within the outermost position of the reinforced area.

Reinforcement steel:
Yield strength 500 N/mm², Tensile strength 550 N/mm²

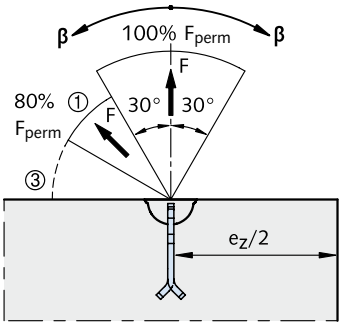
Load capacity, installation dimensions — **Concrete strength $\beta_W \geq 15$ N/mm²**

Designation	Load group	Minimum distances from edge and between centres for $\beta_W \geq 15$N/mm²		Tilting and turning reinforcement		Permitted load		
		e_r	e_z	d_s	l_s ①	Lifting	Lifting ②	Tilting
	[t]	[mm]	[mm]	[mm]	[mm]	[kN]	[kN]	[kN]
TPA-FS 0,7 - 11	2,5	100	700	dia. 8	600	7	5.6	3.5
TPA-FS 1,4 - 16		100	700	dia. 10	700	14	11.2	7
TPA-FS 2,0 - 21		100	800	dia. 10	750	20	16	10
TPA-FS 2,5 - 25		100	875	dia. 12	800	25	20	12.5
TPA-FS 3,0 - 28	5,0	150	950	dia. 12	850	30	24	15
TPA-FS 4,0 - 32		150	1050	dia. 14	950	40	32	20
TPA-FS 5,0 - 40		150	1435	dia. 16	1000	50	40	25
TPA-FS 7,5 - 42	10,0	250	1470	dia. 20	1200	75	60	37.5
TPA-FS 10,0 - 52		300	1820	dia. 20	1500	100	80	50
TPA-FS 14,0 - 46	26,0	525	1800	dia. 25	1800	140	112	70
TPA-FS 22,0 - 62		710	2200	dia. 28	1800	220	176	110

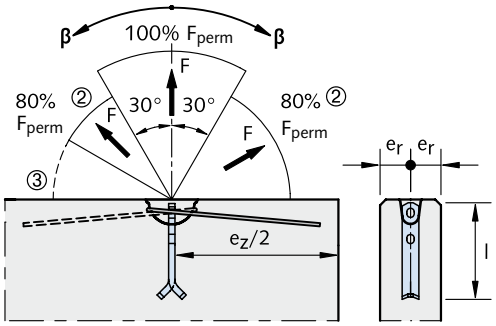
① l_s = Length before bending reinforcement steel
② For concrete strength $\beta_W \geq 23$ N/mm² is 100% of load permitted.
- Required reinforcement: minimum standard reinforcement

Load capacity, installation dimensions for thin-walled precast elements

Without angled pull reinforcement



With angled pull reimnforcement



Position the angled pull reinforcement as closely to the recess former as possible

① Angled pull at 30° < β ≤ 60° without angled pull reinforcement only permissible when:
$\beta_W \geq 15$ N/mm² + 3-fold min. thickness of unit
$\beta_W \geq 25$ N/mm² + 2,5-fold min. thickness of unit
$\beta_W \geq 35$ N/mm² + 2-fold min. thickness of unit
(Minimum thickness of unit: $e = 2 \times e_r$)

② Where concrete strength $\beta_W \geq 23$ N/mm² F_{perm} can be taken as 100%.

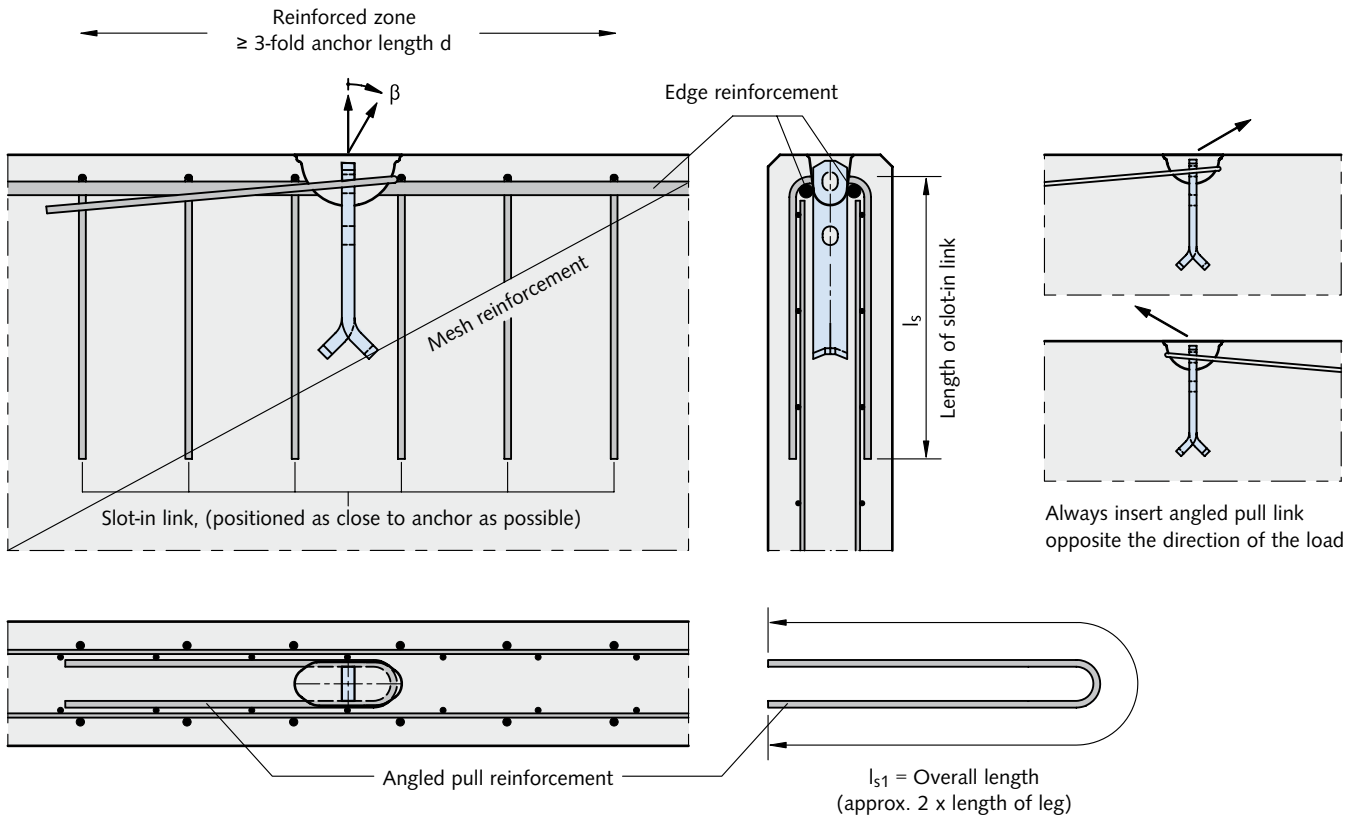
③ Angle of β > 60° due to cable spread are impermissible!

Load capacity and installation dimensions

Designation	Load group	Anchor length	Spacing between anchor centres	Min. thickness of precast unit 2 x e_r			100% F_{perm} **Pull** (β ≤ 30°)	80% F_{perm} **Angled pull** (β > 30°)
		l	min. e_z	where β_W ≥ 15 N/mm²	where β_W ≥ 25 N/mm²	where β_W ≥ 35 N/mm²		
	[t]	[mm]	[mm]	[mm]	[mm]	[mm]	[kN]	[kN]
TPA-FS 0,7 - 11	2,5	110	330	60	60	60	7	5.6
TPA-FS 1,4 - 11		110	330	75	60	60	14	11.2
TPA-FS 1,4 - 16		160	480	75	60	60	14	11.2
TPA-FS 2,0 - 13		130	390	100	80	70	20	16
TPA-FS 2,0 - 16		160	480	100	80	70	20	16
TPA-FS 2,0 - 21		210	630	100	80	70	20	16
TPA-FS 2,5 - 15		150	450	120	90	80	25	20
TPA-FS 2,5 - 20		200	600	120	90	80	25	20
TPA-FS 2,5 - 25		250	750	120	90	80	25	20
TPA-FS 3,0 - 16	5,0	160	480	160	90	80	30	24
TPA-FS 3,0 - 20		200	600	120	90	80	30	24
TPA-FS 3,0 - 28		280	840	120	90	80	30	24
TPA-FS 4,0 - 18		180	540	210	130	100	40	32
TPA-FS 4,0 - 24		240	720	150	115	100	40	32
TPA-FS 4,0 - 32		320	960	150	115	100	40	32
TPA-FS 5,0 - 18		180	540	350	210	150	50	40
TPA-FS 5,0 - 24		240	720	180	140	120	50	40
TPA-FS 5,0 - 40		400	1200	180	140	120	50	40
TPA-FS 7,5 - 26	10,0	260	780	340	200	150	75	60
TPA-FS 7,5 - 30		300	900	240	150	130	75	60
TPA-FS 7,5 - 42		420	1260	195	150	130	75	60
TPA-FS 10,0 - 30		300	900	450	270	190	100	80
TPA-FS 10,0 - 37		370	1110	270	190	160	100	80
TPA-FS 10,0 - 52		520	1560	245	190	160	100	80
TPA-FS 14,0 - 37	26,0	370	1110	610	360	260	140	112
TPA-FS 14,0 - 46		460	1380	350	210	165	140	112
TPA-FS 22,0 - 50		500	1500	760	460	330	220	176
TPA-FS 22,0 - 62		620	1860	450	270	230	220	176

- Observe the reinforcement data on table page 23.
- Smaller wall thicknesses are possible in the case of reverse reinforcement of the release head. However, this means reinforced concrete with a cracked tension zone.

Reinforcement at anchor zone for thin-walled precast elements



Reinforcement of thin precast concrete elements								Concrete strength $\beta_W \geq 15$ N/mm²
		Pull β ≤ 30°			**Angled pull** β > 30°			
Load group	Load range	Mesh reinf. both sides crosswise *	Slot-in link *	Edge reinforcement *	Mesh reinf.* both sides crosswise	Slot-in link *	Edge reinforcement *	① Angle pull reinforcement *
			d_s x l_s			d_s x l_s		d_{s1} x l_{s1}
[t]	[t]	[mm²/m]	[mm]	[mm]	[mm²/m]	[mm]	[mm]	[mm]
2,5	0,7	131	constructive	constructive	131	4 dia. 6 x 300	dia. 8	dia. 6 x 450
	1,4	131	2 dia. 6 x 400	constructive	131	4 dia. 6 x 400	dia. 8	dia. 6 x 900
	2,0	131	2 dia. 6 x 500	constructive	131	4 dia. 6 x 500	dia. 8	dia. 8 x 950
	2,5	131	2 dia. 8 x 600	constructive	131	4 dia. 8 x 600	dia. 10	dia. 8 x 1200
5,0	3,0	131	2 dia. 8 x 700	constructive	131	4 dia. 8 x 700	dia. 10	dia. 10 x 1150
	4,0	131	2 dia. 8 x 800	constructive	131	4 dia. 8 x 800	dia. 12	dia. 10 x 1500
	5,0	131	2 dia. 10 x 800	constructive	131	4 dia. 10 x 800	dia. 12	dia. 12 x 1550
10,0	7,5	188	4 dia. 10 x 800	dia. 10	188	4 dia. 10 x 800	dia. 12	dia. 14 x 2000
	10,0	188	6 dia. 10 x 1000	dia. 12	188	6 dia. 10 x 1000	dia. 14	dia. 16 x 2300
26,0	14,0	257	6 dia. 10 x 1000	dia. 14	257	8 dia. 10 x 1000	dia. 14	dia. 20 x 2600
	22,0	257	8 dia. 10 x 1200	dia. 14	257	8 dia. 10 x 1200	dia. 16	dia. 28 x 3450

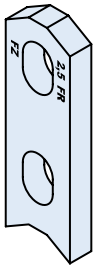
① **No angled pull reinforcement is needed**
- for concrete strength of β_W 15 N/mm² + 3-fold minimum thickness of units
- for concrete strength of β_W 25 N/mm² + 2,5-fold minimum thickness of units
- for concrete strength of β_W 25 N/mm² + 2-fold minimum thickness of units

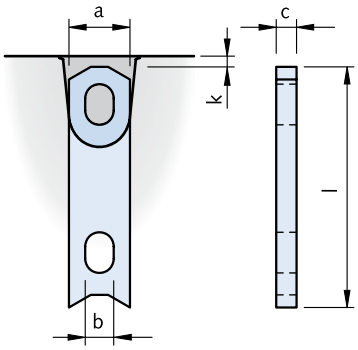
***** Yield strength 500 N/mm²
Tensile strength 550 N/mm²

Two hole anchor TPA-FZ

Anchor dimensions

The head of the two hole anchor is identical to the head of the spread anchor. The anchorage in concrete is achieved by means of a reinforcement tail. Longer anchors with additional holes can be produced on request.



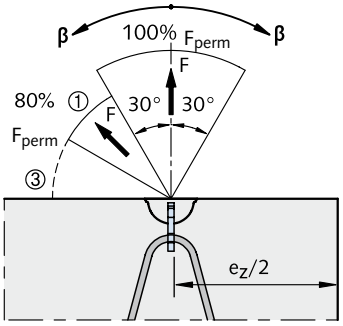


Dimensions, Two hole anchor TPA-FZ

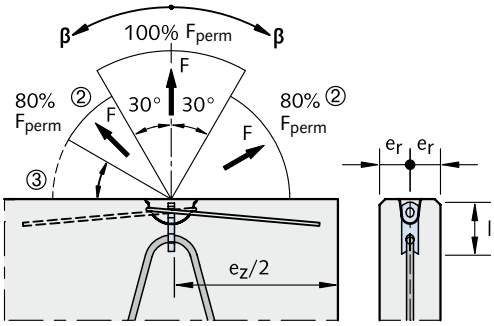
Designation **mill finish**	Order No. 0070.020-	Load group [t]	a [mm]	b [mm]	c [mm]	l [mm]	k [mm]
TPA-FZ 1,4- 9	00002	2,5	30	14	6	90	10
TPA-FZ 2,0- 9	00003		30	14	8	90	
TPA-FZ 2,5- 9	00004		30	14	10	90	
TPA-FZ 3,0-12	00005	5,0	40	18	10	120	10
TPA-FZ 4,0-12	00006		40	18	12	120	
TPA-FZ 5,0-12	00007		40	18	15	120	
TPA-FZ 7,5-16	00009	10,0	60	26	16	160	15
TPA-FZ 10,0-17	00010		60	30	20	165	
TPA-FZ 14,0-24	00011	26,0	80	35	20	240	15
TPA-FZ 22,0-30	00013		90	35	28	300	
TPA-FZ 26,0-30	00012		120	65	30	300	
Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	b [mm]	c [mm]	l [mm]	k [mm]
TPA-FZ 1,4- 9 FV	00064	2,5	30	14	6	90	10
TPA-FZ 2,0- 9 FV	00065		30	14	8	90	
TPA-FZ 2,5- 9 FV	00066		30	14	10	90	
TPA-FZ 3,0-12 FV	00067	5,0	40	18	10	120	10
TPA-FZ 4,0-12 FV	00068		40	18	12	120	
TPA-FZ 5,0-12 FV	00069		40	18	15	120	
TPA-FZ 7,5-16 FV	00071	10,0	60	26	16	160	15
TPA-FZ 10,0-17 FV	00072		60	30	20	165	
TPA-FZ 14,0-24 FV	00073	26,0	80	35	20	240	15
TPA-FZ 22,0-30 FV	00075		90	35	28	300	
TPA-FZ 26,0-30 FV	00074		120	65	30	300	

Load capacity, installation dimensions

Without angled pull reinforcement



With angled pull reinforcement



Position the angled pull reinforcement as closely to the recess former as possible

① Angled pull at 30° < β ≤ 60° without angled pull reinforcement only permissible when:
$\beta_W \geq 15$ N/mm² + 3-fold min. thickness of unit
$\beta_W \geq 25$ N/mm² + 2,5-fold min. thickness of unit
$\beta_W \geq 35$ N/mm² + 2-fold min. thickness of unit
(minimum thickness of unit: $e = 2 \times e_r$)

② Where concrete strength $\beta_W \geq 23$ N/mm² F_{perm} can be taken as 100%.

