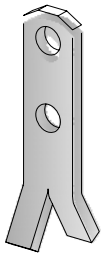
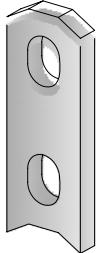
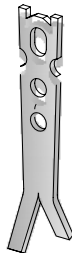
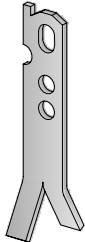
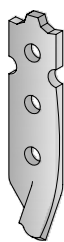

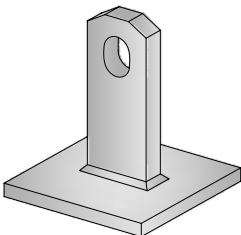
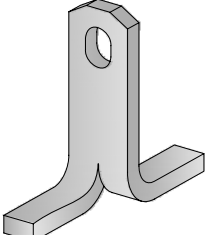
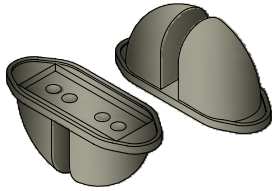
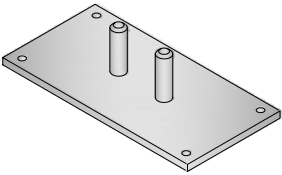
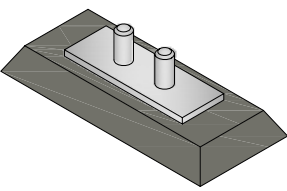
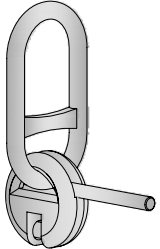


Spread Anchor Lifting System

SALON
TUKITUOTE

Instructions of use

Lifting Anchors			
			
Transport Anchor TPA-S (pages 2-10)	Transport Anchor TPA-2 (pages 11-16)	Transport Anchor TPA-SA (pages 17-23)	
			
Transport Anchor TPA-SE (pages 24-30)	Universal Anchor TPA-U (pages 31-36)	Sandwich Panel Anchor TPA-ST (pages 37-41)	
			
Plate Anchor TPA-P (pages 42-45)	Flat Foot Anchor TPA-F (pages 46-49)		
Lifting Accessories			
			
Recess Former TPA-A1 (pages 50-51)	Holding Plate (page 52)	Magnetic Plate HM9 (page 53)	Ring Clutch TPA-R1 (pages 54-56)

Transport Anchor TPA-S

Transport Anchor TPA-S is suitable for load ranges 0,7 to 22,0 for use in both thin panels and slabs.

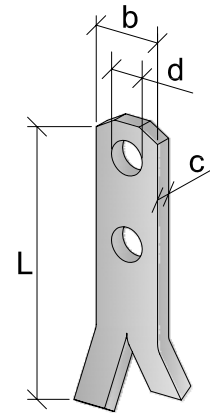
The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional hole in the anchor is for additional reinforcement which is used in certain special applications.

The components of the system are classified in 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 stress transfer to the concrete occurs through the lower spread of the flat steel. It provides an efficient anchoring in both thin walls and large concrete units.

Spread Anchors can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).

Anchors from stainless steel A4, anchors with changed length or zinc-plated anchors on request.



Materials:

- stainless steel A4 or
- zinc-plated

Main application: columns, beams, trusses, wall units, TT-slabs

Table 1(1): Transport Anchor TPA-S

Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-S-0,7-11	2.5	0,7	110	30	5	14×20	12
TPA-S-1,4-11		1,4	110	30	6	14×20	13
TPA-S-1,4-16		1,4	160	30	6	14×20	20
TPA-S-2,0-13		2,0	130	30	8	14×20	21
TPA-S-2,0-16		2,0	160	30	8	14×20	27
TPA-S-2,0-21		2,0	210	30	8	14×20	36
TPA-S-2,5-15		2,5	150	30	10	14×20	31
TPA-S-2,5-20		2,5	200	30	10	14×20	42
TPA-S-2,5-25		2,5	250	30	10	14×20	54
TPA-S-3,0-16	5	3,0	160	40	10	18×22	45
TPA-S-3,0-20		3,0	200	40	10	18×22	57
TPA-S-3,0-28		3,0	280	40	10	18×22	81
TPA-S-4,0-18		4,0	180	40	12	18×22	61
TPA-S-4,0-24		4,0	240	40	12	18×22	81
TPA-S-4,0-32		4,0	320	40	12	18×22	111
TPA-S-5,0-18		5,0	180	40	15	18×22	78
TPA-S-5,0-24		5,0	240	40	15	18×22	105
TPA-S-5,0-40		5,0	400	40	15	18×22	178

Table 1(2): Transport Anchor TPA-S

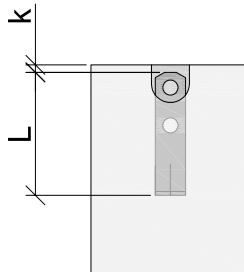
Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-S-5,3-22	10	5,3	220	60	12	26×26	110
TPA-S-5,3-26		5,3	260	60	12	26×26	132
TPA-S-5,3-34		5,3	340	60	12	26×26	177
TPA-S-7,5-26		7,5	260	60	15	26×26	164
TPA-S-7,5-30		7,5	300	60	15	26×26	195
TPA-S-7,5-42		7,5	420	60	15	26×26	273
TPA-S-10,0-30		10,0	300	60	20	29×29	260
TPA-S-10,0-37		10,0	370	60	20	29×29	325
TPA-S-10,0-52		10,0	520	60	20	29×29	459
TPA-S-14,0-37		14,0	370	80	20	35×35	414
TPA-S-14,0-46	26	14,0	460	80	20	35×35	525
TPA-S-22,0-50		22,0	500	80	25	35×35	816
TPA-S-22,0-62		22,0	620	80	25	35×35	1017

Installation Instructions for Transport Anchors TPA-S

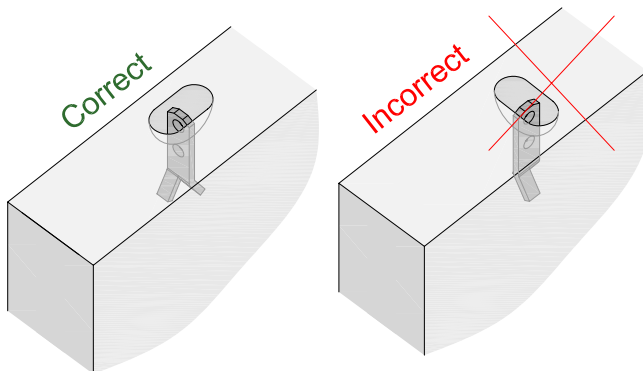
1. Spacing of Transport Anchors TPA-S and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]
2,5	10
5,0	10
10,0	15
26,0	15

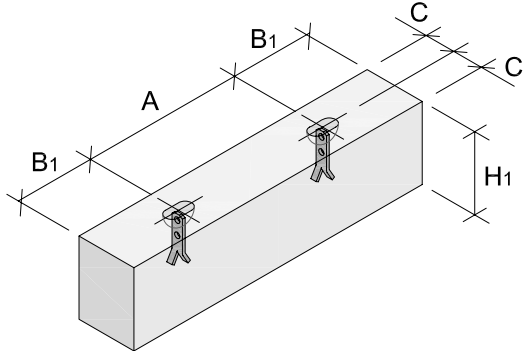


Orientation of installation:



Transport Anchors TPA-S may only be installed in wall elements with the flat steel at right-angles of the slab

Thick-walled precast element (beam):



Large-area precast element (slab):

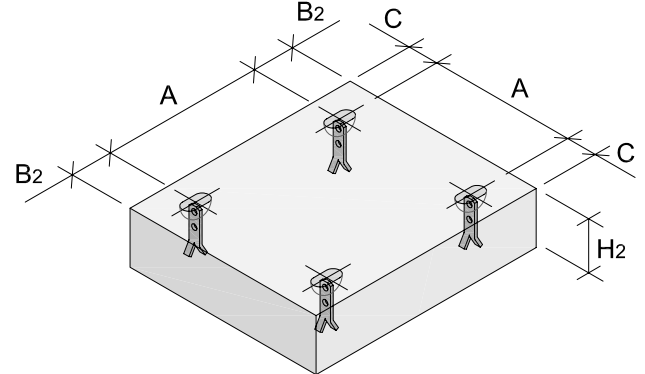


Table 3: Minimal dimensions for large-area or thick-walled precast elements (without tilting)

Article	H ₁ [mm]	H ₂ [mm]	A [mm]	B ₁ [mm]	B ₂ [mm]			C [mm]		
					concrete strength [N/mm ²]			concrete strength [N/mm ²]		
					≥15	≥25	≥25	≥15	≥25	≥35
TPA-S-0,7-11	200	145	280	140	35	35	35	35	35	35
TPA-S-1,4-11	190	145	380	190	70	50	40	55	40	35
TPA-S-1,4-16	290	195	530	265	50	35	35	35	35	35
TPA-S-2,0-13	225	165	450	225	100	70	55	75	55	45
TPA-S-2,0-16	285	195	570	285	80	60	45	60	40	35
TPA-S-2,0-21	385	245	770	385	65	45	35	45	35	35
TPA-S-2,5-15	260	185	520	260	120	85	70	90	65	50
TPA-S-2,5-20	360	235	720	360	90	65	50	65	45	35
TPA-S-2,5-25	460	285	920	460	75	50	40	50	35	35
TPA-S-3,0-16	275	195	550	275	145	100	80	105	75	60
TPA-S-3,0-20	350	235	710	355	115	85	65	80	60	45
TPA-S-3,0-28	510	315	1025	513	85	60	50	55	40	40
TPA-S-4,0-18	310	215	610	305	190	135	105	140	100	80
TPA-S-4,0-24	425	275	850	425	145	100	80	100	70	55
TPA-S-4,0-32	590	355	1175	588	110	75	60	70	50	40
TPA-S-5,0-18	300	215	600	300	260	180	145	190	135	110
TPA-S-5,0-24	420	275	840	420	195	140	110	135	95	75
TPA-S-5,0-40	740	435	1480	740	115	85	65	75	55	45
TPA-S-7,5-26	450	300	900	450	300	215	175	210	150	120
TPA-S-7,5-30	530	340	1060	530	265	190	150	180	125	100
TPA-S-7,5-42	770	460	1540	770	190	135	110	120	85	70
TPA-S-10,0-30	515	340	1030	515	390	275	220	270	190	150
TPA-S-10,0-37	655	410	1310	655	315	225	180	210	150	120
TPA-S-10,0-52	955	560	1910	955	225	160	130	140	100	80
TPA-S-14,0-37	615	410	1230	615	500	355	285	350	250	200
TPA-S-14,0-46	795	500	1590	795	400	285	230	265	190	150
TPA-S-22,0-50	850	540	1700	850	675	480	385	450	320	260
TPA-S-22,0-62	1090	660	2180	1090	540	385	310	350	250	200

Table 4: Minimal dimensions for thin-walled precast elements (without tilting)