③ Angle of β > 60° due to cable spread are impermissible!

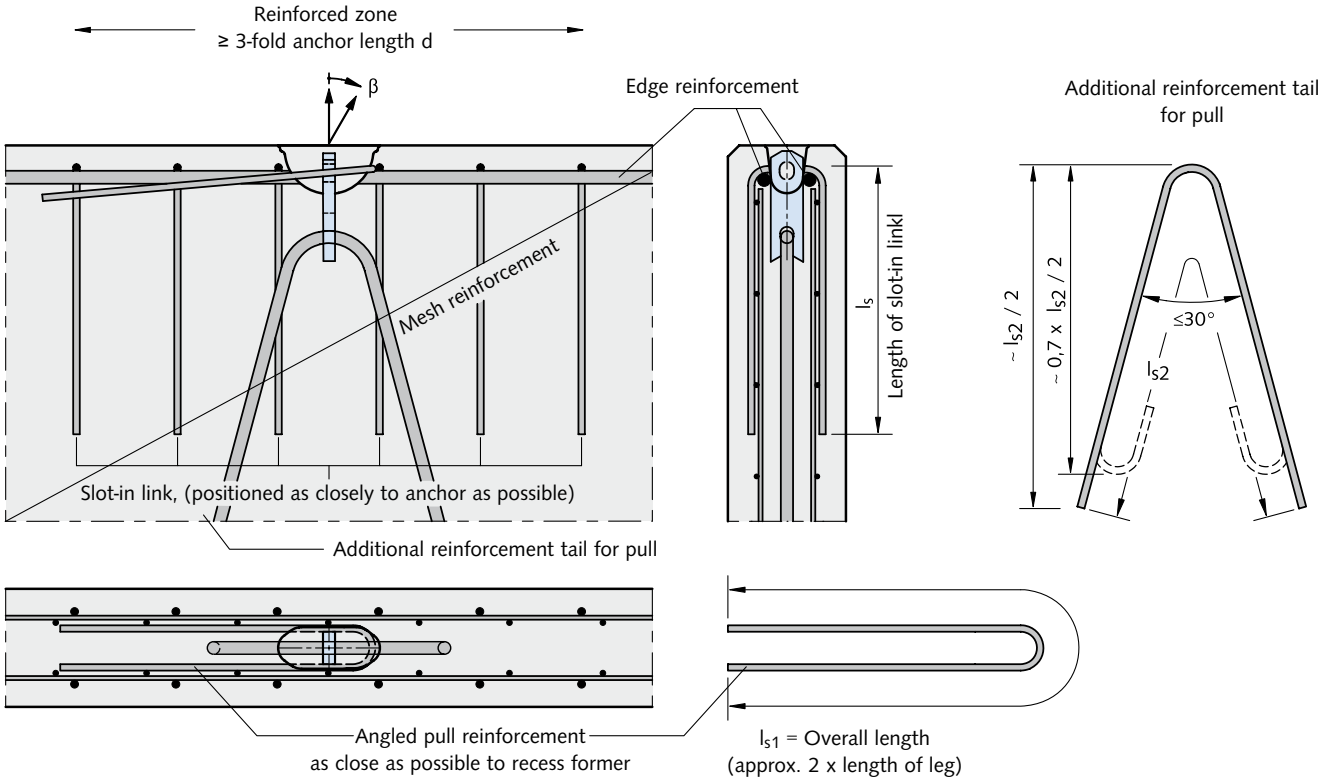
Load capacity, installation dimensions TPA-FZ — **Concrete strength $\beta_W \geq 15$ N/mm²**

Designation	Load group [t]	Anchor lenght l [mm]	Spacing between anchor centres e_z [mm]	Minimum thickness of precast unit 2 x e_r [mm]	100% F_{perm} **Pull** (β ≤ 30°) [kN]	80% F_{perm} **Angled pull** (β > 30°) [kN]
TPA-FZ 1,4- 9	2,5	90	500	80	14	11.2
TPA-FZ 2,0- 9		90	600	90	20	16
TPA-FZ 2,5- 9		90	600	100	25	20
TPA-FZ 3,0-12	5,0	120	650	100	30	24
TPA-FZ 4,0-12		120	700	110	40	32
TPA-FZ 5,0-12		120	750	120	50	40
TPA-FZ 7,5-16	10,0	160	1200	130	75	60
TPA-FZ 10,0-17		165	1200	140	100	80
TPA-FZ 14,0-24	26,0	240	1500	160	140	112
TPA-FZ 22,0-30		300	1500	180	220	176
TPA-FZ 26,0-30		300	1500	200	260	208

Observe the reinforcement data on table page 26.

Two hole anchor TPA-FZ

Reinforcement in anchor zone



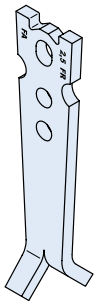
Reinforcement											Concrete strength $\beta_W \geq 15$ N/mm²
		Pull (β ≤ 30°)					**Angled pull** (β > 30°)				
Designation	Load group	Mesh reinf. both sides crosswise*	Slot-in links *	Edge reinf.*	② Add. reinf. for pull		Mesh reinf. both sides crosswise*	Slot-in links *	Edge reinf.*	② Add. reinf. for pull	① Angled Pull reinf.
			d_s x l_s		d_{s2} x l_{s2} both sides			d_s x l_s		d_{s2} x l_{s2}	d_{s1} x l_{s1}
	[t]	[mm²/m]	[mm]	[mm]	[mm]		[mm²/m]	[mm]	[mm]	[mm]	[mm]
TPA-FZ 1,4- 9	2,5	131	2 dia. 6 x 400	constructive	1 dia. 10 x 650		131	4 dia. 6 x 400	dia. 8	1 dia. 10 x 650	dia. 6 x 900
TPA-FZ 2,0- 9		131	2 dia. 6 x 500	constructive	1 dia. 12 x 800		131	4 dia. 6 x 500	dia. 8	1 dia. 10 x 800	dia. 8 x 950
TPA-FZ 2,5- 9		131	2 dia. 8 x 600	constructive	1 dia. 12 x 1000		131	4 dia. 8 x 600	dia. 10	1 dia. 12 x 1000	dia. 8 x 1200
TPA-FZ 3,0-12	5,0	131	2 dia. 8 x 700	constructive	1 dia. 14 x 1000		131	4 dia. 8 x 700	dia. 10	1 dia. 14 x 1000	dia. 10 x 1150
TPA-FZ 4,0-12		131	2 dia. 8 x 700	constructive	1 dia. 16 x 1200		131	4 dia. 8 x 800	dia. 12	1 dia. 16 x 1200	dia. 10 x 1500
TPA-FZ 5,0-12		131	2 dia. 8 x 800	constructive	1 dia. 16 x 1500		131	4 dia. 10 x 800	dia. 12	1 dia. 16 x 1500	dia. 12 x 1550
TPA-FZ 7,5-16	10,0	131	2 dia. 10 x 800	dia. 10	1 dia. 20 x 1750		131	4 dia. 10 x 800	dia. 12	1 dia. 20 x 1750	dia. 14 x 2000
TPA-FZ 10,0-17		131	4 dia. 10 x 800	dia. 12	1 dia. 25 x 1850		131	6 dia. 10 x 1000	dia. 14	1 dia. 25 x 1850	dia. 16 x 2300
TPA-FZ 14,0-24	26,0	131	4 dia. 10 x 1000	dia. 14	1 dia. 28 x 2350		131	8 dia. 10 x 1000	dia. 14	1 dia. 28 x 2350	dia. 20 x 2600
TPA-FZ 22,0-30		131	4 dia. 12 x 1200	dia. 14	1 dia. 28 x 3000		131	8 dia. 10 x 1200	dia. 16	1 dia. 28 x 3000	dia. 25 x 3000
TPA-FZ 26,0-30		131	6 dia. 12 x 1200	dia. 14	2 dia. 28 x 3050		131	8 dia. 12 x 1200	dia. 16	2 dia. 28 x 3050	dia. 28 x 3450

① **No angled pull reinforcement is needed:**
- for concrete strength of von $\beta_W \geq 15$ N/mm² + 3-fold minimum thickness of units
- for concrete strength of von $\beta_W \geq 25$ N/mm² + 2,5-fold minimum thickness of units
- for concrete strength of von $\beta_W \geq 35$ N/mm² + 2-fold minimum thickness of units

② For other concrete strengths, the length L_{s2} of the additional reinforcement tail for pull may be reduced in relation to the permissible bond stress (β_W = 25 N/mm² : x 0,8; β_W = 35 N/mm² : x 0,65)

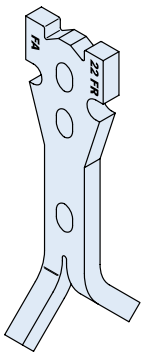
- Please consult us if the concrete strength is lower or if lightweight concrete is used.
- * Yield strength: 500 N/mm², tensile strength: 550 N/mm²

Anchor dimensions TPA-FA / TPA-FE

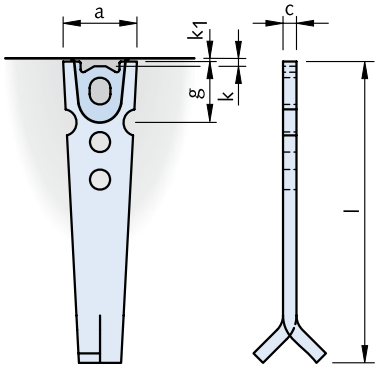


Load range 1,4t-17,0t

Load range 22,0t

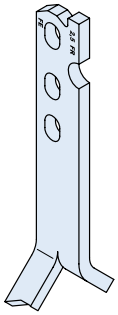


The special shaped anchor head means that that the pitching/turning loads are taken by the anchor and not to the concrete. This helps to prevent spalling of the concrete. The anchors are notched to assist with the placement of additional reinforcement required in the pitching/turning operation.



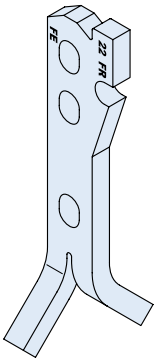
Dimensions, Erection anchor TPA-FA

Designation **mill finish**	Order No. 0070.030-	Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	c [mm]	l [mm]	g [mm]	k [mm]	k_1 [mm]
TPA-FA 1,4- 20	00001	TPA-FA 1,4- 20 FV	00001	2,5	55	6	200	45	10	5
TPA-FA 2,5- 23	00002	TPA-FA 2,5- 23 FV	00002		55	10	230	45		
TPA-FA 4,0-27	00003	TPA-FA 4,0-27 FV	00003	5,0	70	12	270	70	10	5
TPA-FA 5,0-29	00004	TPA-FA 5,0-29 FV	00004		70	15	290	70		
TPA-FA 7,5-32	00005	TPA-FA 7,5-32 FV	00005	10,0	95	15	320	90	15	6
TPA-FA 10,0-39	00006	TPA-FA 10,0-39 FV	00006		95	20	390	90		
TPA-FA 12,5-50	00007	TPA-FA 12,5-50 FV	00007	26,0	148	20	500	90	15	9
TPA-FA 17,0-50	00008	TPA-FA 17,0-50 FV	00008		148	25	500	90		
TPA-FA 22,0-50	00009	TPA-FA 22,0-50 FV	00009		148	30	500	90		

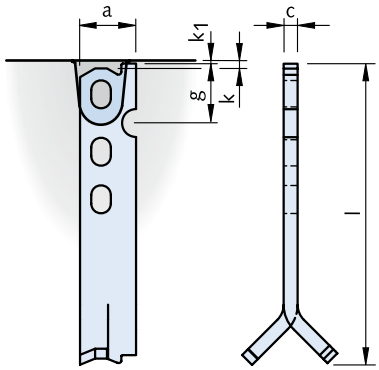


Load range 1,4t-17,0t

Load range 22,0t



In contrast to the erection anchor TPA-FA, the TPA-FE can only be subjected to load in one direction. Its shape makes it particularly suitable for thin components. A semi-circular notch is provided for fitting of the turning reinforcement.

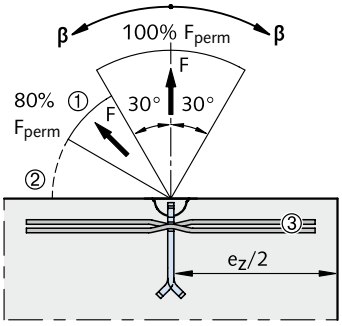


Dimensions, Unilateral erection anchor TPA-FE

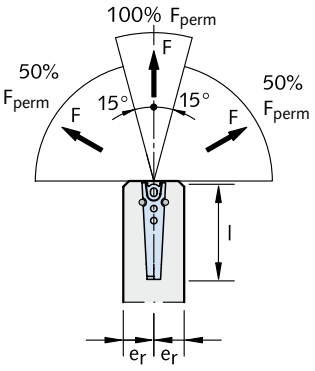
Designation **mill finish**	Order No. 0070.040-	Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	c [mm]	l [mm]	g [mm]	k [mm]	k_1 [mm]
TPA-FE 1,4- 20	00001	TPA-FE 1,4- 20 FV	00010	2,5	40	6	200	42.2	10	5
TPA-FE 2,5- 23	00002	TPA-FE 2,5- 23 FV	00011		40	10	230	42.5		
TPA-FE 4,0-27	00003	TPA-FE 4,0-27 FV	00012	5,0	55	12	270	50.5	10	5
TPA-FE 5,0-29	00004	TPA-FE 5,0-29 FV	00013		55	15	290	50.5		
TPA-FE 7,5-32	00005	TPA-FE 7,5-32 FV	00014	10,0	80	15	320	78,0	15	6
TPA-FE 10,0-39	00006	TPA-FE 10,0-39 FV	00015		80	20	390	78,0		
TPA-FE 12,5-50	00007	TPA-FE 12,5-50 FV	00016	26,0	115	20	500	88.5	15	9
TPA-FE 17,0-50	00008	TPA-FE 17,0-50 FV	00017		115	25	500	88.5		
TPA-FE 22,0-50	00009	TPA-FE 22,0-50 FV	00018		115	30	500	88.5		

Load capacity, installation dimensions

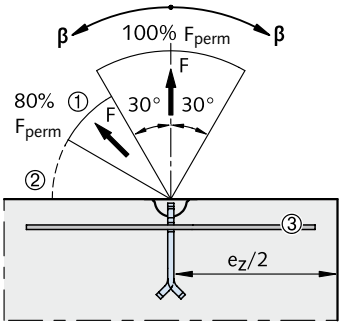
Lifting TPA-FA



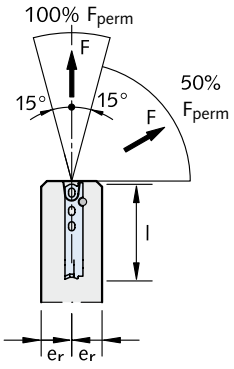
Tilting TPA-FA



Lifting TPA-FE



Tilting TPA-FE



① Where concrete strength $\beta_W \geq 23$ N/mm² F_{perm} can be taken as 100%.

② Angle of $\beta > 60°$ due to cable spread are not allowed!

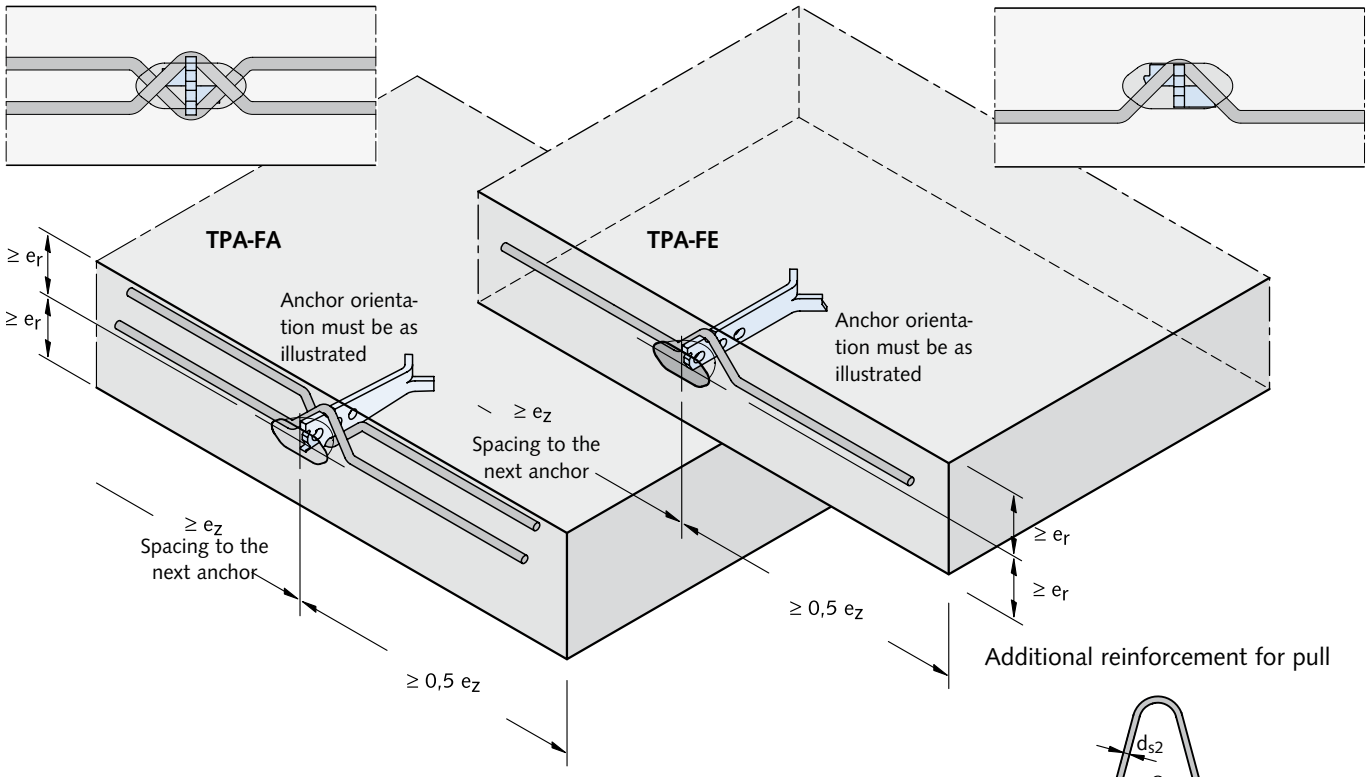
③ Insert the erection reinforcement in the anchor notches.

Load capacity, installation dimensions — Concrete strength $\beta_W \geq 15$ N/mm²

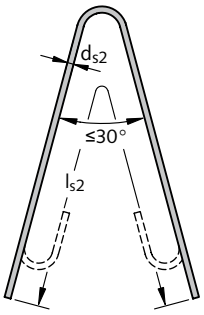
Load group	Load range	Anchor length	Spacing between anchor centres	Minimum thickness of precast element (2 x e_r) with additional reinforcement		Minimum thickness of precast element (2 x e_r) without additional reinforcement		Lifting	Lifting ①	Tilting
								Pull (β ≤ 30°) 100% F_{perm}	**Angled pull** (β > 30°) 80% F_{perm}	50% F_{perm}
		l	e_z	TPA-FE	TPA-FA	TPA-FE	TPA-FA			
[t]	[t]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kN]	[kN]	[kN]
2,5	1,4	200	700	90	100	90	100	14	11	7
	2,5	230	800	120	120	120	120	25	20	13
5,0	4,0	270	950	140	150	150	150	40	32	20
	5,0	290	1000	140	160	180	180	50	40	25
10,0	7,5	320	1200	160	175	200	200	75	60	38
	10,0	390	1500	200	200	250	250	100	80	50
26,0	12,5	500	1500	240	240	320	320	125	100	62,5
	17,0	500	1500	300	300	380	380	170	136	85
	22,0	500	1500	360	360	450	450	220	176	110

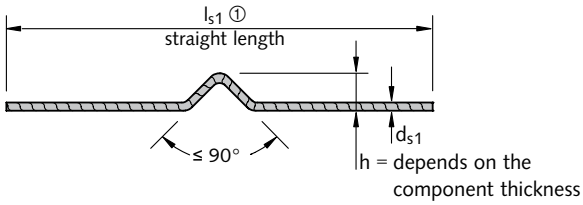
- Observe the reinforcement data on page 29.

Reinforcement in anchor zone



Additional reinforcement for pull





Bending radius acc. to DIN 1045-1.

Reinforcement of thin-walled concrete precast unit			Concrete strength $\beta_W \geq 15$ N/mm²
Load group	Load rate	Tilting reinforcement d_{s1} x l_{s1} ①	Additional reinforcement for pull d_{s2} x l_{s2}
[t]	[t]	[mm]	[mm]
2,5	1,4	dia. 10 x 700	dia. 10 x 650
	2,5	dia. 12 x 800	dia. 12 x 1000
5,0	4,0	dia. 14 x 950	dia. 16 x 1200
	5,0	dia. 16 x 1000	dia. 16 x 1500
10,0	7,5	dia. 20 x 1200	dia. 20 x 1750
	10,0	dia. 20 x 1500	dia. 20 x 1900
26,0	12,5	dia. 25 x 1500	dia. 25 x 2200
	17,0	dia. 25 x 1800	dia. 28 x 2500
	22,0	dia. 25 x 1800	dia. 28 x 3000

① l_{s1} = Length before bending reinforcement steel *
For other concrete strength, the length l_{s1} of the erecting reinforcement may be reduced in relation to the permitted composite stresses (β_W = 25 N/mm² : x 0,8; β_W = 35 N/mm² : x 0,65)

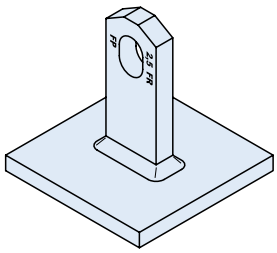
* Yield strength: 500 N/mm²
* Tensile strength: 550 N/mm²

The horizontal legs of the tilting and turning reinforcement are located directly within the outermost position of the reinforced area.
Tilting reinforcement on both sides also acts as angled pull reinforcement. No additional angled pull reinforcement is required.

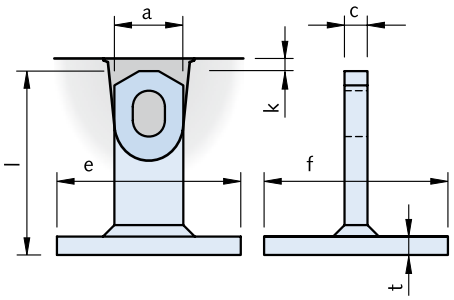
Without additional reinforcement for pull:
Meshes, slot-in links and edge reinforcement as for TPA-FS.

With additional reinforcement for pull:
Meshes, slot-in links and edge reinforcement as for TPA-FZ.

Anchor dimensions TPA-FP



This anchor mainly is used for slabs.
Additional reinforcement is essential.

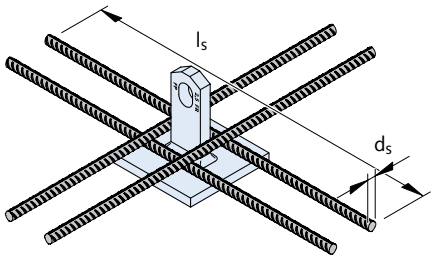


Dimensions, Plate anchor TPA-FP

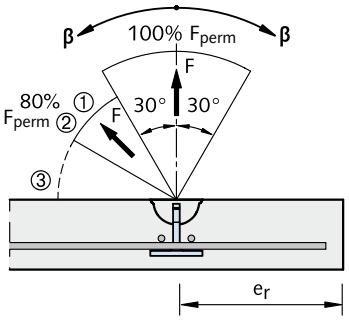
Designation **mill finish**	Order No. 0070.050-	Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	c [mm]	l [mm]	e x f [mm]	t [mm]	k [mm]
TPA-FP 1,4- 5	00001	TPA-FP 1,4- 5 FV	00076	2,5	30	6	55	80 x 80	8	10
TPA-FP 2,5- 8	00002	TPA-FP 2,5- 8 FV	00077		30	10	80	80 x 80	8	
TPA-FP 5,0-12	00003	TPA-FP 5,0-12 FV	00078	5,0	40	15	120	100 x 100	10	10
TPA-FP 10,0-16	00004	TPA-FP 10,0-16 FV	00079	10,0	60	20	160	140 x 140	12	15

Other anchor lengths are available on request

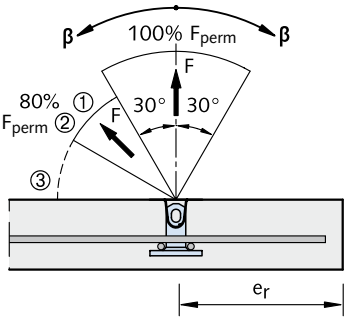
Load capacity, installation dimensions, additional reinforcement for thin slabs and pipes



* Yield strength: 500 N/mm², tensile strength: 550 N/mm²



① Angled pull at 30° < β ≤ 60°
without angled pull reinforcement only permissible when:
$\beta_W \geq 15$ N/mm² + 3-fold min. thickness of unit
$\beta_W \geq 25$ N/mm² + 2,5-fold min. thickness of unit
$\beta_W \geq 35$ N/mm² + 2-fold min. thickness of unit



② Where concrete strength $\beta_W \geq 23$ N/mm² F_{perm} can be taken as 100%.

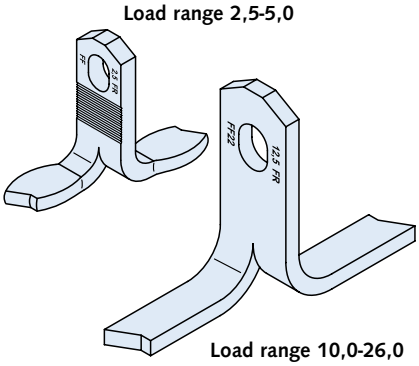
③ Angle of β > 60° due to cable spread are impermissible!

Reinforcement — **Concrete strength $\beta_W \geq 15$ N/mm²**

Designation	Load group [t]	Anchor length l [mm]	Minimum spaces between centres and from edge e_r [mm]	e_z [mm]	Additional reinforcement * d_s [mm]	l_s [mm]	100 % F_{perm} **Pull** (β ≤ 30°) [kN]	80 % F_{perm} ② **Angled pull** (β > 30°) [kN]
TPA-FP 1,4 - 5	2,5	55	115	230	8	200	14	11.2
TPA-FP 2,5 - 8		80	165	330	10	300	25	20
TPA-FP 5,0 - 12	5,0	120	240	480	12	450	50	40
TPA-FP 10,0 - 16	10,0	160	330	660	16	600	100	80

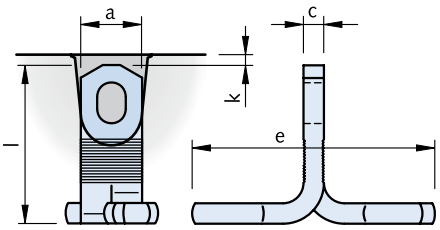
Anchor dimensions TPA-FF

Load range 2,5-5,0



Load range 10,0-26,0

This anchor is an alternative to the plate anchor TPA-FP. The main use is in elements with a concrete strength at lifting in excess of 20 N/mm^2.