Article	A ₃ [mm]	B ₃ [mm]	2×C ₃ [mm]		
			concrete strength [N/mm ²]		
			≥15	≥25	≥35
TPA-S-0,7-11	330	145	60	60	60
TPA-S-1,4-11	330	145	75	60	60
TPA-S-1,4-16	480	240	75	60	60
TPA-S-2,0-13	390	195	100	80	70
TPA-S-2,0-16	480	240	100	80	70
TPA-S-2,0-21	630	315	100	80	70
TPA-S-2,5-15	450	225	120	90	80
TPA-S-2,5-20	600	300	120	90	80
TPA-S-2,5-25	750	375	120	90	80
TPA-S-3,0-16	480	240	160	90	80
TPA-S-3,0-20	600	300	120	90	80
TPA-S-3,0-28	840	420	120	90	80
TPA-S-4,0-18	540	270	210	130	100
TPA-S-4,0-24	720	360	150	115	100
TPA-S-4,0-32	960	480	150	115	100
TPA-S-5,0-18	540	270	350	210	150
TPA-S-5,0-24	720	360	180	140	120
TPA-S-5,0-40	1200	600	180	140	120
TPA-S-7,5-26	780	390	340	200	150
TPA-S-7,5-30	900	450	240	150	130
TPA-S-7,5-42	1260	630	195	150	130
TPA-S-10,0-30	900	450	450	270	190
TPA-S-10,0-37	1110	555	270	190	160
TPA-S-10,0-52	1560	680	245	190	160
TPA-S-14,0-37	1110	555	610	360	260
TPA-S-14,0-46	1380	690	350	210	165
TPA-S-22,0-50	1500	750	760	460	330
TPA-S-22,0-62	1860	930	450	270	230

Thin-walled precast element:

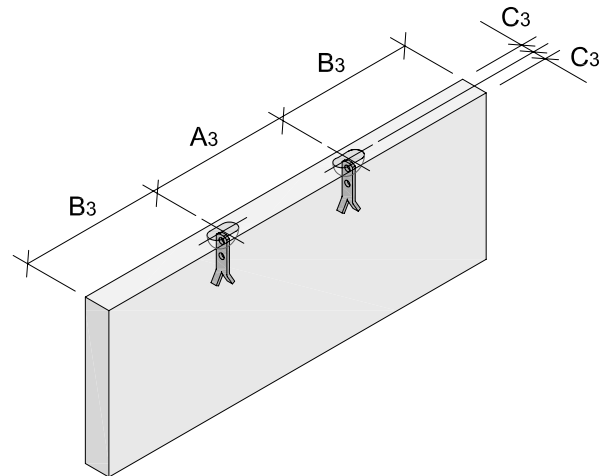
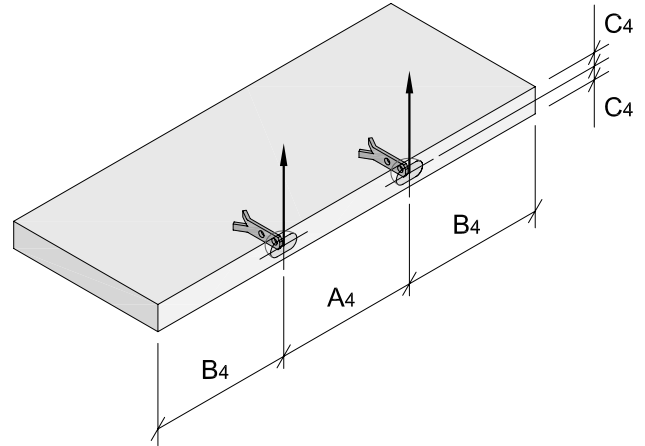
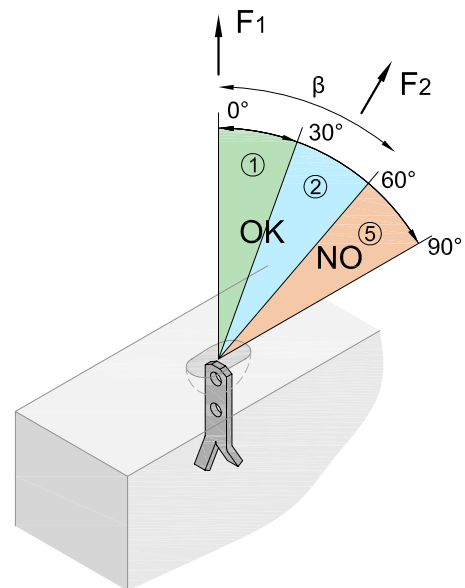
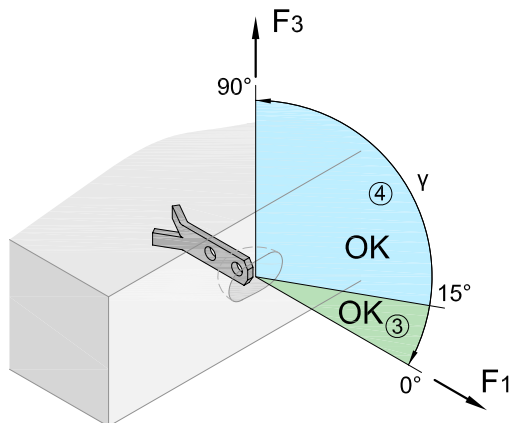


Table 5: Minimal dimensions for elements, which is planned to tilt or turn

Load group [t]	Load range [t]	A ₄ [mm]	B ₄ [mm]	C ₄ [mm]
2,5	0,7	700	350	100
	1,4	700	350	100
	2,0	800	400	100
	2,5	875	438	100
5,0	3,0	950	475	150
	4,0	1050	525	150
	5,0	1435	718	150
10,0	7,5	1470	735	250
	10,0	1820	910	300
26,0	14,0	1800	900	525
	22,0	2200	1100	710



2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull** with reinforcement at anchorage zone*, without additional reinforcement
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull**** with reinforcement at anchorage zone* + parallel shear pull reinf.
- 3) $\gamma < 15^\circ$ - **straight pull** (tilting from tilting table) with reinforcement at anchorage zone*, without additional reinforcement
- 4) $\gamma = 90^\circ$ - **transversal pull** (tilting) with reinforcement at anchorage zone* + transversal pull reinf.
- 5) $\beta > 60^\circ$ - not permissible

* - for thin-walled elements

** - angled pull without additional angled pull reinforcement permissible when concrete strength and element thickness:

- $\geq 15 \text{ N/mm}^2$ and $t \geq 3 \times t_{\min}$
- $\geq 25 \text{ N/mm}^2$ and $t \geq 2,5 \times t_{\min}$
- $\geq 35 \text{ N/mm}^2$ and $t \geq 2 \times t_{\min}$, where $t_{\min} = 2 \times C$

Table 6: Permissible loads

Load group [t]	Load range F [t]	Permissible loads		
		Straight pull ($\beta < 30^\circ$; $\gamma < 15^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]	Tilting ($\gamma = 90^\circ$): $F_3 = 50\% F$ [kN]
2,5	0,7	7	5,6	3,5
	1,4	14	11,2	7
	2,0	20	16	10
	2,5	25	20	12,5
5,0	3,0	30	24	15
	4,0	40	32	20
	5,0	50	40	25
10,0	5,3	53	42,4	26,5
	7,5	75	60	37,5
	10,0	100	80	50
26,0	14,0	140	112	70
	22,0	220	176	110

* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement

Reinforcement at anchorage zone for thin-walled elements:

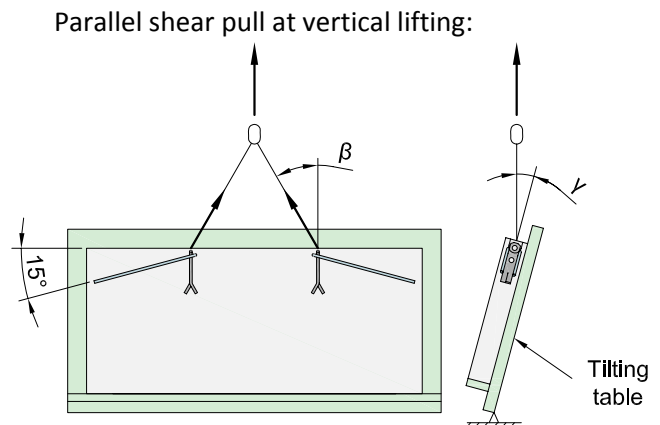
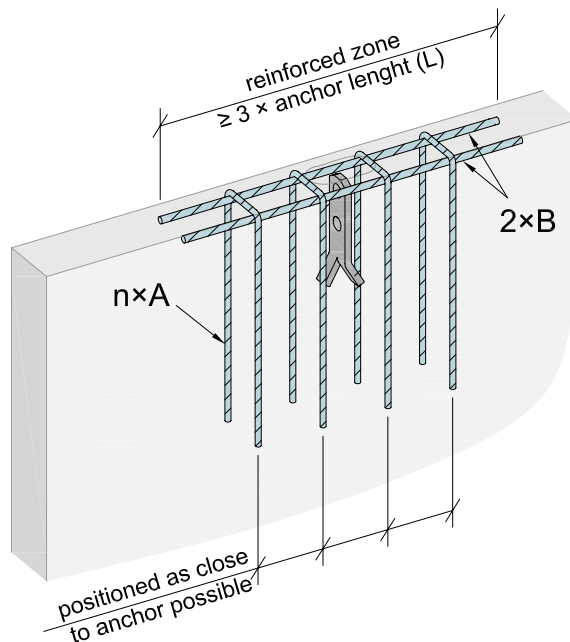
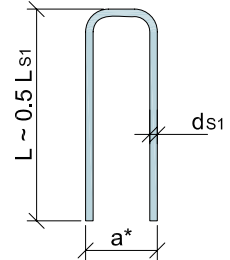


Table 7: Anchor zone reinforcement bars A, B (according to DIN 1045-1)

Load group [t]	Load range [t]	number of A [pc]		d_{s1} [mm]	L_{s1} [mm]	d_{s2} [mm]
		$\beta < 30^\circ$	$\beta > 30^\circ$			
2,5	0,7	2	4	6	300	6
	1,4	2	4	6	400	6
	2,0	2	4	6	500	6
	2,5	2	4	8	600	8
5,0	3,0	2	4	8	700	8
	4,0	2	4	8	800	8
	5,0	2	4	10	800	10
10,0	7,5	4	4	10	800	10
	10,0	6	6	10	1000	12
26,0	14,0	6	8	10	1000	14
	22,0	8	8	10	1200	14

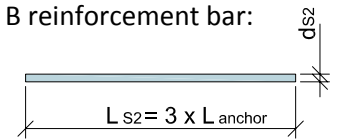
Reinforcement steel: Yield strength 500N/mm²
Tensile strength 550 N/mm²

A reinforcement bar:

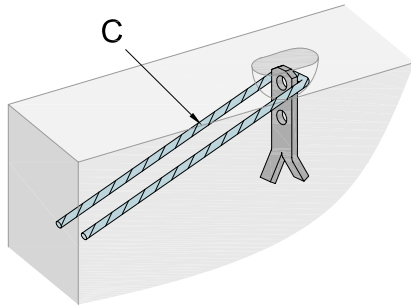


* a – depends on the component thickness

B reinforcement bar:



Additional parallel shear pull reinforcement*:



The parallel shear pull reinforcement must be installed in opposite direction to the horizontal force components. The reinforcement must be fixed to the Transport Anchor TPA-S with a tying wire. Close contact is important!