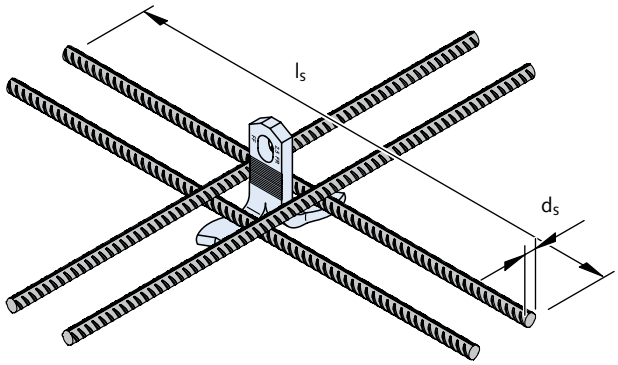


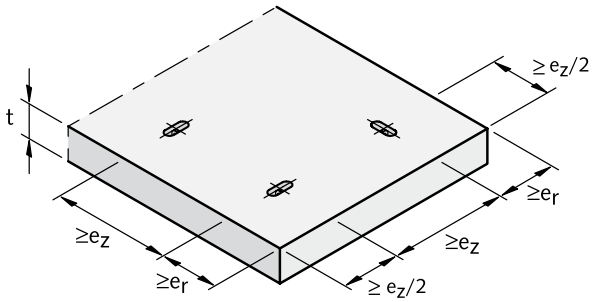
Dimensions, Flat foot anchor TPA-FF

Designation **mill finish**	Order No. 0070.070-	Load group [t]	a [mm]	c [mm]	l [mm]	e [mm]	k [mm]
TPA-FF 0,7- 6	00001	2,5	30	5	65	70	10
TPA-FF 1,4- 6	00002		30	6	65	70	
TPA-FF 2,0- 7	00003		30	8	70	80	
TPA-FF 2,5- 7	00004		30	10	75	94	
TPA-FF 3,0- 9	00005	5,0	40	10	90	100	10
TPA-FF 4,0-11	00006		40	12	110	100	
TPA-FF 5,0-12	00007		40	15	125	105	
TPA-FF 7,5-17	00009	10,0	60	16	170	120	15
TPA-FF 10,0-20	00010		60	20	200	120	
TPA-FF 12,5-22	00011	26,0	80	16	220	200	15
TPA-FF 17,0-27	00012		80	20	270	200	
TPA-FF 22,0-31	00013		90	28	310	200	
Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	a [mm]	c [mm]	l [mm]	e [mm]	k [mm]
TPA-FF 0,7- 6 FV	00019	2,5	30	5	65	70	10
TPA-FF 1,4- 6 FV	00020		30	6	65	70	
TPA-FF 2,0- 7 FV	00021		30	8	70	80	
TPA-FF 2,5- 7 FV	00022		30	10	75	94	
TPA-FF 3,0- 9 FV	00023	5,0	40	10	90	100	10
TPA-FF 4,0-11 FV	00024		40	12	110	100	
TPA-FF 5,0-12 FV	00025		40	15	125	105	
TPA-FF 7,5-17 FV	00027	10,0	60	16	170	120	15
TPA-FF 10,0-20 FV	00028		60	20	200	120	
TPA-FF 12,5-22 FV	00029	26,0	80	16	220	200	15
TPA-FF 17,0-27 FV	00030		80	20	270	200	
TPA-FF 22,0-31 FV	00031		90	28	310	200	

Other anchor lengths are available on request.

Reinforcement in anchor zone





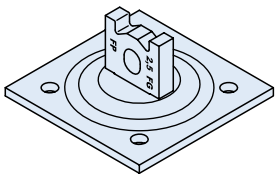
Where loads are acting towards the edge of the element, insert angled pull reinforcement as for spread or two hole anchors.

Position the additional reinforcement bars as close to anchor as possible.

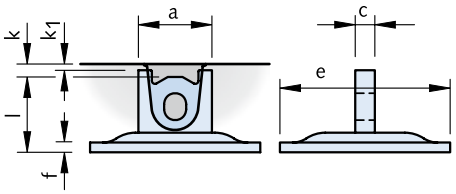
Reinforcement in anchor zone								Concrete strength β_W ≥ 15 N/mm²		
Designation	Load group	Anchor length	Minimum thickness of element	Minimum distance between centres and from edge		Additional reinforcement *		Permitted load **Centrical, angled and transversal pull** at concrete strength β_W when lifted		
	[t]	l [mm]	B [mm]	e_r [mm]	e_z [mm]	d_s [mm]	l_s [mm]	≥15 N/mm² [kN]	≥25 N/mm² [kN]	≥35 N/mm² [kN]
TPA-FF 0,7 - 6	2,5	65	95 ①	140	280	8	200	7	7	7
TPA-FF 1,4 - 6		65	95 ①	140	280	8	250	14	14	14
TPA-FF 2,0 - 7		70	100 ①	150	300	8	300	18	20	20
TPA-FF 2,5 - 7		75	105 ①	160	320	8	300	20	25	25
TPA-FF 3,0 - 9	5,0	90	120	190	380	10	400	28	30	30
TPA-FF 4,0 - 11		110	140	230	460	12	450	37	40	40
TPA-FF 5,0 - 12		125	160	260	520	12	500	44	50	50
TPA-FF 7,5 - 17	10,0	170	215	340	680	14	600	54.6	70.4	75
TPA-FF 10,0 - 20		200	245	400	800	14	600	75.5	100	100
TPA-FF 12,5 - 22	26,0	220	265	440	880	16	750	88.5	125	125
TPA-FF 17,0 - 27		270	315	540	1080	16	900	120.3	170	170
TPA-FF 22,0 - 31		310	355	620	1240	20	1100	148	220	220

① If corrosion protection is assured, the plate thickness can be reduced.
* Yield strength: 500 N/mm², tensile strength: 550 N/mm²

Anchor dimensions TPA-FG



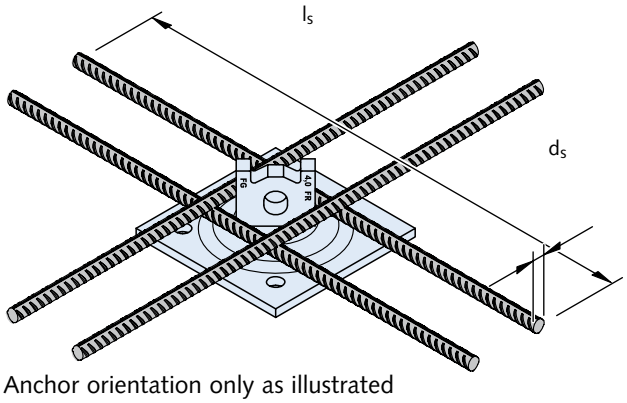
This anchor is designed for special applications, such as thin floors of prefabricated garages. The plate anchor with erection anchor head permits high angled pull for handling units in areas with a very restricted access height. In the case of axial and angled pull at $\beta < 45°$ (spread of cable < 90°), the permissible loads as per the table must be reduced by 50 %. The concrete strength must be at least $\beta_W \geq 25$ N/mm^2.



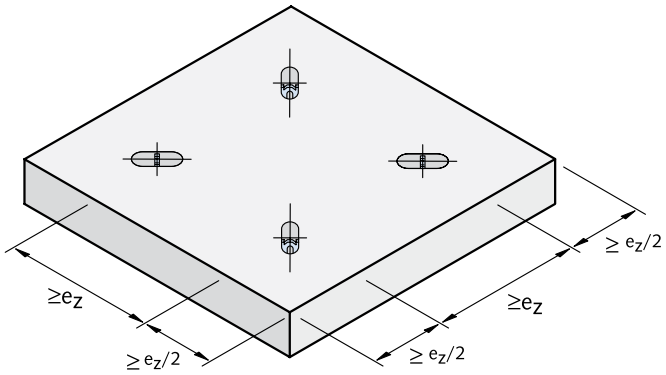
Dimensions, Garage anchor TPA-FG

Designation	Order No. 0070.060-	Load group [t]	a [mm]	c [mm]	l [mm]	e [mm]	f [mm]	k [mm]	k_1 [mm]
TPA-FG 4,0- 7	00001	5,0	60	16	67	150	8	10	5

Load capacity, installation dimensions, additional reinforcement for prefabricated garages



Anchor orientation only as illustrated

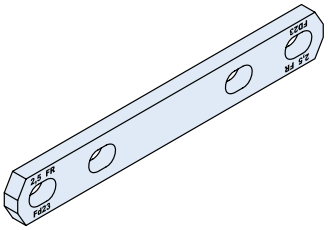


Reinforcement — **Concrete strength $\beta_W \geq 15$ N/mm^2**

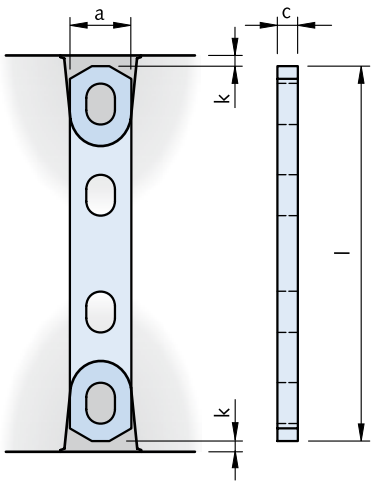
Designation	Load group	Anchor length	Minimum distance between centres and from edge		Additional pull reinforcement *		Permitted load
		l	$e_z/2$	e_z	d_s	l_s	(for $\beta > 45°$) ①
		[mm]	[mm]	[mm]	[mm]	[mm]	[kN]
TPA-FG 4,0 - 7	5,0	67	240	480	12	450	40

① β = cable angle, when b < 45° see hints above
* Yield strength: 500 N/mm^2, tensile strength: 550 N/mm^2

Dimensions TPA-FD



This anchor is identical to the head of the two hole anchor. It was specially developed for the tilting of columns or similar construction elements



Dimensions, Double ended column anchor TPA-FD

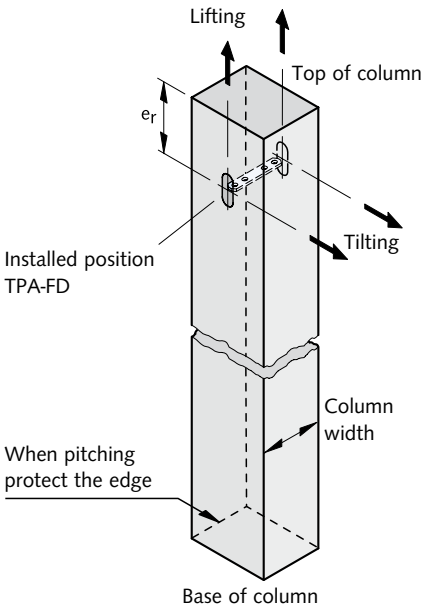
Designation **mill finish**	Order No. 0070.080-	Designation **hot-dip galvanised**	Order No. 0070.110-	Load group [t]	Column width [mm]	a [mm]	c [mm]	l [mm]	k [mm]
TPA-FD 2,5-23	00001	TPA-FD 2,5-23 FV	00080	2,5	250	30	10	228	10
TPA-FD 2,5-28	00002	TPA-FD 2,5-28 FV	00081		300	30	10	278	
TPA-FD 2,5-33	00003	TPA-FD 2,5-33 FV	00082		350	30	10	328	
TPA-FD 5,0-23	00004	TPA-FD 5,0-23 FV	00083	5,0	250	40	15	226	10
TPA-FD 5,0-28	00005	TPA-FD 5,0-28 FV	00084		300	40	15	276	
TPA-FD 5,0-33	00006	TPA-FD 5,0-33 FV	00085		350	40	15	326	
TPA-FD 5,0-38	00007	TPA-FD 5,0-38 FV	00086		400	40	15	376	
TPA-FD 5,0-43	00008	TPA-FD 5,0-43 FV	00087		450	40	15	426	
TPA-FD 5,0-48	00009	TPA-FD 5,0-48 FV	00088		500	40	15	476	
TPA-FD 7,5-26	00010	TPA-FD 7,5-26 FV	00089	10,0	300	60	16	262	15
TPA-FD 7,5-31	00011	TPA-FD 7,5-31 FV	00090		350	60	16	312	
TPA-FD 7,5-36	00012	TPA-FD 7,5-36 FV	00091		400	60	16	362	
TPA-FD 7,5-41	00013	TPA-FD 7,5-41 FV	00092		450	60	16	412	
TPA-FD 7,5-46	00014	TPA-FD 7,5-46 FV	00093		500	60	16	462	
TPA-FD 10,0-26	00015	TPA-FD 10,0-26 FV	00094		300	60	20	262	
TPA-FD 10,0-31	00016	TPA-FD 10,0-31 FV	00095		350	60	20	312	
TPA-FD 10,0-36	00017	TPA-FD 10,0-36 FV	00096		400	60	20	362	
TPA-FD 10,0-41	00018	TPA-FD 10,0-41 FV	00097		450	60	20	412	
TPA-FD 10,0-46	00019	TPA-FD 10,0-46 FV	00098		500	60	20	462	
TPA-FD 12,5-36	00020	TPA-FD 12,5-36 FV	00099	26,0	400	80	16	362	15
TPA-FD 12,5-41	00021	TPA-FD 12,5-41 FV	00100		450	80	16	412	
TPA-FD 12,5-46	00022	TPA-FD 12,5-46 FV	00101		500	80	16	462	
TPA-FD 17,0-36	00023	TPA-FD 17,0-36 FV	00102		400	80	20	362	
TPA-FD 17,0-41	00024	TPA-FD 17,0-41 FV	00103		450	80	20	412	
TPA-FD 17,0-46	00025	TPA-FD 17,0-46 FV	00104		500	80	20	462	
TPA-FD 22,0-41	00026	TPA-FD 22,0-41 FV	00105		450	90	28	412	
TPA-FD 22,0-46	00027	TPA-FD 22,0-46 FV	00106		500	90	28	462	
TPA-FD 22,0-56	00028	TPA-FD 22,0-56 FV	00107		600	90	28	562	

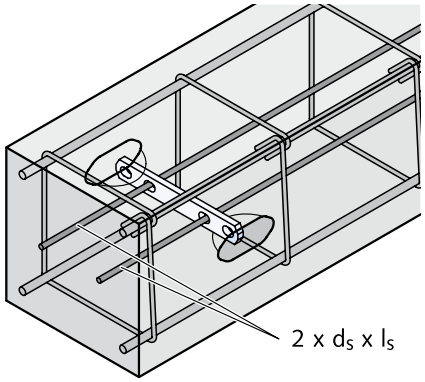
Other anchor lenghts on request

Load capacity, reinforcement

The anchor is capped with the appropriate recess former at both ends. The assembly of anchor and recess formers is then pushed between the reinforcement bars and fastened to the formwork at both ends. The additional reinforcement bars are then pushed through the holes of the anchor and wired into place.

The diameter of the reinforcement tails is the same as for the two hole anchor.





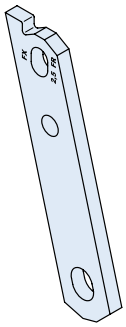
Load capacity double ended column anchor TPA-FD

Designation	Load group	Reinforcement		Load capacity	
		d_s	l_s	for $\beta_W \geq 15$ N/mm²	for $\beta_W \geq 25$ N/mm²
	[t]	[mm]	[mm]	[kN]	[kN]
TPA-FD 2,5-23	2,5	12	750	40	50
TPA-FD 2,5-28		12	750	40	50
TPA-FD 2,5-33		12	750	40	50
TPA-FD 5,0-23	5,0	16	1000	80	100
TPA-FD 5,0-28		16	1000	80	100
TPA-FD 5,0-33		16	1000	80	100
TPA-FD 5,0-38		16	1000	80	100
TPA-FD 5,0-43		16	1000	80	100
TPA-FD 5,0-48		16	1000	80	100
TPA-FD 7,5-26	10,0	20	1200	120	150
TPA-FD 7,5-31		20	1200	120	150
TPA-FD 7,5-36		20	1200	120	150
TPA-FD 7,5-41		20	1200	120	150
TPA-FD 7,5-46		20	1200	120	150
TPA-FD 10,0-26		25	1500	160	200
TPA-FD 10,0-31		25	1500	160	200
TPA-FD 10,0-36		25	1500	160	200
TPA-FD 10,0-41		25	1500	160	200
TPA-FD 10,0-46		25	1500	160	200
TPA-FD 12,5-36	26,0	25	1500	200	250
TPA-FD 12,5-41		25	1500	200	250
TPA-FD 12,5-46		25	1500	200	250
TPA-FD 17,0-36		28	1600	272	340
TPA-FD 17,0-41		28	1600	272	340
TPA-FD 17,0-46		28	1600	272	340
TPA-FD 22,0-41		28	2000	352	440
TPA-FD 22,0-46		28	2000	352	440
TPA-FD 22,0-56		28	2000	352	440

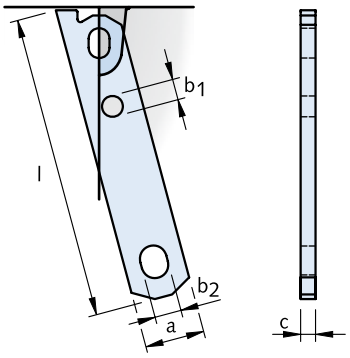
Note:

The larger the dimension e_r, the greater the load on the anchor when tilting, but the lower the load on the edge at the base of the column.

Dimensions TPA-FX

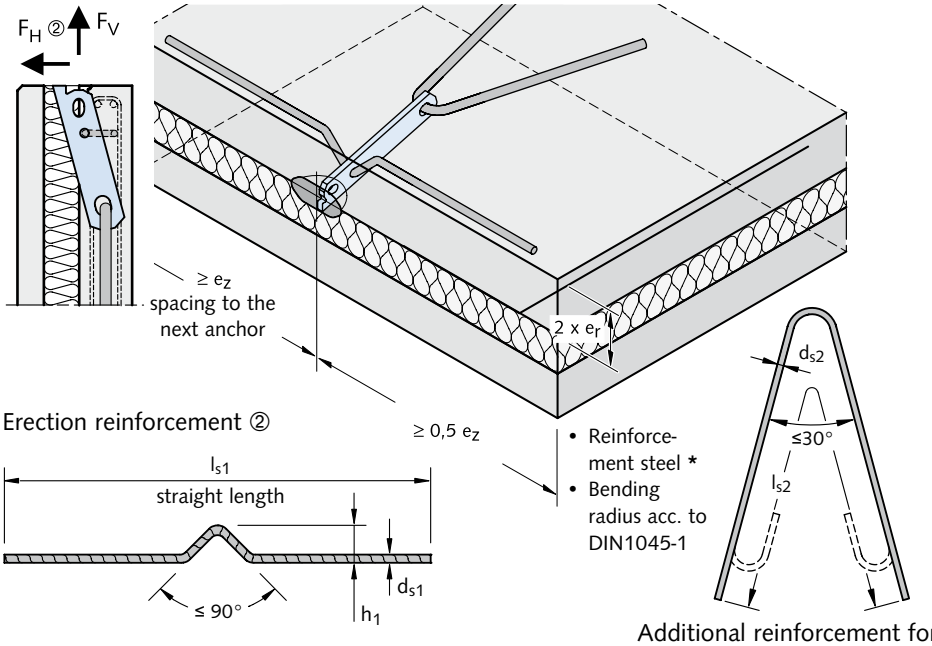


This anchor is specially designed for use with precast sandwich panels. Its suspension point is close to the gravity axis thus allowing the element to be transported and erected in an upright position.



Dimensions, Sandwich panel anchor TPA-FX

Designation **mill finish**	Order No. 0070.090-	Designation **hot-dip galvanised**	Order No. 0070.090-	Load group [t]	a [mm]	b_1 [mm]	b_2 [mm]	c [mm]	l [mm]
TPA-FX 2,5-25	00001	TPA-FX 2,5-25 FV	00006	2,5	40	14	18	10	250
TPA-FX 5,0-30	00002	TPA-FX 5,0-30 FV	00007	5,0	60	17.5	26	16	300
TPA-FX 7,5-35	00003	TPA-FX 7,5-35 FV	00008	10,0	80	25	35	16	350
TPA-FX 10,0-35	00004	TPA-FX 10,0-35 FV	00009		80	25	35	20	350
TPA-FX 17,0-40	00005	TPA-FX 17,0-40 FV	00010	26,0	100	30	35	20	400



The specially designed sloping head of the sandwich panel anchor type TPA-FX can be inserted close to the gravity axis in large precast concrete sandwich-panels. The panel hangs nearly upright during transportation and installation. The head shape is compatible with the FRIMEDA range of TPA accessories.

① h_1 = acc. to thickness of element, but at least as per table below

② Only required if F_H exists, e.g. when positive production

* Yield strength: 500 N/mm², tensile strength: 550 N/mm²

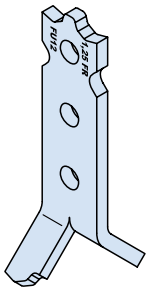
Reinforcement — **Concrete strength $\beta_W \geq 15$ N/mm²**

Designation	Load group [t]	Minimum spacing between centres e_z [mm]	thickness of element 2 x e_r [mm]	Slot-in links for pull * (Page 26) d_s x l_s [mm]	Erection reinforcement (not included in delivery) d_{s1} [mm]	l_{s1} [mm]	h_1 ③ [mm]	Additional reinf. for pull (not included in delivery) d_{s2} [mm]	l_{s2} [mm]	Load capacity ④ [kN]	[kN]	recommended recess former
TPA-FX 2,5-25	2,5	600	100	2 dia. 8 x 600	10	600	≥ 60	14	800	25	8	TPA-A1 2,5
TPA-FX 5,0-30	5,0	750	120	2 dia. 8 x 800	14	700	≥ 80	16	1200	50	18	TPA-A1 5,0
TPA-FX 7,5-35	10,0	1200	130	2 dia. 10 x 800	16	800	≥ 100	25	1400	75	26	TPA-A1 10,0
TPA-FX 10,0-35		1200	140	4 dia. 10 x 800	20	900	≥ 120	25	1800	100	35	TPA-A1 10,0
TPA-FX 17,0-40	26,0	1500	180	4 dia. 12 x 1200	20	1100	≥ 140	28	2500	170	50	TPA-A1 26,0

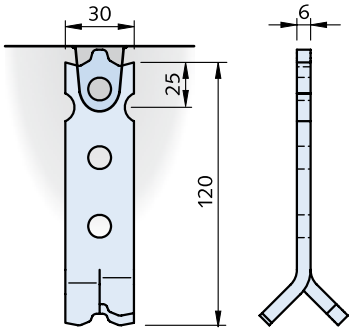
③ In order to ensure adequate corrosion protection, we recommend hot-dip galvanised additional reinforcement.

④ The loads at diagonal pull for concrete strengths < 23 N/mm² must be reduced to 80%.

Load capacity, anchor and installation dimensions, reinforcement

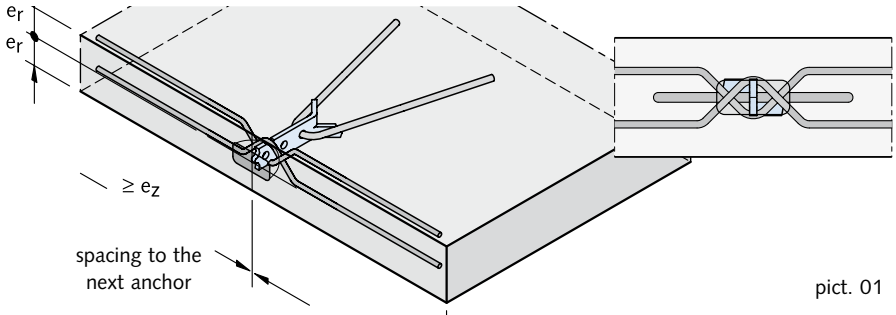


This anchor combines the opportunities of spread-, two hole- and erection anchor with a very small recess in the precast element.
This is a special load group and not part of the normal load group system.



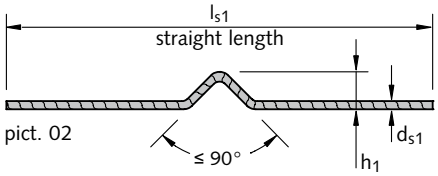
Dimension, Universal anchor TPA-FU

Designation **mill finish**	Order No. 0070.100-	Designation **hot-dip galvanised**	Order No. 0070.100-	Load group [t]
TPA-FU 1,25-12	00001	TPA-FX 1,25-12 FV	00003	1,25



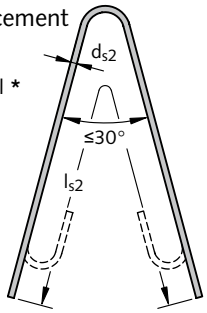
pict. 01

Erection reinforcement
- Reinforcement steel *
- d_{s1} dia.8mm, cut lenght 600 mm
- h_1 = depending on thickness of element
- Bending radius acc. to DIN 1045-1



pict. 02

Additional reinforcement for pull
- Reinforcement steel *
- d_{s2} dia.8mm, cut lenght l_{s2} 700mm



For the handling of very thin precast concrete units (e.g. balcony parapet panels), erection and transport anchors are required, which are especially adapted to those requirements. The FRIMEDA universal anchor TPA-FU 1.25-12 has been designed for this specific application, and is ideal for tilting, turning and lifting units in the above situation.

Recommended reinforcement
An additional reinforcement tail as in pict. 01 is essential for distributing the loads in very thin panels or on ones with only a single-layer reinforcement. For turning and tilting, a turning reinforcement as shown pict. 02 must be incorporated.

* Yield strength: 500 N/mm², tensile strength: 550 N/mm²

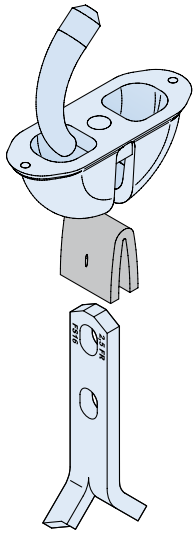
Permitted loads of universal anchor TPA-FU

Designation	Minimum spacing between centres	thick-ness of element	**Centrical pull** up to 30°			**Angled pull** up to 45°			**Tilting and turning**		
			Permitted load at concrete strength			Permitted load at concrete strength			Permitted load at concrete strength		
	e_z	2 x e_r	β_W = 15N/mm²	β_W = 25 N/mm²	β_W = 35 N/mm²	β_W = 15N/mm²	β_W = 25 N/mm²	β_W = 35 N/mm²	β_W = 15N/mm²	β_W = 25 N/mm²	β_W = 35 N/mm²
	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
TPA-FU 1,25-12	240	60	10.0 ①	12.5 ①	12,5 ①	10.0 ①	12.5 ①	12.5 ①	-	-	-
		80	12.5 ①	12.5 ①	12,5 ①	10.0 ①	12.5 ①	12.5 ①	4.1	4.6	5.0
		100	12.5 ①	12.5	12,5	10.0 ①	12.5	12.5	4.5	5.2	5.6
		120	12.5	12.5	12,5	12.5	12.5	12.5	4.8	5.6	6.0
		140	12.5	12.5	12,5	12.5	12.5	12.5	6.0	6.25	6.25
		160	12.5	12.5	12,5	12.5	12.5	12.5	6.25	6.25	6.25

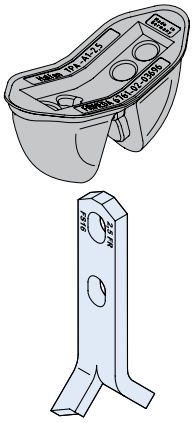
① with additional reinforcement dia. 8x700

Recess former

Steel recess former for a durable attachment to the formwork. The anchor head is pressed into the foam strips TPA-A Z01 and secured in the recess former from the outside with the wedge TPA-A E01. The wedge is simply taken out for removal from the formwork.



The plastic recess formers are used for easy attachment to the formwork. The recess former in open position will be put over the anchor head. Closing the recess former will fix the anchor tightly. Afterwards, the recess former can be fixed to the formwork together with the anchor.

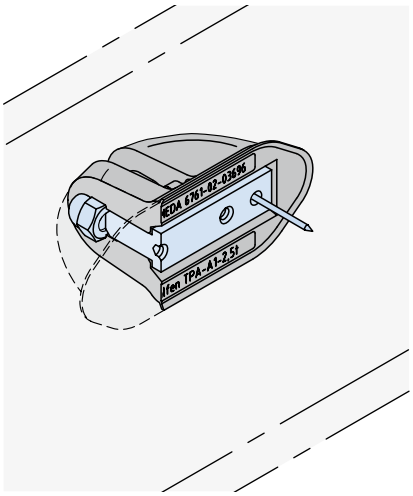


Holding plates

The holding plate TPA-H1 consists of a baseplate with two bolts. 4 nail holes are provided in the baseplate.

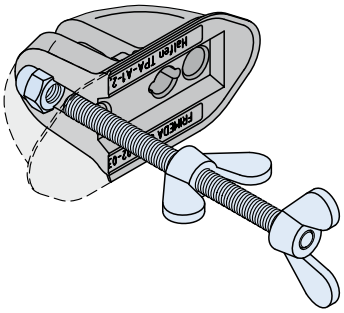
The plate can either be nailed or welded on. The recess former is simply fitted onto the bolts for installation.

The formwork can then simply be pulled off without first having to remove the plate.

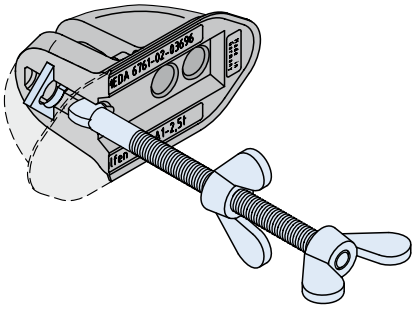


Holding bolts

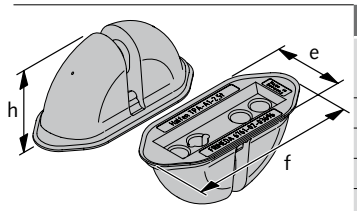
The **threaded holding bolt TPA-S1** is used for bolting on the recess former. It is pressed in at the upper end with a wing nut. An identical wing nut is screwed onto the thread.



The **bayonet holding bolt TPA-S2** consists of a threaded holding bolt with a pressed-on bayonet fitting. This is inserted into the bayonet connection of the recessed unit, and then turned through 90°. The upper wing nut must then be at right-angles to the lengthwise direction of the recessed unit. The recessed former is then drawn onto the formwork with the second wing nut.