*angled pull without additional angled pull reinforcement permissible when concrete strength and element thickness:

- $\geq 15 \text{ N/mm}^2$ and $t \geq 3 \times t_{\min}$
- $\geq 25 \text{ N/mm}^2$ and $t \geq 2,5 \times t_{\min}$
- $\geq 35 \text{ N/mm}^2$ and $t \geq 2 \times t_{\min}$,

where $t_{\min} = 2 \times C$

C reinforcement bar:

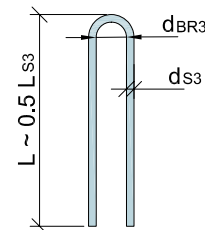


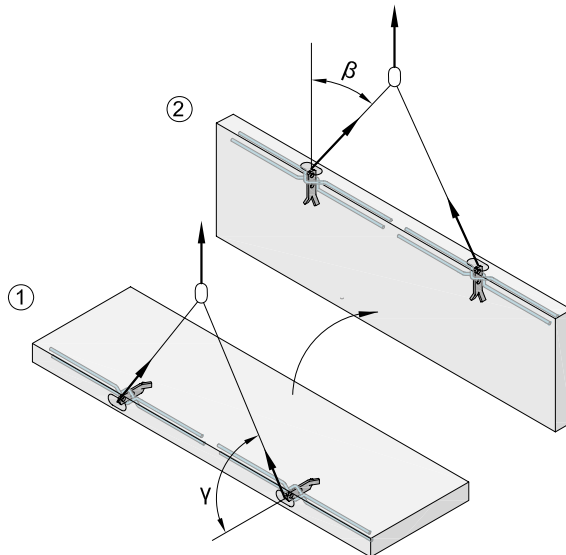
Table 8: Anchor zone reinforcement bar C (according to DIN 1045-1)

Load group [t]	Load range [t]	d_{s3} [mm]	d_{BR3} [mm]	L_{s3} [mm]
2,5	0,7	6	24	450
	1,4	6	24	900
	2,0	8	32	950
	2,5	8	32	1200
5,0	3,0	10	40	1150
	4,0	10	40	1500
	5,0	12	48	1550
10,0	7,5	14	56	2000
	10,0	16	64	2300
26,0	14,0	20	140	2600
	22,0	28	196	3450

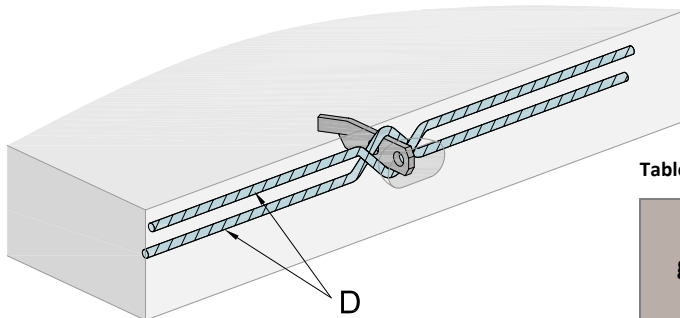
Reinforcement steel: Yield strength 500N/mm²
Tensile strength 550 N/mm²

Transversal pull while lifting up a lying panel:

Transversal pull while lifting up a lying panel:

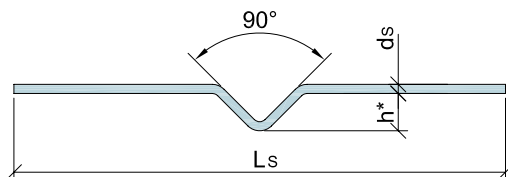


Transversal pull reinforcement:



The transversal pull reinforcement must be fixed to the Transport Anchor TPA-S with a tying wire. Close contact is important!

D reinforcement bar:



* h- depends on the component thickness

Table 9: Transversal pull reinforcement bar D (acc. to DIN 1045-1)

Load group [t]	Load range [t]	d_s [mm]	L_s^* [mm]
2,5	0,7	8	600
	1,4	10	700
	2,0	10	750
	2,5	12	800
5,0	3,0	12	850
	4,0	14	950
	5,0	16	1000
10,0	7,5	20	1200
	10,0	20	1500
26,0	14,0	25	1800
	22,0	28	1800

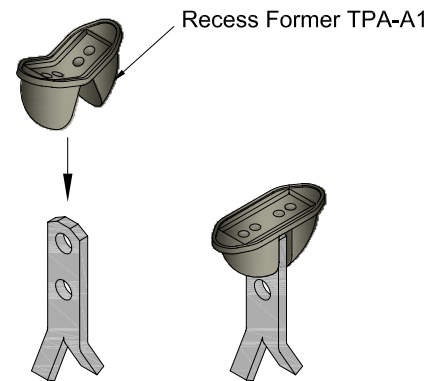
* L_s – length before bending reinforcement steel

Reinforcement steel: Yield strength 500N/mm²

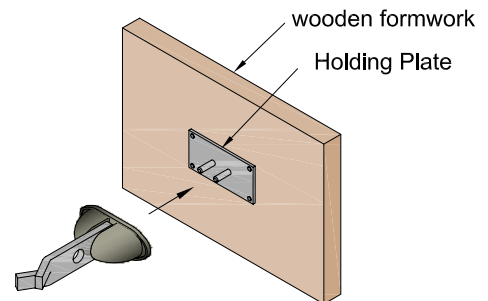
Tensile strength 550 N/mm²

4. Accessories of Installation

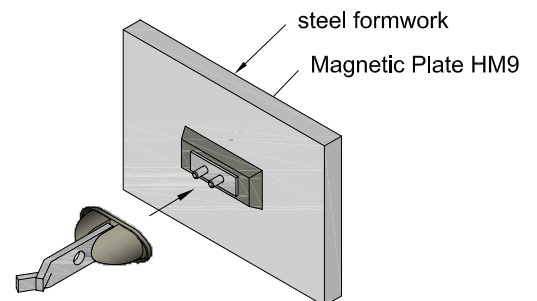
Recess Former TPA-A1 (for more information, see pages 50-51) is used to attach Transport Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



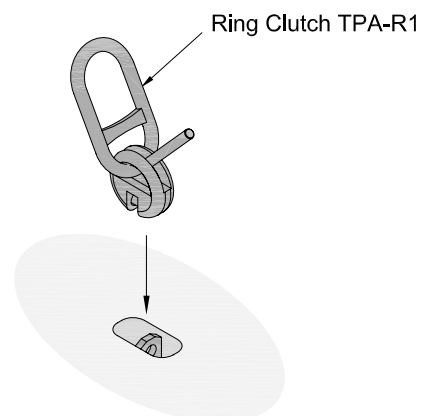
Holding Plate (for more information, see page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Transport Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, see page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Transport Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, see page 54-56) for the load group is inserted in the concrete recess over the head of Transport Anchor.



Transport Anchor TPA-2

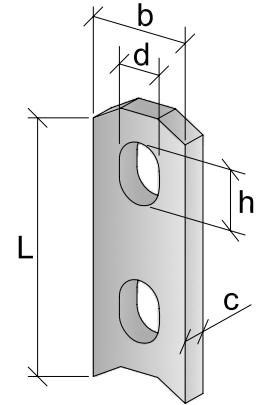
Transport Anchor TPA-2 is suitable for load ranges 0,7 to 22,0. Transport Anchor TPA-2 is similar to the Transport Anchor TPA-S, except this anchor utilizes additional reinforcement passed through the hole for anchorage.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional hole in the anchor is for additional reinforcement.

The components of the system are classified in 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 stress transfer to the concrete occurs through the reinforcement bar.

Transport Anchor TPA-2 can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Material:

- steel S355J2, $f_{uk} \geq 510 \text{ N/mm}^2$

Main application: prestressed concrete trusses, thin-walled elements

Table 1: Transport Anchor TPA-2

Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	h [mm]
TPA-Z-0,7-09	2,5	0,7	90	30	5	14	20
TPA-Z-1,4-09		1,4	90	30	6	14	20
TPA-Z-2,0-09		2,0	90	30	8	14	20
TPA-Z-2,5-09		2,5	90	30	10	14	20
TPA-Z-3,0-12	5,0	3,0	120	40	10	18	22
TPA-Z-4,0-12		4,0	120	40	12	18	22
TPA-Z-5,0-12		5,0	120	40	15	18	22
TPA-Z-5,3-16	10,0	5,3	160	60	12	26	26
TPA-Z-7,5-16		7,5	160	60	16	26	26
TPA-Z-10,0-17		10,0	170	60	20	29	29
TPA-Z-14,0-24	26,0	14,0	240	80	20	35	35
TPA-Z-22,0-30		22,0	300	90	25	35	35
TPA-Z-26,0-30		26,0	300	120	30	35	46

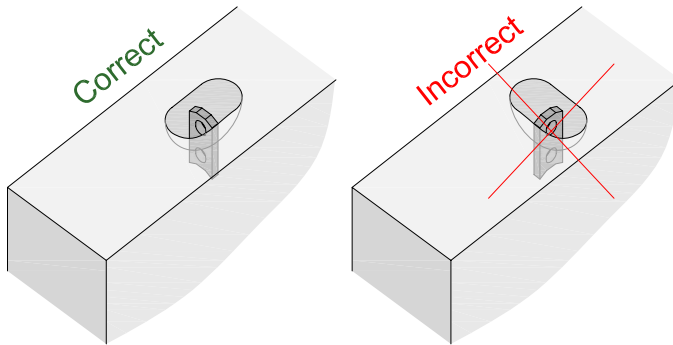
Installation Instructions for Transport Anchors TPA-2

1. Spacing of Transport Anchors TPA-2 and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]
2,5	10
5,0	10
10,0	15
26,0	15

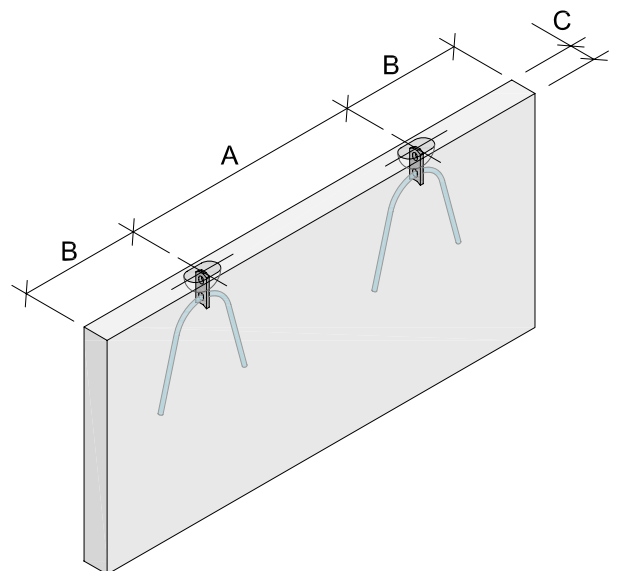
Orientation of installation:



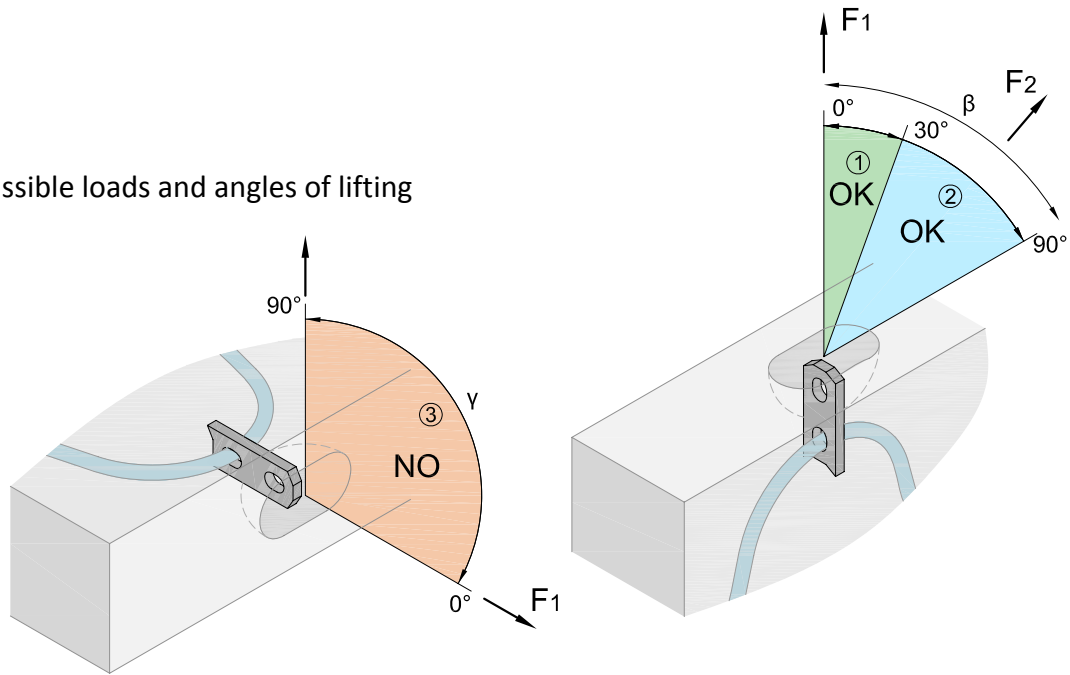
Transport Anchors TPA-2 may only be installed in wall elements with the flat steel at right-angles of the slab

Table 3: Minimal dimensions

Article	A _{min} [mm]	B _{min} = 0,5A [mm]	C _{min} [mm]
TPA-Z-0,7-09	400	200	70
TPA-Z-1,4-09	500	250	80
TPA-Z-2,0-09	500	300	90
TPA-Z-2,5-09	600	300	100
TPA-Z-3,0-12	650	325	100
TPA-Z-4,0-12	700	350	110
TPA-Z-5,0-12	800	400	120
TPA-Z-5,3-16	800	400	130
TPA-Z-7,5-16	1000	500	140
TPA-Z-10,0-17	1200	600	180
TPA-Z-14,0-24	1500	750	200
TPA-Z-22,0-30	1900	950	260
TPA-Z-26,0-30	2300	1000	300



2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull**
- 2) $30^\circ < \beta < 90^\circ$ - **angled pull** (with additional reinforcement)
- 3) $\gamma > 0^\circ$ - **not permissible**

Table 4: Permissible loads

Load group [t]	Load range F [t]	Permissible loads	
		Straight pull ($\beta < 30^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($\beta > 30^\circ$): $F_2 = 80\% F$ [kN]
2,5	0,7	7	5,6
	1,4	14	11,2
	2,0	20	16
	2,5	25	20
5,0	3,0	30	24
	4,0	40	32
	5,0	50	40
10,0	5,3	53	42
	7,5	75	60
	10,0	100	80
26,0	14,0	140	112
	22,0	220	176
	26,0	260	208

3. Reinforcement

Pull reinforcement:

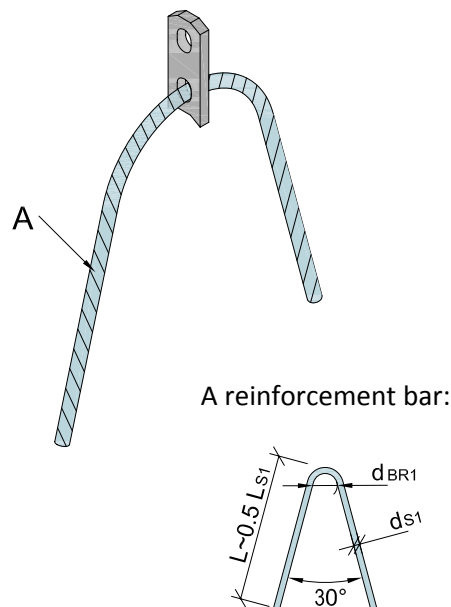
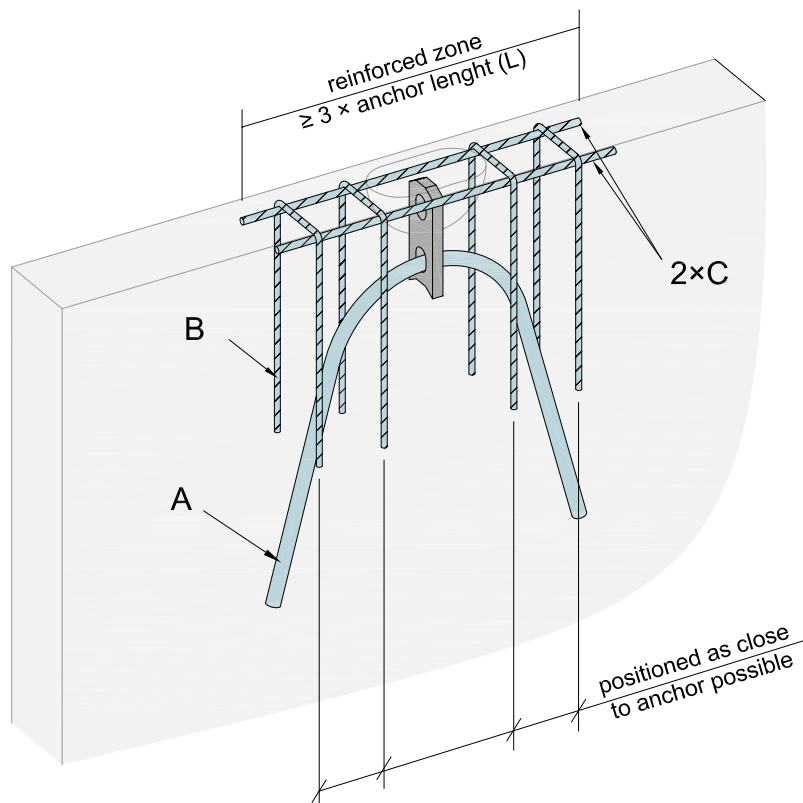


Table 5: Pull reinforcement bar A

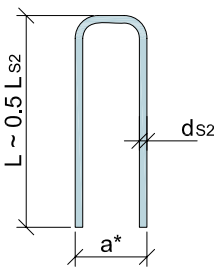
Load group [t]	Load range [t]	$n \times d_{s1}$ [mm]	d_{BR1} [mm]	L_{s1} [mm]
2,5	0,7	1 Ø8	80	450
	1,4	1 Ø10	100	650
	2,0	1 Ø12	120	750
	2,5	1 Ø12	120	900
5,0	3,0	1 Ø14	140	950
	4,0	1 Ø16	160	1100
	5,0	1 Ø16	160	1300
10,0	5,3	1 Ø16	160	1400
	7,5	1 Ø20	200	1600
	10,0	1 Ø25	250	1750
26,0	14,0	1 Ø28	280	2150
	22,0	1 Ø28	280	3100
	26,0	2 Ø28	280	2650

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

Reinforcement at anchorage zone:

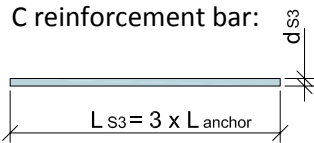


B reinforcement bar:

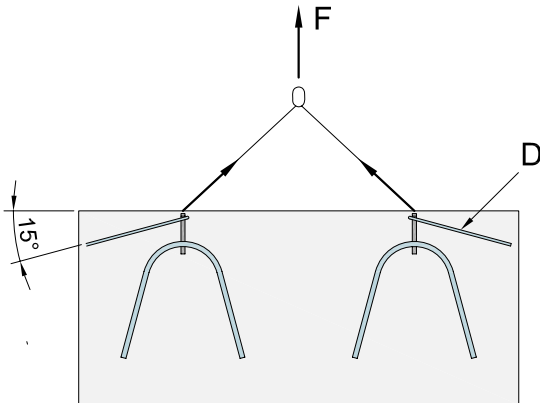


* a – depends on the panel thickness

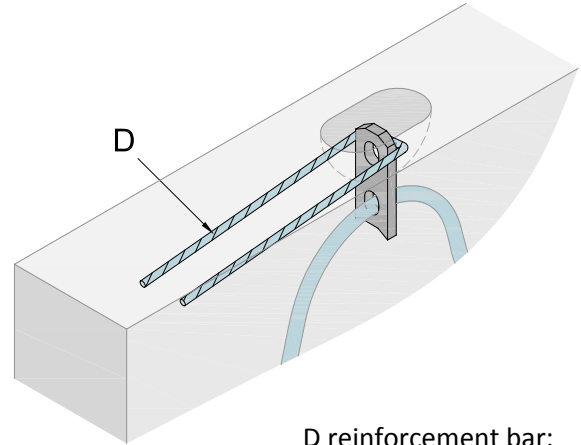
C reinforcement bar:



Parallel shear pull at vertical lifting:

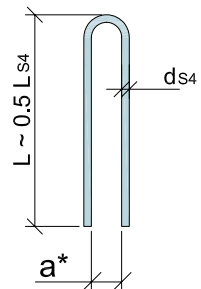


Additional parallel shear pull reinforcement:



The parallel shear pull reinforcement must be installed in opposite direction to the horizontal force components. Close contact is important!