Recess former

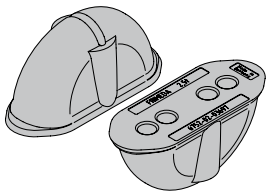


Plastic recess former TPA-A1

Designation	Order No. 0072.010-	
TPA-A1 2,5	00001	for all anchors, not FU, FG
TPA-A1 5,0	00002	
TPA-A1 10,0	00003	
TPA-A1 26,0	00004	

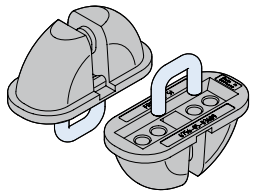
Plastic recess former TPA-A9

Designation	Order No. 0072.090-	Load group [t]	e [mm]	f [mm]	h [mm]	Thread M	Colour	
TPA-A9 2,5	00001	2,5	43	104	45	8	orange	for all anchors, not FA, FE, FX, FU, FG
TPA-A9 5,0	00002	5,0	49	126	59	8	black	
TPA-A9 10,0	00003	10,0	67	188	85	12	green	
TPA-A9 26,0	00004	26,0	112	234	118	16	blue	



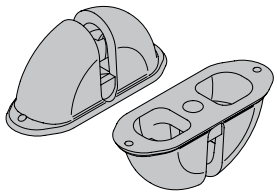
Rupper recess former TPA-A2

Designation	Order No. 0073.020-	Load group [t]	e [mm]	f [mm]	h [mm]	Colour	
TPA-A2 2,5	00001	2,5	41	102	47	black	for all anchors, not FA, FE, FX, FU, FG
TPA-A2 5,0	00002	5,0	51	126	59		
TPA-A2 10,0	00003	10,0	70	184	84		



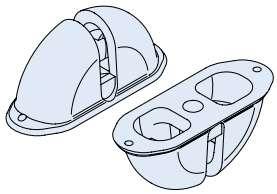
Rupper recess former TPA-A3

Designation	Order No. 0073.030-	Load group [t]	e [mm]	f [mm]	h [mm]	Colour	
TPA-A3 5,0	00001	5,0	54	115	50	black	only for FG



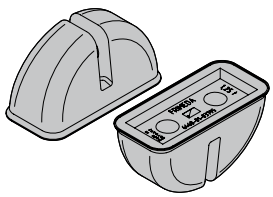
Plastic recess former TPA-A4 (incl. TPA-A E01)

Designation	Order No. 0072.040-	Load group [t]	e [mm]	f [mm]	h [mm]	Thread M	Colour	
TPA-A4 2,5	00001	2,5	37	102	45	8	orange	for all anchors, not FU, FG
TPA-A4 5,0	00002	5,0	48	126	59	8	black	
TPA-A4 10,0	00003	10,0	70	184	84	12	green	
TPA-A4 26,0	00004	26,0	112	252	118	16	blue	



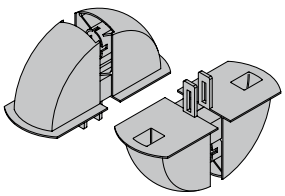
Steel recess former TPA-A5 (incl. TPA-A E01)

Designation	Order No. 0072.050-	Load group [t]	e [mm]	f [mm]	h [mm]	Thread M	
TPA-A5 2,5	00001	2,5	37	102	45	8	for all anchors, not FU, FG
TPA-A5 5,0	00002	5,0	48	126	59	8	
TPA-A5 10,0	00003	10,0	70	184	84	12	
TPA-A5 26,0	00004	26,0	112	252	118	16	



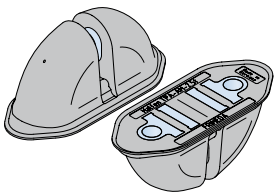
Plastic recess former TPA-A7

Designation	Order No. 0073.070-	Load group [t]	e [mm]	f [mm]	h [mm]	Colour	
TPA-A7 1,25	00001	1,25	28	60	32	blue	only for FU



Plastic recess former TPA-A8

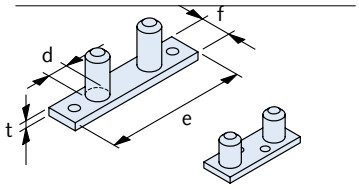
Designation	Order No. 0073.080-	Load group [t]	e [mm]	f [mm]	h [mm]	Colour	
TPA-A8 2,5	00001	2,5	42	100	47	orange	for all anchors, not FU



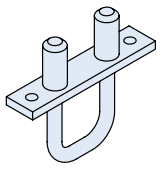
Magnetic recess former TPA-AM

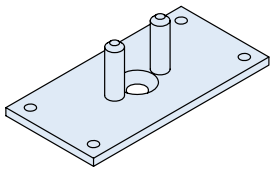
Designation	Order No. 0072.100-	Load group [t]	e [mm]	f [mm]	h [mm]	Colour	
TPA-AM 2,5	00001	2,5	43	104	45	orange	for all anchors, not FU, FG
TPA-AM 5,0	00002	5,0	49	126	59	black	

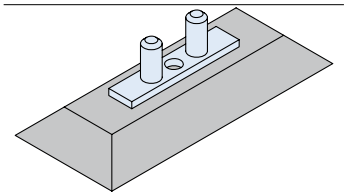
Holding plates and holding bolts for recess former

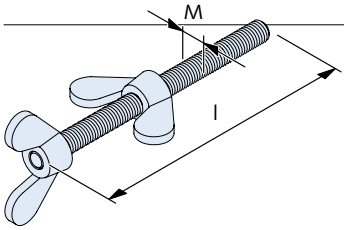


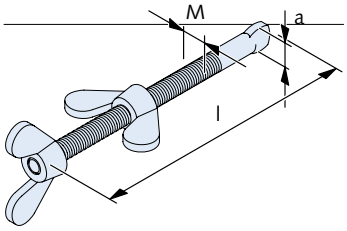
Version load group 1,25











Holding plate TPA-H1 (for recess former TPA-A1, TPA-A7, TPA-A9)

Designation	Order No. 0073.010-	Load group [t]	e [mm]	f [mm]	t [mm]	d [mm]
TPA-H1 1,25	00001	1,25	40	15	3	8
TPA-H1 2,5	00002	2,5	70	15	4	10
TPA-H1 5,0	00003	5,0	85	30	4	10
TPA-H1 10,0	00004	10,0	125	45	4	12
TPA-H1 26,0	00005	26,0	175	65	4	16

Holding plate TPA-H2 (for floating installation of recess former TPA-A1, TPA-A9)

Designation	Order No. 0073.020-	Load group [t]	e [mm]	f [mm]	t [mm]	d [mm]
TPA-H2 2,5	00001	2,5	70	15	4	10
TPA-H2 5,0	00002	5,0	85	30	4	10
TPA-H2 10,0	00003	10,0	125	45	4	12
TPA-H2 26,0	00004	26,0	178	65	4	16

Holding plate TPA-H3 (for recess former TPA-A2)

Designation	Order No. 0073.030-	Load group [t]	e [mm]	f [mm]	t [mm]	d [mm]
TPA-H3 2,5	00001	2,5	100	50	4	8
TPA-H3 5,0	00002	5,0	120	60	4	8
TPA-H3 10,0	00003	10,0	170	80	4	12

Magnetic holding plate TPA-HM (for recess former TPA-A1, TPA-A9)

Designation	Order No. 0073.050-	Load group [t]	e [mm]	f [mm]	t [mm]	d [mm]
TPA-HM 2,5	00001	2,5	144	63	16	10
TPA-HM 5,0	00002	5,0	144	63	16	10
TPA-HM 10,0	00003	10,0	220	125.5	16	12

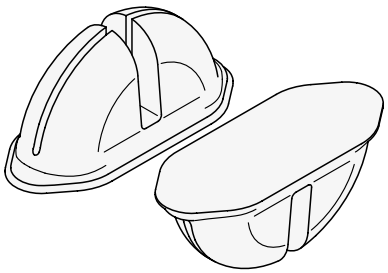
Thread holding bolt (for recess former TPA-A1, TPA-A2, TPA-A7, TPA-A9, and holding plate TPA-H3)

Designation	Order No. 0073.060-	Load group [t]	l [mm]	M
TPA-S1 M 8	00001	1,25 2,5 5,0	160	M8
TPA-S1 M12	00003	10,0	160	M12
TPA-S1 M16	00004	26,0	180	M16

Bayonet holding bolt TPA-S2 (for recess former TPA-A1, TPA-A9)

Designation	Order No. 0073.070-	Load group [t]	l [mm]	a [mm]	M.
TPA-S2 M 8	00001	2,5 5,0	160	11	M8
TPA-S2 M12	00002	10,0 26,0	180	16	M12

Recess filler TPA-V1 (Polystyrene)

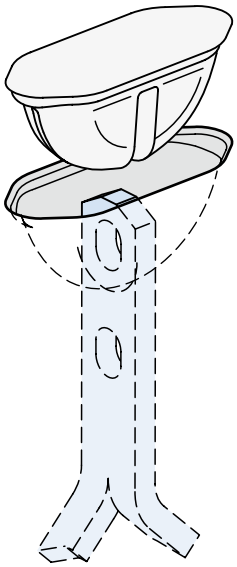


If precast concrete units are stored outdoors for any length of time, we recommend the use of our recess fillers. The polystyrene recess filler is used to seal off or fill the anchor recess in the precast concrete. It protects the anchor against corrosion and prevents water from collecting in the recess (this could otherwise result in icing-up in cold weather). The recess filler can be used for transport and storage, for a permanent seal once assembly and erection are completed. The recess filler is supplied in the corresponding four load groups and suitable for all recess formers of the load group.

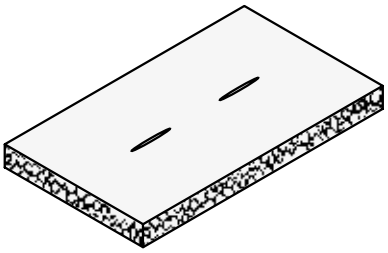
Recess filler TPA-V1		
Designation	Order No. 0073.080-	Load group [t]
TPA-V1 2,5	00001	2,5
TPA-V1 5,0	00002	5,0
TPA-V1 10,0	00003	10,0
TPA-V1 26,0	00004	26,0

Fitting the recess filler

The recess filler is very easy to install. It is simply fitted over the anchor and pressed into the recess.



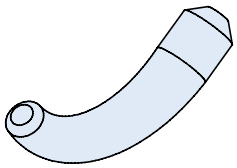
Foam strip TPA-A Z01 (for recess former TPA-A4 und TPA-A5)



The anchor head is pressed into the foam strips, and then inserted into the recessed unit TPA-A4 or TPA-A5. A missing foam strip means that concrete sludge can run into the recess.

Foam strip		
Designation	Order No. 0072.120-	Load group [t]
TPA-A-Z1 2,5	00006	2,5
TPA-A-Z1 5,0	00007	5,0
TPA-A-Z1 10,0	00008	10,0
TPA-A-Z1 26,0	00009	26,0

Spare wedge TPA-A E01 (for recess former TPA-A4 und TPA-A5)



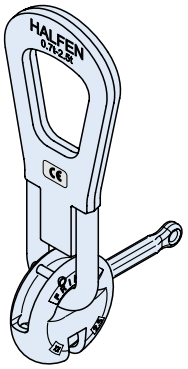
The wedge is used for attachment of the anchor for recess former TPA-A4 and TPA-A5. Then the wedge is simply taken out for removal from the formwork. The wedge is supplied with the recess former, although it can also be ordered separately.

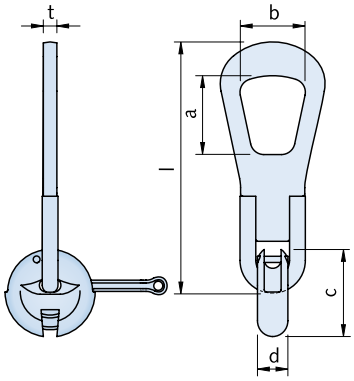
Spare wedge		
Designation	Order No. 0072.120-	Load group [t]
TPA-A-E1 2,5	00002	2,5
TPA-A-E1 5,0	00003	5,0
TPA-A-E1 10,0	00004	10,0
TPA-A-E1 26,0	00005	26,0

Ring clutch TPA-R1 with shackle for manual release

The ring clutch consists of a shackle and a clutch head. The shackle is free to move in any direction. The clutch head incorporates a locking bolt which fastens to the anchor.
Anchors must be cast in with the correct recess former

Ring clutches are available in four load groups. There are three or four anchors in each load group.





TPA-R1

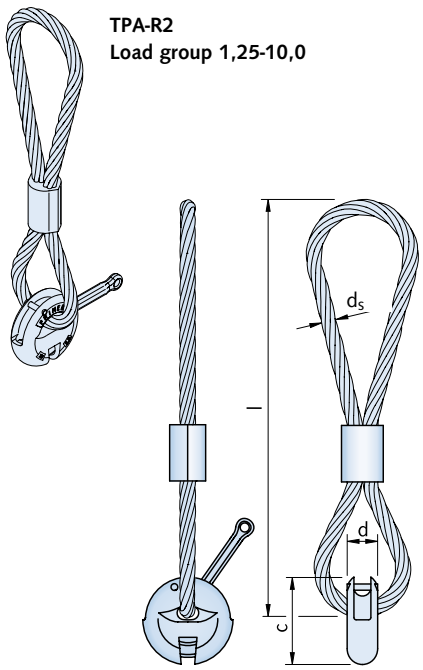
Designation	Order No. 0071.010-	Load group [t]	l [mm]	a [mm]	b [mm]	c [mm]	d [mm]	t [mm]
TPA R1 2,5	00001	2,5	265	70	58	80	27	12
TPA R1 5,0	00002	5,0	330	86	65	105	36	16
TPA R1 10,0	00003	10,0	425	112	90	150	50	25
TPA R1 26,0	00004	26,0	605	160	120	206	72	30

Lifting devices have to be checked regularly according to instructions on page 43.

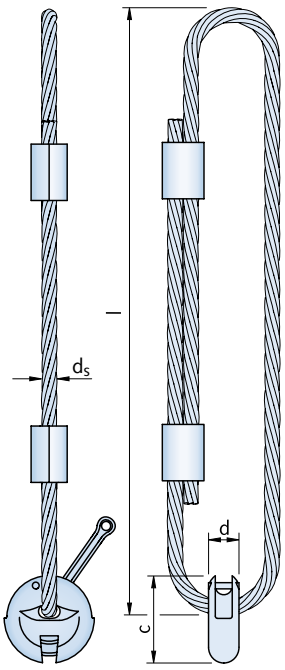
Ring clutches with wire cables TPA-R2 (for load groups 1,25 / 2,5 / 5,0 / 10,0) TPA-R3 (for load group 26,0)

Ring clutches with wire cables are subject to the same controls, i.e. annual safety inspection by experts, as all other lifting and handling systems. Any damaged wire must be withdrawn from use in strict accordance with the relevant accident prevention regulations for lifting equipment.
As the clutch head generally has a much longer life than the pressed cable loops, HALFEN can fit clutch heads onto new cables if necessary.

TPA-R2
Load group 1,25-10,0



TPA-R3
Load group 26,0



TPA-R2 / TPA-R3

Designation	Order No. 0071.060-	Load group [t]	l [mm]	c [mm]	d [mm]	d_s [mm]
TPA R2 1,25	00001	1,25	~320	52	20	dia. 8
TPA R2 2,5	00002	2,5	~560	80	27	dia. 14
TPA R2 5,0	00003	5,0	~595	105	36	dia. 18
TPA R2 10,0	00004	10,0	~702	150	50	dia. 22
TPA R3 26,0	00005	26,0	~1570	206	72	dia. 32

Do not combine our products with accessories from other manufacturers. HALFEN will only guarantee the efficient operation and safety of its ring clutches if used in conjunction with original cable loops.