D reinforcement bar:



*-a depends on the component thickness

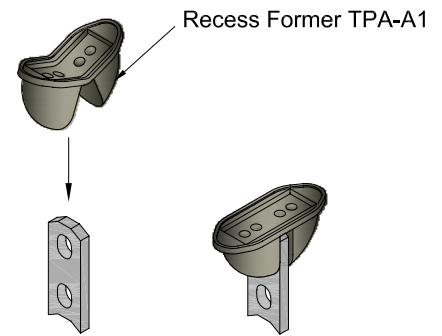
Table 6: Anchor zone reinforcement bars B, C, parallel shear pull reinforcement bar D

Load group [t]	Load range [t]	$\beta < 30^\circ$			$\beta > 30^\circ$					
		B		C	B		C	D		
		$n \times d_{s2}$ [mm]	L_{s2} [mm]	d_{s3} [mm]	$n \times d_{s2}$ [mm]	L_{s2} [mm]	d_{s3} [mm]	d_{s4} [mm]	L_{s4} [mm]	d_{BR4} [mm]
2,5	0,7	2 Ø6	400	constr.	4 Ø6	400	Ø8	Ø6	600	45
	1,4	2 Ø6	400	constr.	4 Ø6	400	Ø8	Ø6	900	45
	2,0	2 Ø6	500	constr.	4 Ø6	500	Ø8	Ø8	950	45
	2,5	2 Ø8	600	Ø8	4 Ø8	600	Ø10	Ø8	1200	45
5,0	3,0	2 Ø8	700	Ø8	4 Ø8	700	Ø10	Ø10	1150	50
	4,0	2 Ø8	700	Ø8	4 Ø8	700	Ø12	Ø12	1500	50
	5,0	2 Ø8	800	Ø8	4 Ø10	800	Ø12	Ø12	1550	50
10,0	5,3	2 Ø8	850	Ø8	4 Ø10	800	Ø12	Ø12	1700	70
	7,5	2 Ø10	1000	Ø10	4 Ø10	900	Ø12	Ø14	2000	70
	10,0	4 Ø10	850	Ø12	6 Ø10	900	Ø14	Ø16	2300	70
26,0	14,0	4 Ø10	1100	Ø14	8 Ø10	1000	Ø20	Ø20	2600	120
	22,0	4 Ø12	1400	Ø16	8 Ø12	1250	Ø25	Ø25	3000	120
	26,0	6 Ø12	1350	Ø20	8 Ø14	1350	Ø25	Ø28	3450	120

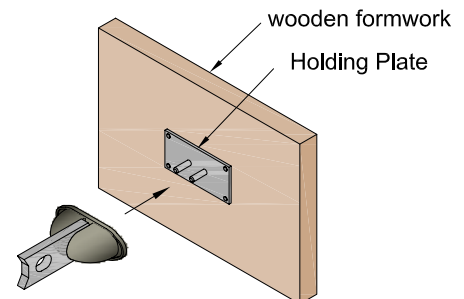
Reinforcement steel: Yield strength 500N/mm², Tensile strength 550 N/mm²

4. Accessories of Installation

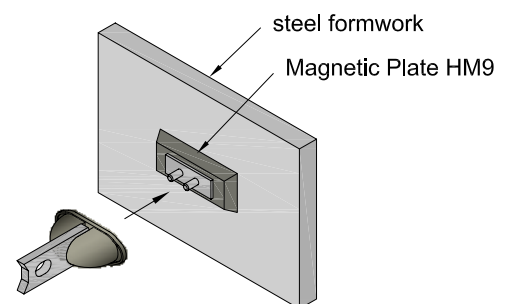
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Transport Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



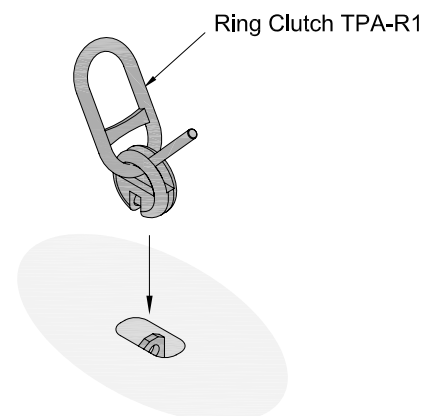
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Transport Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Transport Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Transport Anchor.



Transport Anchor TPA-SA

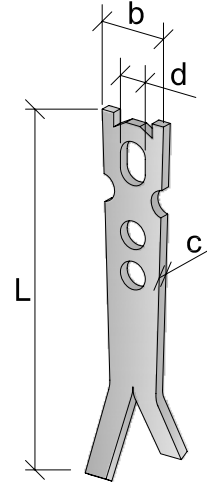
Transport Anchor TPA-SA is suitable for load ranges 0,7 to 22,0. Transport Anchor TPA-SA is designed for tilting panels from the horizontal to the vertical. The anchor is used for erecting and turning thin-walled precast units in both directions.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional hole in the anchor is for additional reinforcement. The anchor head is designed so that loads are not transferred to the upper part of the concrete surface.

The stress transfer to the concrete occurs through the reinforcement bar, which is laid over both sides of the anchor.

The components of the system are classified in 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.

Transport Anchors TPA-SA can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Materials:

- stainless steel A4 or
- zinc-plated

Main application: thin-walled concrete elements, being lifted from a horizontal to a perpendicular position

Table 1: Transport Anchor TPA-SA

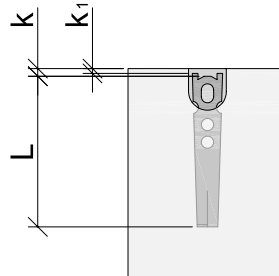
Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-SA-1,4-20	2,5	1,4	200	50	6	15×15	38
TPA-SA-2,5-23		2,5	230	50	10	15×15	67.4
TPA-SA-4,0-27	5,0	4,0	270	70	12	20×20	144.6
TPA-SA-5,0-29		5,0	290	70	15	20×20	189.4
TPA-SA-7,5-32	10,0	7,5	320	100	15	29×29	376
TPA-SA-10,0-39		10,0	390	100	20	29×29	416
TPA-SA-12,5-50	26,0	12,5	500	150	20	36×46	643.8
TPA-SA-17,0-50		17,0	500	150	25	34×46	682
TPA-SA-22,0-50		22,0	500	150	30	36×46	996

Installation Instructions for Transport Anchor TPA-SA

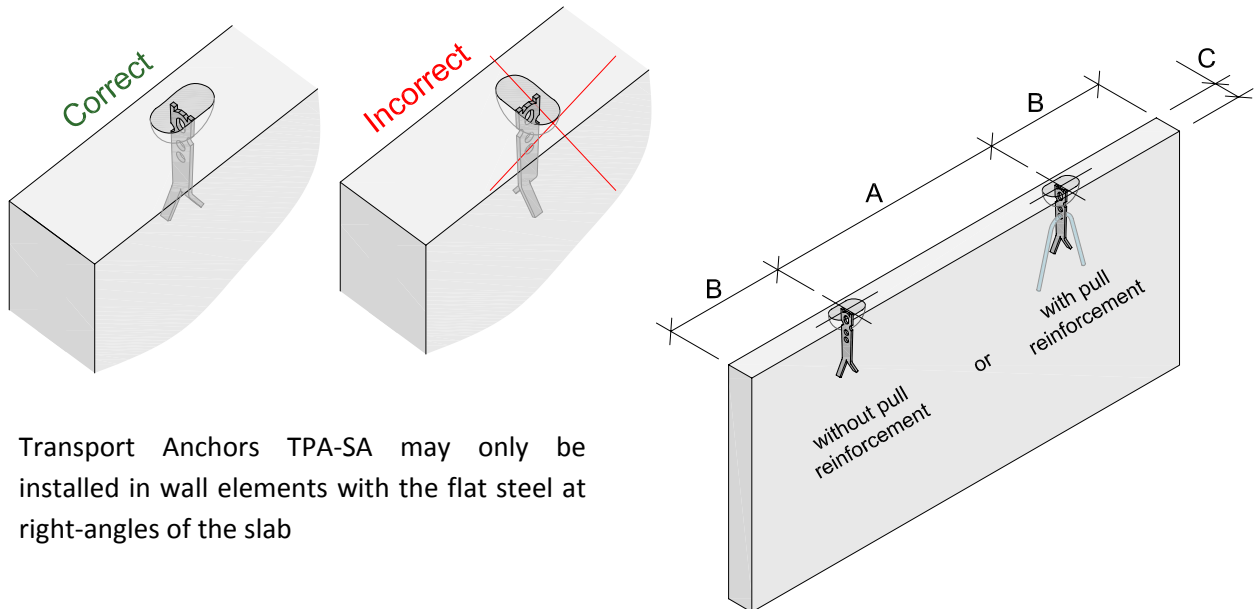
1. Spacing of Transport Anchors TPA-SA and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]	k ₁ [mm]
2,5	10	5
5,0	10	5
10,0	15	6
26,0	15	9



Orientation of installation:

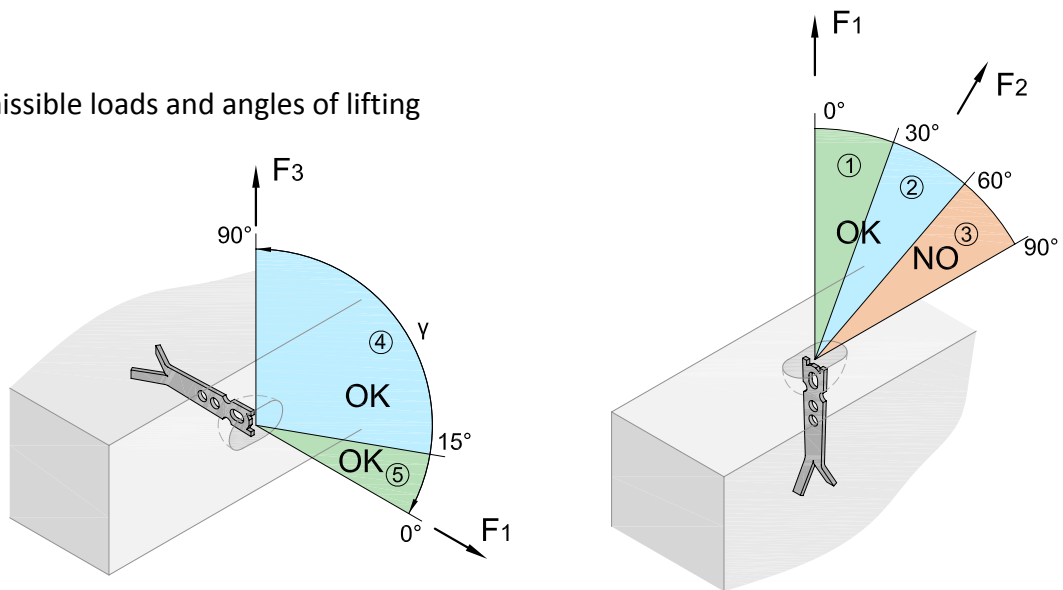


Transport Anchors TPA-SA may only be installed in wall elements with the flat steel at right-angles of the slab

Table 3: Minimal dimensions

Article	A _{min} [mm]	B _{min} = 0,5A [mm]	C _{min} [mm]	
			with pull reinforcement	without pull reinforcement
TPA-SA-1,4-20	700	350	100	100
TPA-SA-2,5-23	800	400	120	120
TPA-SA-4,0-27	950	475	150	150
TPA-SA-5,0-29	1000	500	160	180
TPA-SA-7,5-32	1200	600	175	200
TPA-SA-10,0-3.9	1500	750	200	250
TPA-SA-12,5-50	1500	750	240	320
TPA-SA-17,0-50	1500	750	300	380
TPA-SA-22,0-50	1500	750	360	450

2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull**
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull**
- 3) $\beta > 60^\circ$ - **not permissible**
- 4) $\gamma < 15^\circ$ - **straight pull** (tilting from tilting table)
- 5) $15^\circ < \gamma < 90^\circ$ - **transversal pull** (lifting up a laying panel)

Table 4: Required reinforcement

Reinforcement type	Angle β		Angle γ	
	$\beta < 30^\circ$	$30^\circ < \beta < 60^\circ$	$\gamma < 15^\circ$	$15^\circ < \gamma < 90^\circ$
reinforcement at anchorage zone	+	+	+	+
pull reinforcement*	- / +	- / +	- / +	- / +
transversal reinforcement**	-	+	-	+

*- in very thin panels only or in panels with a single-layer reinforcement

** - transversal reinforcement also acts as angled pull reinforcement, no additional angled pull reinforcement is required

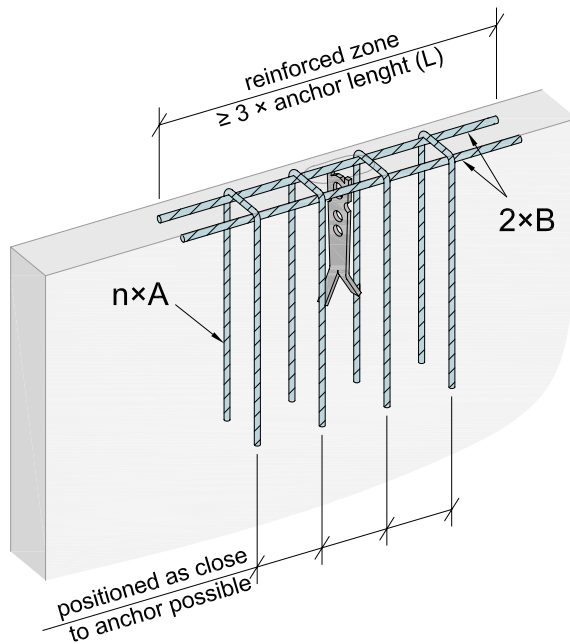
Table 5: Permissible loads

Load group [t]	Load range F [t]	Permissible loads		
		Straight pull ($\beta < 30^\circ$; $\gamma < 15^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]	Tilting ($15^\circ < \gamma < 90^\circ$): $F_3 = 50\% F$ [kN]
2,5	1,4	14	11,2	7
	2,5	25	20	12,5
5,0	4,0	40	32	20
	5,0	50	40	25
10,0	7,5	75	60	37,5
	10,0	100	80	50
26,0	12,5	125	100	62,5
	17,0	170	136	85
	22,0	220	176	110

* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement

1) Reinforcement at anchorage zone without pull reinforcement:



2) Reinforcement at anchorage zone without pull reinforcement:

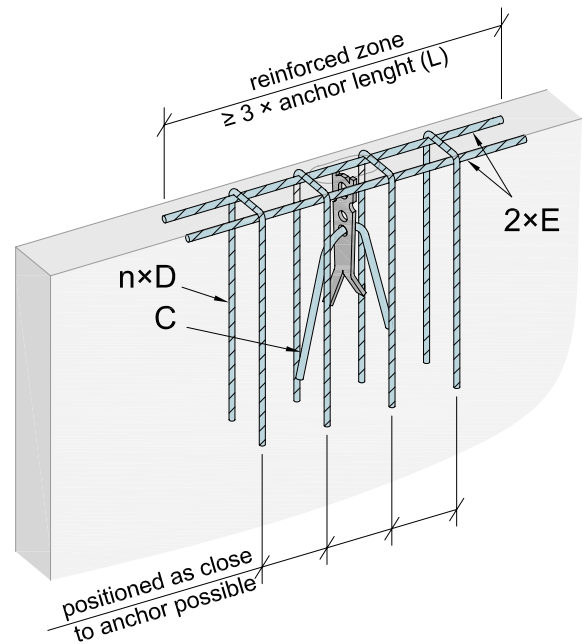
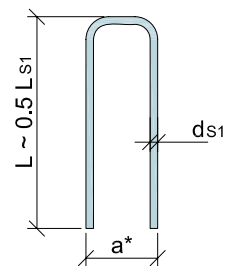


Table 6: Anchor zone (without pull reinforcement) reinforcement bars A, B (according to DIN 1045-1)

Article	number of A [pc]		d_{s1} [mm]	L_{s1} [mm]	d_{s2} [mm]
	$\beta < 30^\circ$	$\beta > 30^\circ$			
TPA-SA-1,4-20	2	4	6	400	6
TPA-SA-2,5-23	2	4	8	600	8
TPA-SA-4,0-27	2	4	8	800	8
TPA-SA-5,0-29	2	4	10	800	10
TPA-SA-7,5-32	4	4	10	800	10
TPA-SA-10,0-3.9	6	6	10	1000	12
TPA-SA-12,5-50					
TPA-SA-17,0-50	8	8	10	1200	14
TPA-SA-22,0-50					

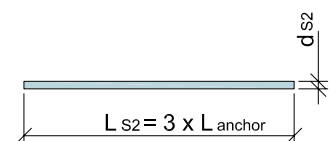
Reinforcement steel: Yield strength 500N/mm², Tensile strength 550 N/mm²

A reinforcement bar:



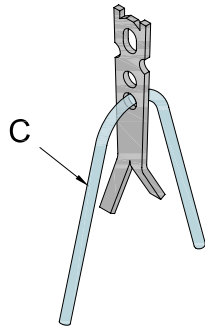
a – depends on the panel thickness

B reinforcement bar:



Pull reinforcement:

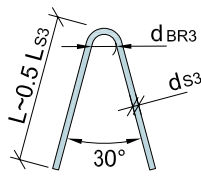
Table 7: Pull reinforcement bar C (according to DIN 1045-1)



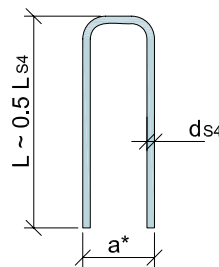
Article	d_{s3} [mm]	d_{BR3} [mm]	L_{s3} [mm]		
			concrete strength [N/mm ²]		
			≥15	≥25	≥35
TPA-SA-1,4-20	10	40	650	520	425
TPA-SA-2,5-23	12	48	1000	800	650
TPA-SA-4,0-27	16	64	1200	960	780
TPA-SA-5,0-29	16	64	1500	1200	975
TPA-SA-7,5-32	20	140	1750	1400	1140
TPA-SA-10,0-3.9	20	140	1900	1520	1235
TPA-SA-12,5-50	25	175	2200	1760	1430
TPA-SA-17,0-50	28	196	2500	8000	1625
TPA-SA-22,0-50	28	196	3000	2400	1950

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

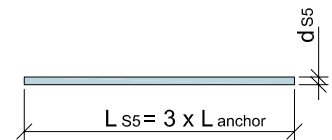
C reinforcement bar:



D reinforcement bar:



E reinforcement bar:



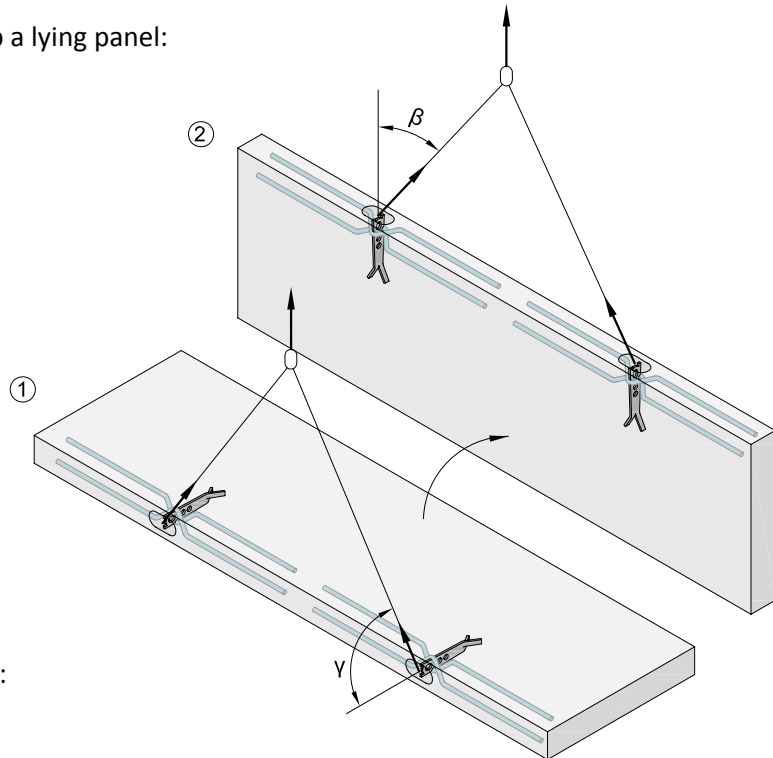
* - a depends on the component thickness

Table 8: Anchor zone (with pull reinforcement) reinforcement bars D, E (according to DIN 1045-1)

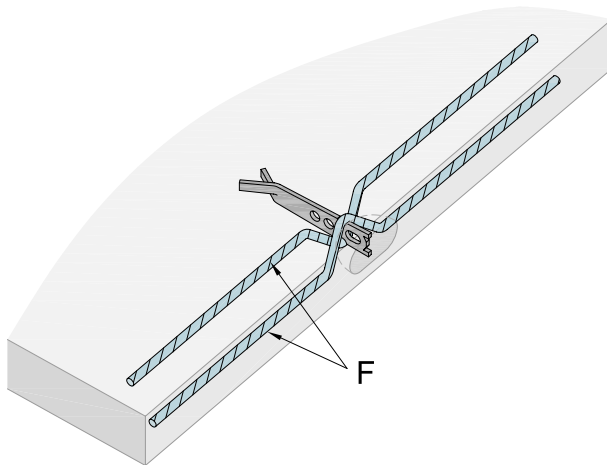
Article	$\beta < 30^\circ$				$\beta > 30^\circ$			
	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]
TPA-SA-1,4-20	2	6	400	6	4	6	400	8
TPA-SA-2,5-23	2	6	500	6	4	6	500	8
TPA-SA-4,0-27	2	8	700	6	4	8	800	12
TPA-SA-5,0-29	2	8	800	6	4	10	800	12
TPA-SA-7,5-32	2	10	800	10	4	10	800	12
TPA-SA-10,0-3.9	4	10	800	12	6	10	1000	14
TPA-SA-22,0-50	4	12	1200	14	8	10	1200	16

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

Transversal pull while lifting up a lying panel:

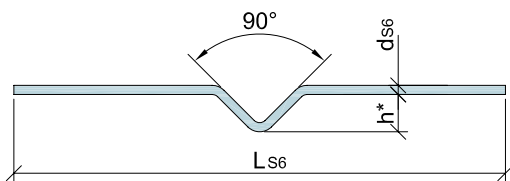


Transversal pull reinforcement:



The transversal pull reinforcement must be fixed to the Erection Anchor with a tying wire. Close contact is important!