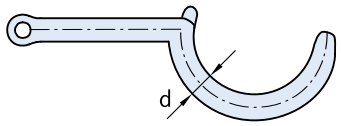
Checking of connection fittings

Like all load-carrying devices, ring clutches must be checked at least once annually by an expert for safe operating condition. There is no fixed working life for FRIMEDA ring clutches. Users are expressly warned against combining our products with those of other manufacturers. The correct function and safety of the ring clutches can only be guaranteed when using original FRIMEDA ring clutches with FRIMEDA anchors. When checking FRIMEDA ring clutches, the following points should be observed:

Locking bolt

Ring clutches with worn or bent locking bolts must be taken out of use. For allowable tolerance due to wear see the table below.

Locking bolt		
Load group [t]	Nominal dimensions d [mm]	Minimum dimension d [mm]
1,25	8.0 +0.4/-0.6	7
2,5	13.0 +0.7/-0.4	12
5,0	16.5 +0.7/-0.4	15.5
10,0	23.5 +0.8/-0.4	22.5
26,0	32.0 +0.9/-0.5	31



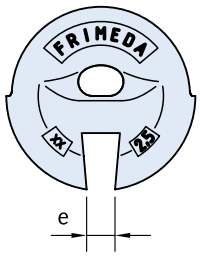
Replacement locking bolt for ring clutches TPA-R1, TPA-R2 und TPA-R3		
Load group [t]	Designation	Order No. 0071.060-
1,25	TPA-R-E1- 1,25 Zi	00001
2,5	TPA-R-E1- 2,5 Zi	00002
5,0	TPA-R-E1- 5,0 Zi	00003
10,0	TPA-R-E1-10,0	00004
26,0	TPA-R-E1-26,0	00005

Replacement locking bolt for ring clutches TPA-F1 und TPA-F2		
Load group [t]	Designation	Order No. 0071.110-
2,5	TPA-F-ERE- 2,5	00002
5,0	TPA-F-ERE- 5,0	00003
10,0	TPA-F-ERE-10,0	00004
26,0	TPA-F-ERE-26,0	00005

Clutch head

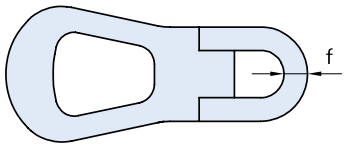
If the clutch head is deformed or the mouth opening is enlarged, the ring clutch has to be withdrawn and can not be repaired. For allowable tolerance due to wear see the table below.

Clutch head		
Load group [t]	Nominal dimension e [mm]	Maximum dimension e [mm]
1,25	7.0 ±0.12	8
2,5	12.0 ±0.5	13
5,0	18.0 +0.5/-1.0	19.5
10,0	22.0 ±0.5	23.5
26,0	34.0 +2.0/-1.0	37



Shackle (TPA-R1)

Clutches with visible signs of damage or excessive wear must be withdrawn immediately. For allowable tolerance due to wear see the table below.



Shackle (TPA-R1)		
Load group [t]	Nominal dimension f [mm]	Minimum dimension f [mm]
2,5	14	13
5,0	20	19
10,0	26	25
26,0	40	38.5

Wire cables (TPA-R2/R3)

Wire cables should be checked for the following defects:

- Kinking and buckling
- One braid broken
- Slackening of the outermost exposed layer on free length
- Crushing on free lengths
- Crushing at the eye´s contact point with more than 4 ruptured wires on braided cables, or more than 10 ruptured wires on cablelaid rope
- Corrosion marks
- Damage or severe wear to the cable connector or cable-end connector
- High number or ruptured wires

The cable must be taken out of use if the following numbers of ruptured wires are found. (depending from the rope diameter)

Wire cables (TPA-R2/R3)			
Cable type	No. of visible ruptured wires over a lenght of		
	3d	6d	30d
Braided cable	4	6	16

Checking of the wire cables has to include for signs of slipping between the cable and the swaged clamp. Acids, alkaline fluids and other aggressive media, that can cause corrosion, must be kept away from the wire cables. Crane hooks must have a large radius. Sharp-edged hooks or hooks with small cross-section, and therefore small radii, can lead to unacceptable damage of the wire cables. As the clutch head usually has a longer service life than the wire loop, clutch heads with worn wire cables can be exchanged by HALFEN.

Ring clutch TPA-F1 with pneumatic release

Operating principle

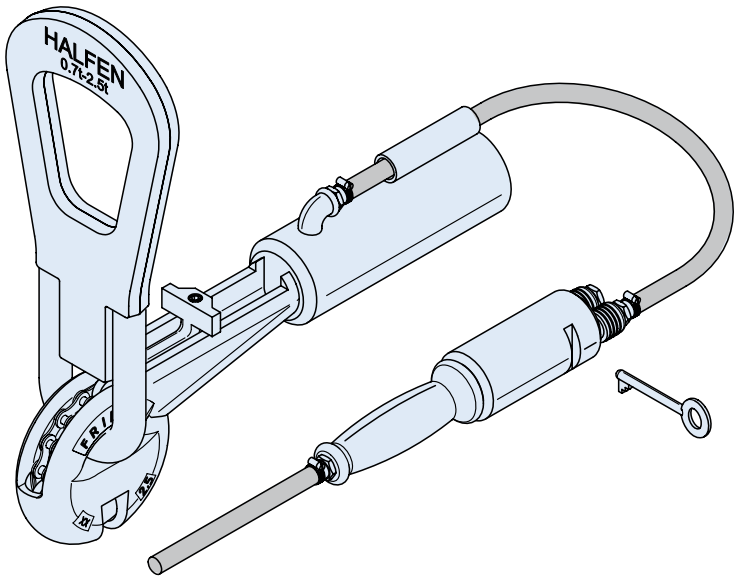
The pneumatically operated remote-control release mechanism has been designed as an alternative to the manual release for distances of more than 10 metres.
On the pneumatic version, the locking bolt is pulled back by compressed air. A one-way cylinder is installed on the clutch for this purpose. The compressed air (max. 7 bar) can be supplied by any suitable source, e.g. the site compressor or a portable unit. The hand valve in the feed line to the ring clutch can be opened by a key (Totmann´s safety handle system). Any number of branches can be fitted downstream of it, depending on the number of ring clutches used.

Operating sequence

The ring clutch is inserted in the concrete recess and closed by actuating the locking bolt. The precast unit can now be lifted. To disengage the clutch, for example after installation of concrete columns, compressed air is fed via the hand valve to the cylinder so that the locking bolt is moved back to open the clutch. There is no risk of unintentional release, as the locking bolt remains closed in the event of failure of the compressed air supply. The system uses an air cylinder which will not release the bolt if it is holding a load greater than 0.2 t. The hand valve admits the compressed air supply only if the key is turned in the direction of the arrow and held in the open position.

As soon as the key is released, even if still in the keyhole, the valve is closed automatically. It is recommended that the lines to the cylinders be installed in the crane or crane jib, to ensure satisfactory operation. If the compressed air is fed to the precast unit directly from ground level, the hoses between the compressor and remote control may only be connected up when it is time to release the clutch; e.g. when the column is in position.

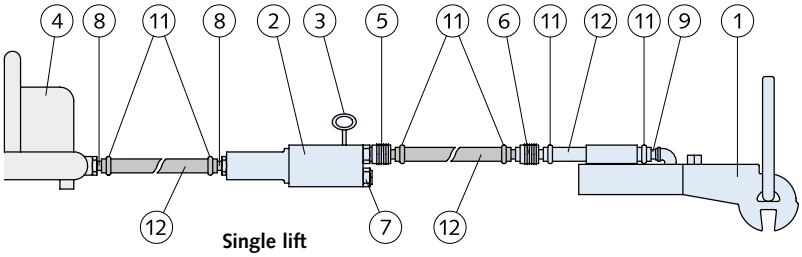
Ring clutches with remote-control release have the same markings as manual ring clutches.



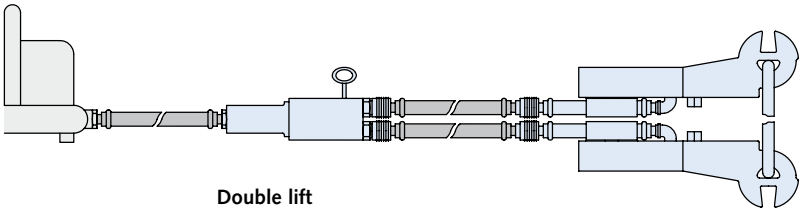
TPA-F1		
Designation	Order No. 0071.030-	Load group [t]
TPA-F1 2,5	00001	2,5
TPA-F1 5,0	00002	5,0
TPA-F1 10,0	00003	10,0
TPA-F1 26,0	00004	26,0

Lifting devices have to be checked regularly according to instructions on page 43.

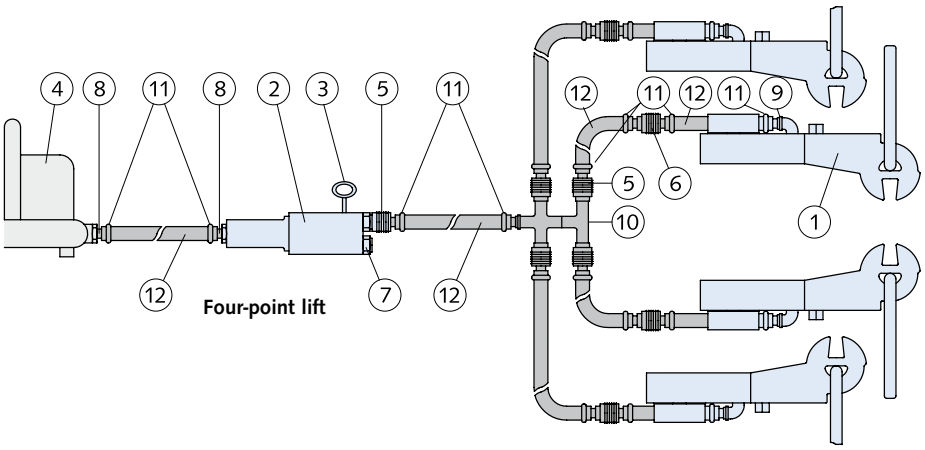
Accessories for TPA-F1



Single lift



Double lift



Four-point lift

Accessories

Pos.	Designation	Order No. 0071.070-	Accessories needed for: Single lift	Double lift	Four-point lift
1	Ring clutch complete	see page 44	1	2	4
2	Hand valve	00004	1	1	1
3	Key	00005	1	1	1
4	Compressor	00011	1	1	1
5	Quick-action hose coupling R 1/4“	00002	2	2	5
6	As No. 5, but for Hose on both sides	00010	2	2	4
7	Thread plug R 1/4“	00003	-	-	1
8	Coupling R 3/8“	00014	2	2	2
9	Coupling R 1/4“	00015	2	2	4
10	4-way distributor	00001	-	-	1
11	Hose clip	00012	6	10	20
12	Fabric hose	00013	As requested	As requested	As requested

Ring clutch TPA-F2 with manual remote control by bowden cable

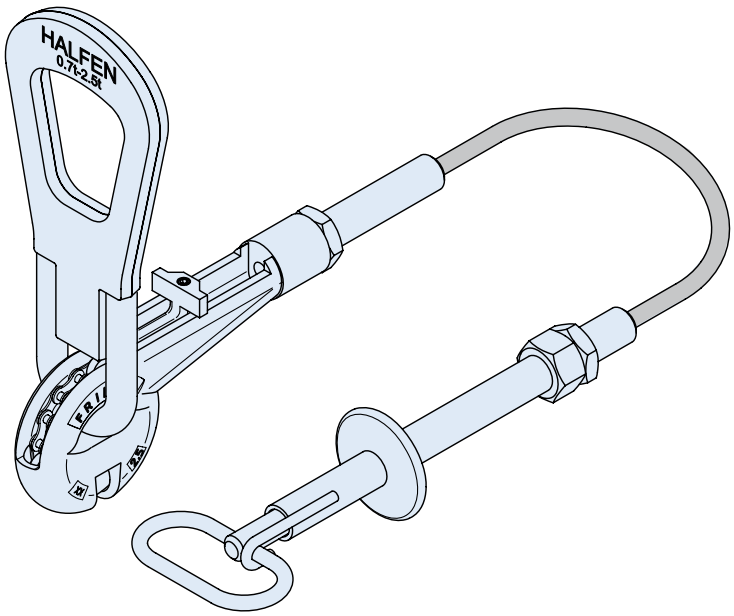
Operating princple

The remote-control release disengages the ring clutch from a safe distance of up to 10 metres. The release mechanism consists basically of a bowden cable connected to the locking bolt of the ring clutch. At the opposite end, the release handle is locked in a tube by means of a safety hook. All TPA-F2 clutch heads in the various load groups have the same M27 thread, i.e. the remote-control mechanism fits any clutch head. The opening and closing mechanism, comprising the locking bolt, the shackle with indicator and the slide, are parts of the complete clutch head.

Operation of the manual remote-control

To disengage the ring clutch, the handle is disengaged by pressing and turning. Unintentional release is not possible. For safety and efficiency reasons, the locking bolt is closed by hand. The remote device is designed such that the locking bolt cannot be closed at a distance.

The flexible tube can withstand reasonable tension and compression loads, so that the precast unit can easily be handled. The ring clutches of all the load groups can be used with any of the manual remote-control releases of lengths 2.5 m, 5.0 m, 7.5 m and 10.0 m.



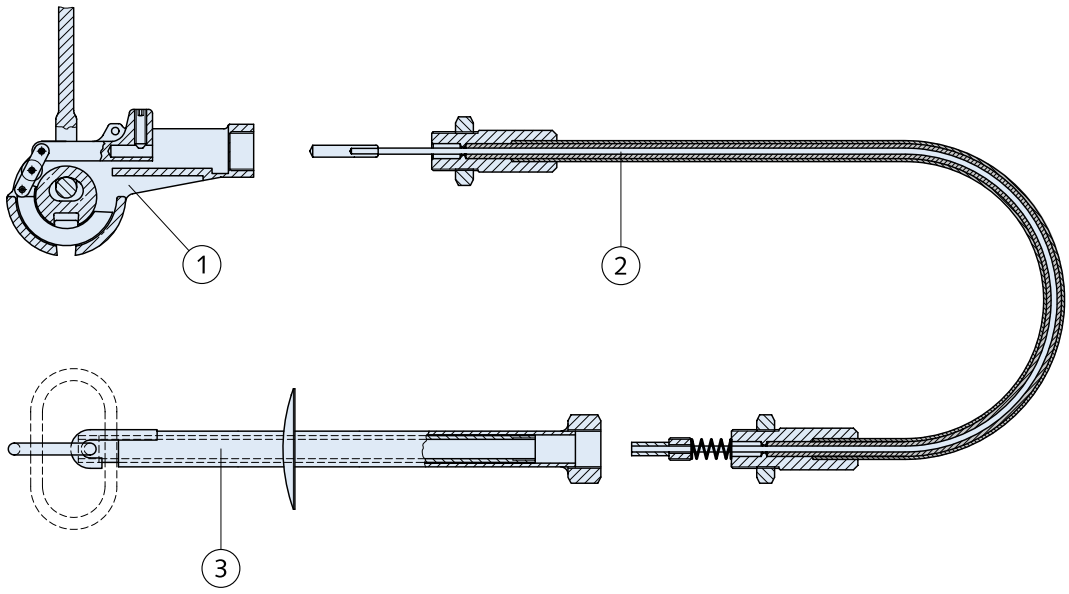
TPA-F2			
Designation	Order No. 0071.040-	Load group [t]	Cable length
TPA-F1 2,5	00001	2,5	2,5 m
	00002		5,0 m
	00003		7,5 m
	00004		10,0 m
TPA-F1 5,0	00005	5,0	2,5 m
	00006		5,0 m
	00007		7,5 m
	00008		10,0 m
TPA-F1 10,0	00009	10,0	2,5 m
	00010		5,0 m
	00011		7,5 m
	00012		10,0 m
TPA-F1 26,0	00013	26,0	2,5 m
	00014		5,0 m
	00015		7,5 m
	00016		10,0 m

Lifting devices have to be checked regularly according to instructions on page 43.