F reinforcement bar:



* h- depends on the component thickness

Table 9: Transversal pull reinforcement bar F (acc. to DIN 1045-1)

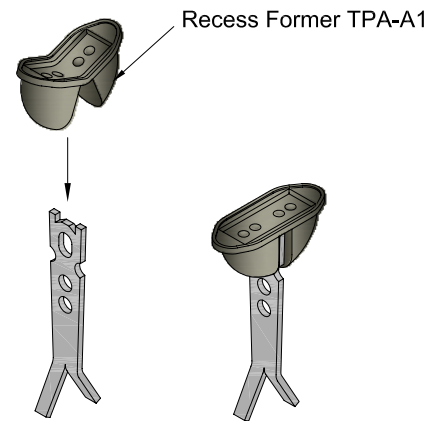
Article	d_{s4} [mm]	L_{s4}^* [mm]
TPA-SA-1,4-20	10	700
TPA-SA-2,5-23	12	800
TPA-SA-4,0-27	14	950
TPA-SA-5,0-29	16	1000
TPA-SA-7,5-32	20	1200
TPA-SA-10,0-3.9	20	1500
TPA-SA-12,5-50	25	1500
TPA-SA-17,0-50	25	1800
TPA-SA-22,0-50	25	1800

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

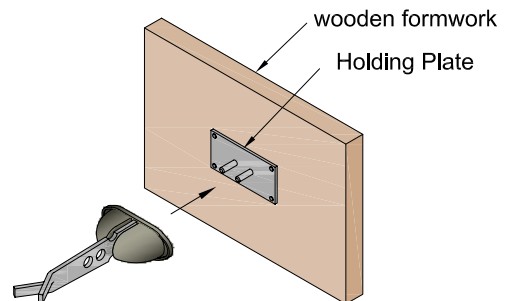
* L_s – length before bending reinforcement steel

4. Accessories of Installation

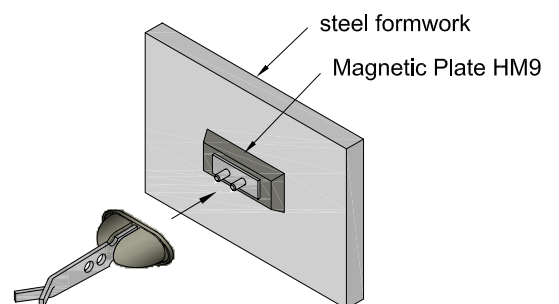
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Transport Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



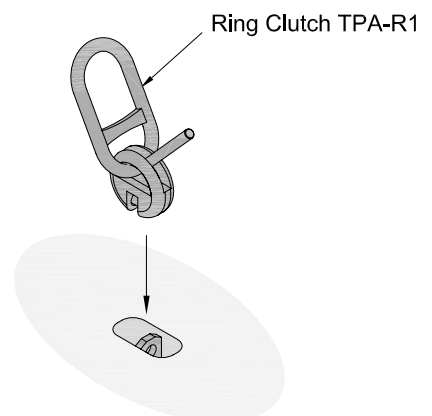
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Transport Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former to a steel formwork. The Recess Former with inserted Transport Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Transport Anchor.



Transport Anchor TPA-SE

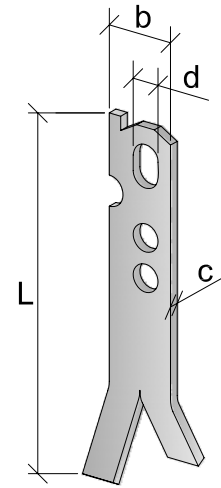
Transport Anchor TPA-SE is suitable for load ranges 0,7 to 22,0. Transport Anchor TPA-SE is designed for tilting panels from the horizontal to the vertical. The anchor is used for erecting and turning thin-walled precast units in one direction.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional hole in the anchor is for additional reinforcement. The anchor head is designed so that loads are not transferred to the upper part of the concrete surface.

The stress transfer to the concrete occurs through the reinforcement bar, which is laid over both sides of the anchor.

The components of the system are classified in 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.

Transport Anchors TPA-SE can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Materials:

- stainless steel A4 or
- zinc-plated

Main application: thin-walled concrete elements, being lifted from a horizontal to a perpendicular position

Table 1: Transport Anchor TPA-SE

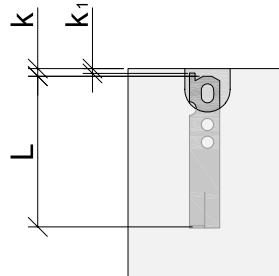
Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-SE-1,4-20	2,5	1,4	200	40	6	15×15	32
TPA-SE-2,5-23		2,5	230	40	10	15×15	63
TPA-SE-4,0-27	5,0	4,0	270	55	12	20×20	125
TPA-SE-5,0-29		5,0	290	55	15	20×20	164
TPA-SE-7,5-32	10,0	7,5	320	80	15	29×29	265.2
TPA-SE-10,0-39		10,0	390	80	20	29×29	441.6
TPA-SE-12,5-50	26,0	12,5	500	115	20	34×46	850
TPA-SE-17,0-50		17,0	500	115	25	34×46	1080
TPA-SE-22,0-50		22,0	500	115	30	34×46	1300

Installation Instructions for Unilateral Erection Anchor

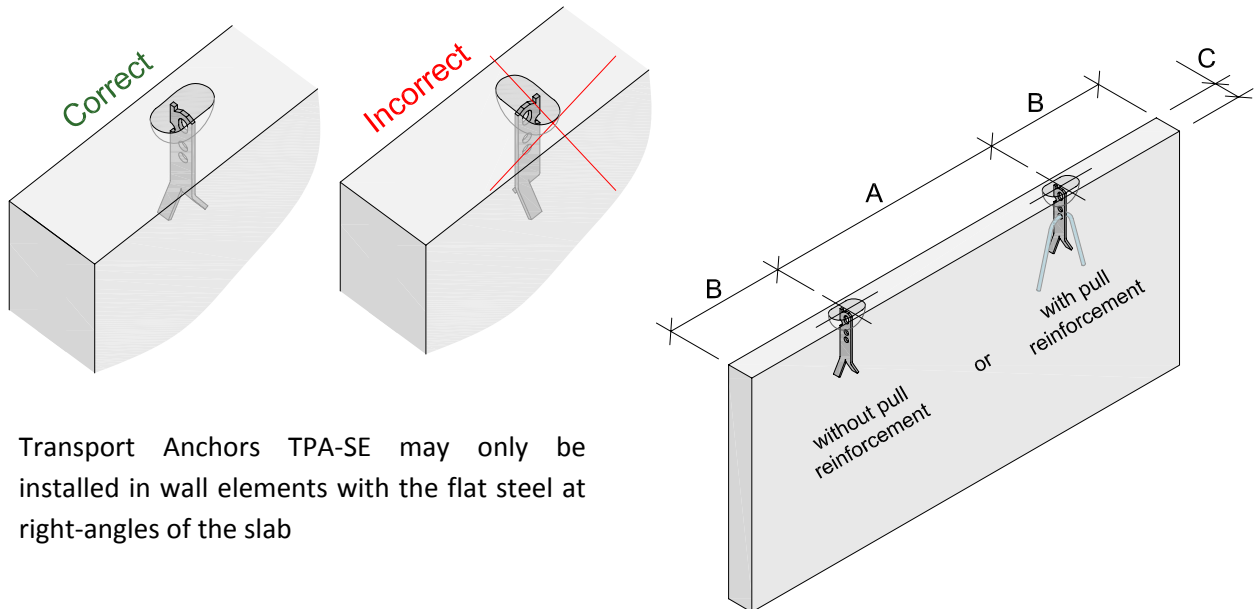
1. Spacing of Unilateral Erection Anchors and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]	k ₁ [mm]
2,5	10	5
5,0	10	5
10,0	15	6
26,0	15	9



Orientation of installation:

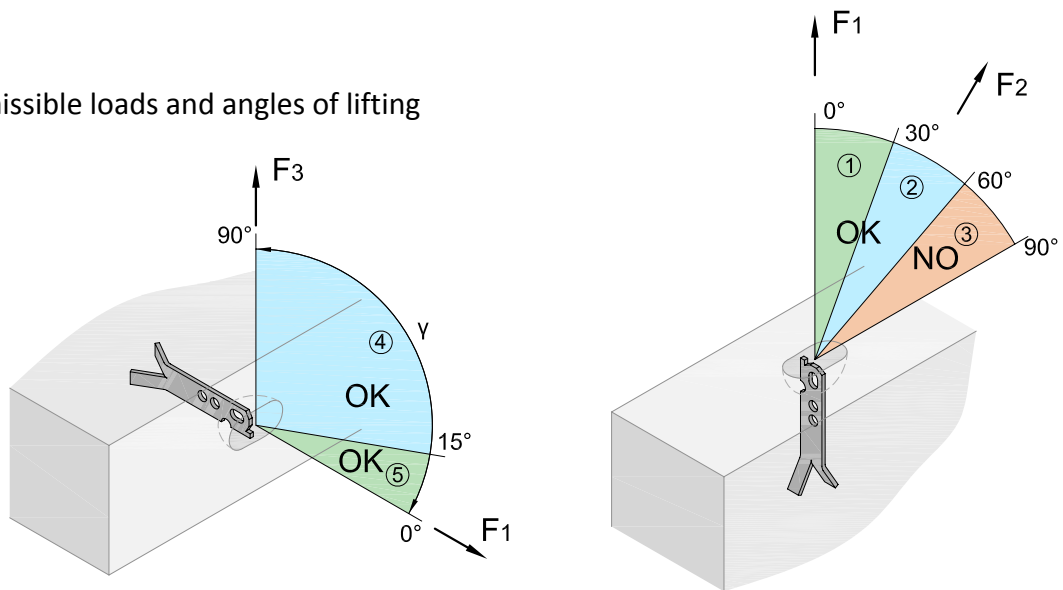


Transport Anchors TPA-SE may only be installed in wall elements with the flat steel at right-angles of the slab

Table 3: Minimal dimensions

Article	A _{min} [mm]	B _{min} = 0,5A [mm]	C _{min} [mm]	
			with pull reinforcement	without pull reinforcement
TPA-SE-1,4-20	700	350	90	90
TPA-SE-2,5-23	800	400	120	120
TPA-SE-4,0-27	950	475	140	150
TPA-SE-5,0-29	1000	500	140	180
TPA-SE-7,5-32	1200	600	160	200
TPA-SE-10,0-39	1500	750	200	250
TPA-SE-12,5-50	1500	750	240	320
TPA-SE-17,0-50	1500	750	300	380
TPA-SE-22,0-50	1500	750	360	450

2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull**
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull**
- 3) $\beta > 60^\circ$ - **not permissible**
- 4) $\gamma < 15^\circ$ - **straight pull** (tilting from tilting table)
- 5) $15^\circ < \gamma < 90^\circ$ - **transversal pull** (lifting up a laying panel)

Table 4: Required reinforcement

Reinforcement type	Angle β		Angle γ	
	$\beta < 30^\circ$	$30^\circ < \beta < 60^\circ$	$\gamma < 15^\circ$	$15^\circ < \gamma < 90^\circ$
reinforcement at anchorage zone	+	+	+	+
pull reinforcement*	- / +	- / +	- / +	- / +
transversal reinforcement**	-	+	-	+

*- in very thin panels only or in panels with a single-layer reinforcement

** - transversal reinforcement also acts as angled pull reinforcement, no additional angled pull reinforcement is required