Component parts for TPA-F2

All clutch heads in the various load groups have an M27 inner connecting thread, making it possible to connect the remote-control mechanism to cables of different lengths and various clutch heads. For this reason, and also to reduce storage space requirements, the remote-control mechanism components can also be ordered separately.

In common with all lifting devices, remote-control mechanisms must be checked regularly by an expert (see Page 43). Worn locking bolts can be replaced by HALFEN at the works, but no other type of repair is permitted.



① Clutch unit TPA-F2-KUP		
Designation	Order No. 0071.080-	Load group [t]
TPA-F2-KUP- 2,5	00001	2,5
TPA-F2-KUP- 5,0	00002	5,0
TPA-F2-KUP-10,0	00003	10,0
TPA-F2-KUP-26,0	00004	26,0

② Pull cable unit TPA-F2-SZE		
Designation	Order No. 0071.080-	Load group [t]
TPA-F2-SZE- 2,5	00005	2,5
TPA-F2-SZE- 5,0	00006	5,0
TPA-F2-SZE- 10,0	00007	10,0
TPA-F2-SZE- 26,0	00008	26,0

③ Release handle and tube TPA-F2-GRI		
Designation	Order No. 0071.080-	Load group [t]
TPA-F2-GRI	00001	all load groups

ANCHOR INSTALLATION

General instructions

The anchors must be installed carefully in the interests of efficient functioning and optimum safety.

Use the available installation aids for all applications.

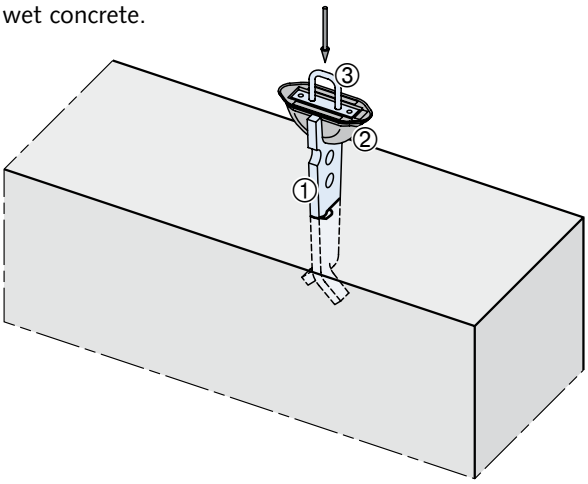
The recess former A1 can easily be removed from the set concrete unit if it is greased before concreting.

We recommend that the recess former should not be nailed to the formwork if at all avoidable!

Floating installation

Application for: columns, beams, trusses, π-slabs
Installation aid: **Holding plate H2**

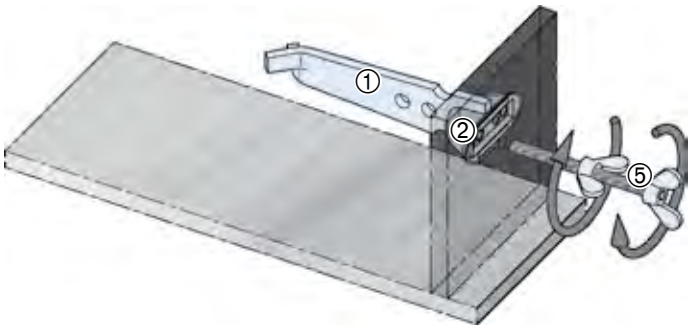
Open up recess former A1 ② insert anchor ①, press holding plate H² ③ into recess former and press into the wet concrete.



Mounting on the formwork (wood/steel)

Installation aid: **Holding bold S1 or S2**

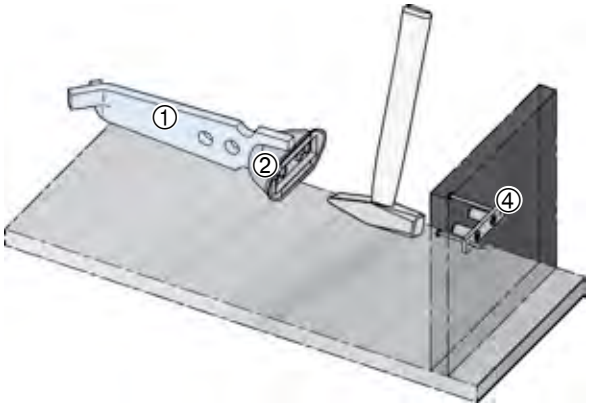
Drill through the formwork, push through the holding bolt S1 or S2 ⑤, screw into the recess former A1 ②, with inserted anchor ①, draw up against formwork and tighten with wing nut.



Mounting on the formwork (wood)

Installation aid: **Holding plate H1**

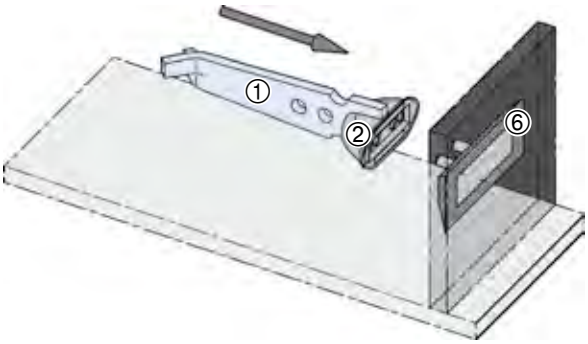
Nail or screw the holding plate H1 ④ onto the formwork. Press on the recess former A1 ②, with inserted anchor ①.



Mounting on the formwork (steel)

Installation aid: **Magnetic plate HM**

Magnetic holding plate ⑥ grips the formwork. Press the recess former A1 ②, with inserted anchor ① onto pins.



Removing the formwork sections

Before lifting the precast concrete unit, as many sections of the formwork as possible should be removed in order to minimise adhesion to the formwork. Inadequate stripping is the most common cause of flaking of the precast concrete unit or of anchor failure. The forces acting on the lifting system may be several times the actual weight of the precast unit.

Removing the recess formers

To strip the recess former, two rods are inserted in the holes in the recess former, which is then levered out by scissors action. This technique will guarantee a long life time for the recess former. Attempting to remove the recess former using the tip of a carpenter's hammer will destroy it.

Fitting the ring clutch

To transport an element, the appropriate ring clutch for the load group is inserted over the anchor head in the concrete recess. The load ranges are mismatch-proof.

Locking the ring clutch

The ring clutch is positively locked by a simple hand-operated movement of the locking bolt. The resulting connection is safe, and the ring clutch is free to move in any direction. The precast element can now be lifted out of the formwork and transported safely to its point of storage.

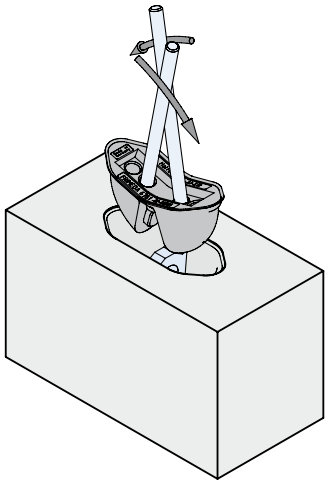
Anchors must be used with the correct recess former. Then only the correct ring clutch will fit the anchor.

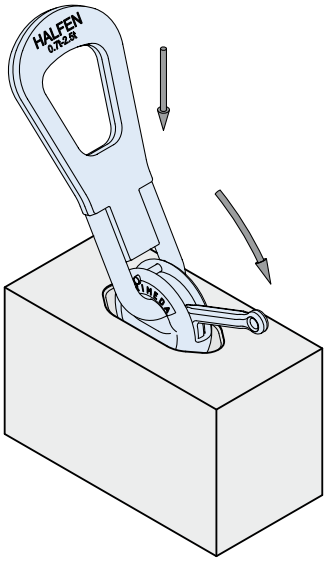
Assembly

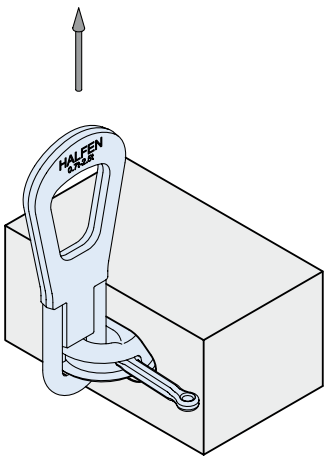
A major advantage of the FRIMEDA Rapid Lift System is that the slinging devices (ring clutches) remain attached to the crane hook, and do not need to be transported by hand.
The ring clutch can be released manually by pushing back the locking bolt once the device is off-load.

Tilting slabs without tilting table

The FRIMEDA Rapid Lift System can be used to move flat-manufactured precast units from a horizontal to a vertical position. The direction of pull is at right-angles to the built-in anchor. To avoid flaking of the concrete, the erection anchor TPA-FA should be properly embedded in the unit. The use of cross-beams when lifting is recommended, in order to avoid torsional forces.

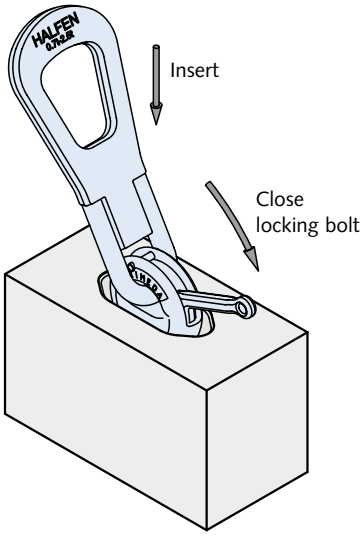






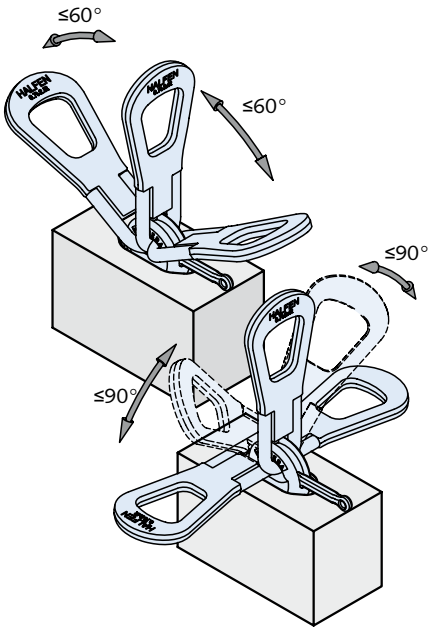
1. Engaging

Insert the ring clutch in the recess in the concrete and close the locking bolt or the slide manually, pushing it to the limit position. Then start the lifting operation.



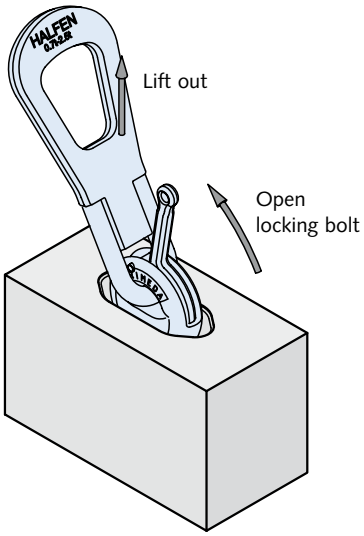
2. Lifting

The ring clutch can be subjected to loads in any direction (do not exceed the load limits of the anchors!). Angled pull of up to 60° due to the use of a spreader is permissible.



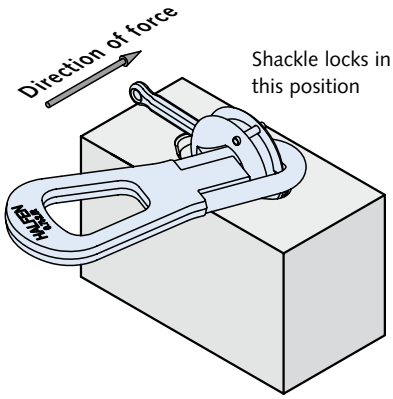
3. Releasing

Manual ring clutch: push back the bolt by hand. Now the ring clutch is free.

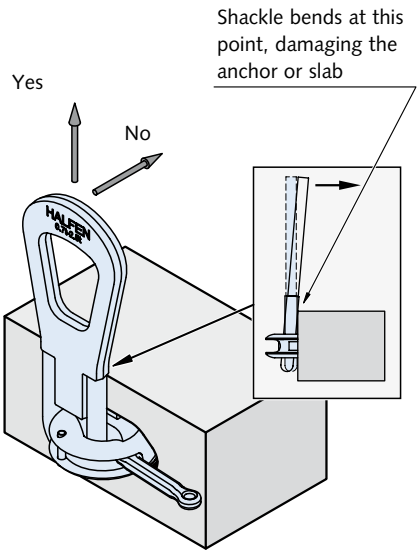


Misuse of the FRIMEDA ring clutch

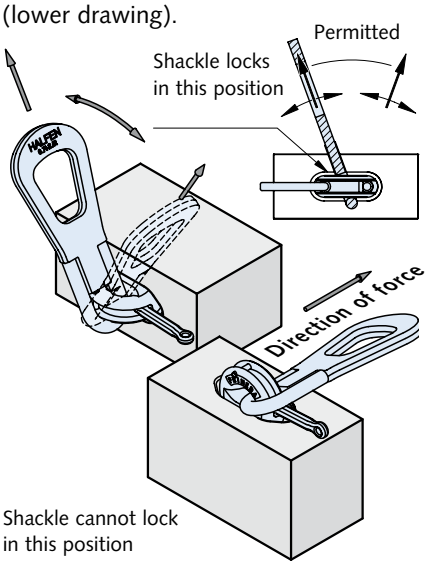
If the shackle is beneath the clutch head when subjected to the load, it may lock in the position illustrated. The round shackle will become bent then when the load is raised.



If the shackle is pulled towards the top surface of the slab when subjected to the load, it may become bent on the edge of the slab.



In the upper position, the shackle may lock within the clutch housing. A narrow lifting cable angle will cause the shackle to become bent. The problem can be overcome by turning the shackle through approx. 45°. (lower drawing).



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