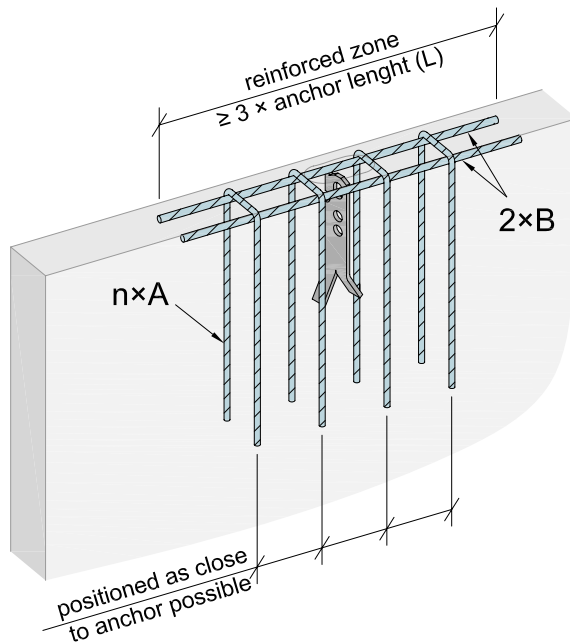
Table 5: Permissible loads

Load group [t]	Load range F [t]	Permissible loads		
		Straight pull ($\beta < 30^\circ$; $\gamma < 15^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]	Tilting ($15^\circ < \gamma < 90^\circ$): $F_3 = 50\% F$ [kN]
2,5	1,4	14	11,2	7
	2,5	25	20	12,5
5,0	4,0	40	32	20
	5,0	50	40	25
10,0	7,5	75	60	37,5
	10,0	100	80	50
26,0	12,5	125	100	62,5
	17,0	170	136	85
	22,0	220	176	110

* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement

1) Reinforcement at anchorage zone without pull reinforcement:



2) Reinforcement at anchorage zone without pull reinforcement:

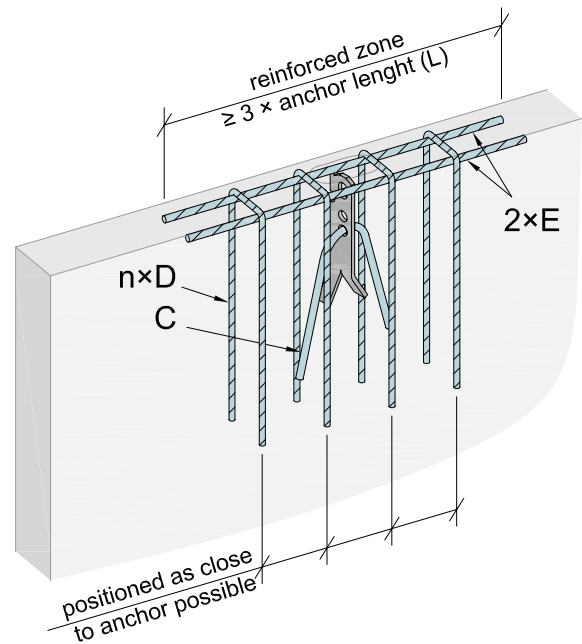
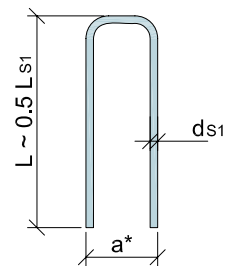


Table 6: Anchor zone (without pull reinforcement) reinforcement bars A, B (according to DIN 1045-1)

Article	number of A [pc]		d_{s1} [mm]	L_{s1} [mm]	d_{s2} [mm]
	$\beta < 30^\circ$	$\beta > 30^\circ$			
TPA-SE-1,4-20	2	4	6	400	6
TPA-SE-2,5-23	2	4	8	600	8
TPA-SE-4,0-27	2	4	8	800	8
TPA-SE-5,0-29	2	4	10	800	10
TPA-SE-7,5-32	4	4	10	800	10
TPA-SE-10,0-39	6	6	10	1000	12
TPA-SE-22,0-50	8	8	10	1200	14

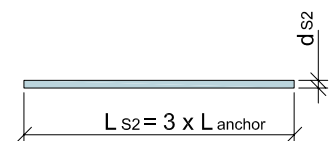
Reinforcement steel: Yield strength 500N/mm², Tensile strength 550 N/mm²

A reinforcement bar:



a – depends on the panel thickness

B reinforcement bar:



Pull reinforcement:

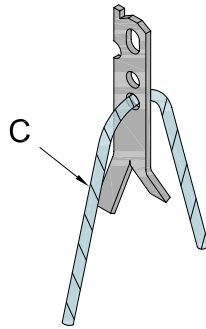
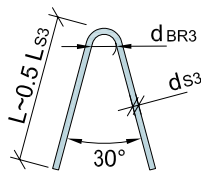


Table 7: Pull reinforcement bar C (according to DIN 1045-1)

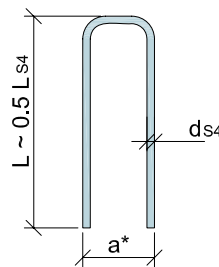
Article	d_{s3} [mm]	d_{BR3} [mm]	L_{s3} [mm]		
			concrete strength [N/mm ²]		
			≥15	≥25	≥35
TPA-SE-1,4-20	10	40	650	520	425
TPA-SE-2,5-23	12	48	1000	800	650
TPA-SE-4,0-27	16	64	1200	960	780
TPA-SE-5,0-29	16	64	1500	1200	975
TPA-SE-7,5-32	20	140	1750	1400	1140
TPA-SE-10,0-39	20	140	1900	1520	1235
TPA-SE-12,5-50	25	175	2200	1760	1430
TPA-SE-17,0-50	28	196	2500	2000	1625
TPA-SE-22,0-50	28	196	3000	2400	1950

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

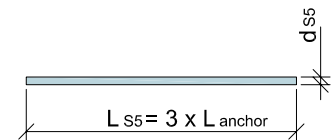
C reinforcement bar:



D reinforcement bar:



E reinforcement bar:



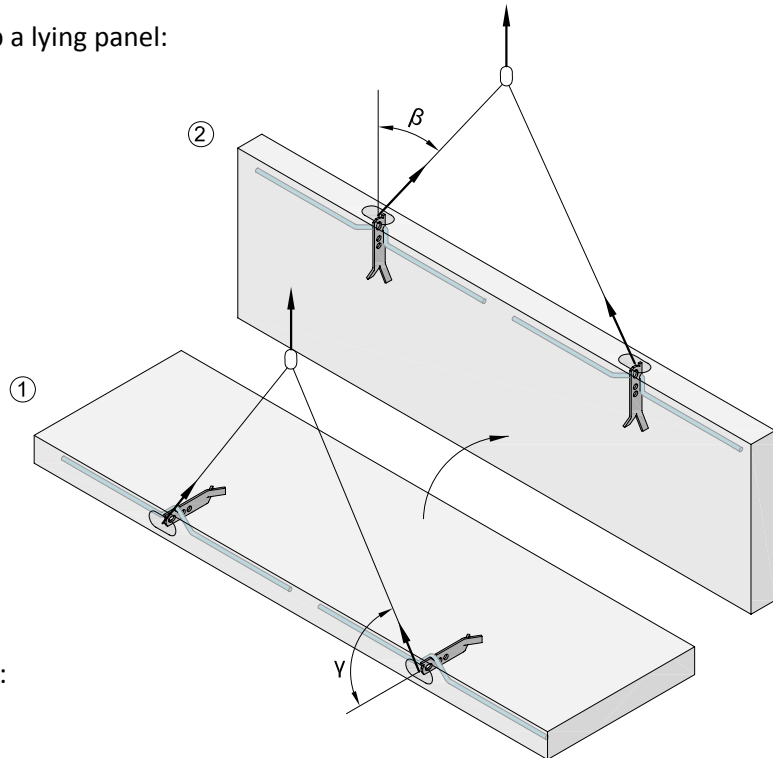
* - a depends on the component thickness

Table 8: Anchor zone (with pull reinforcement) reinforcement bars D, E (according to DIN 1045-1)

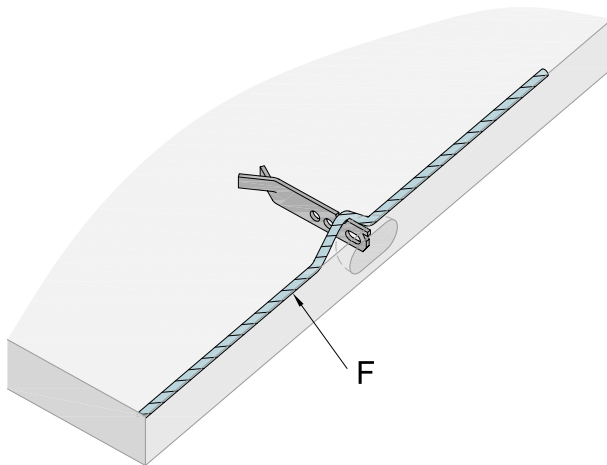
Article	$\beta < 30^\circ$				$\beta > 30^\circ$			
	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]
TPA-SE-1,4-20	2	6	400	6	4	6	400	8
TPA-SE-2,5-23	2	6	500	6	4	6	500	8
TPA-SE-4,0-27	2	8	700	6	4	8	800	12
TPA-SE-5,0-29	2	8	800	6	4	10	800	12
TPA-SE-7,5-32	2	10	800	10	4	10	800	12
TPA-SE-10,0-39	4	10	800	12	6	10	1000	14
TPA-SE-22,0-50	4	12	1200	14	8	10	1200	16

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

Transversal pull while lifting up a lying panel:

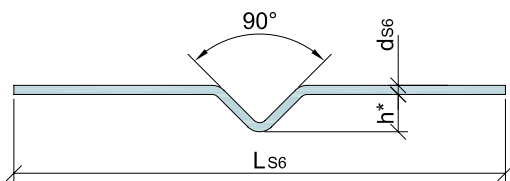


Transversal pull reinforcement:



The transversal pull reinforcement must be fixed to the Transport Anchor TPA-SE with a tying wire. Close contact is important!

F reinforcement bar:



* h- depends on the component thickness

Table 9: Transversal pull reinforcement bar F (acc. to DIN 1045-1)

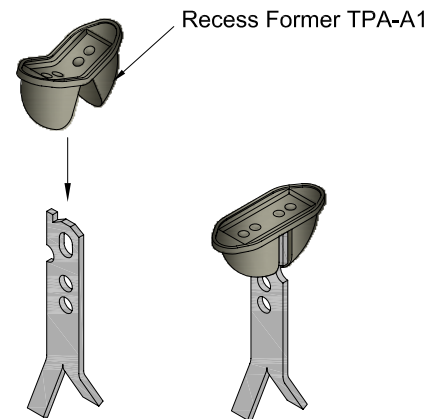
Article	d_{s4} [mm]	L_{s4}^* [mm]
TPA-SE-1,4-20	10	700
TPA-SE-2,5-23	12	800
TPA-SE-4,0-27	14	950
TPA-SE-5,0-29	16	1000
TPA-SE-7,5-32	20	1200
TPA-SE-10,0-39	20	1500
TPA-SE-12,5-50	25	1500
TPA-SE-17,0-50	25	1800
TPA-SE-22,0-50	25	1800

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

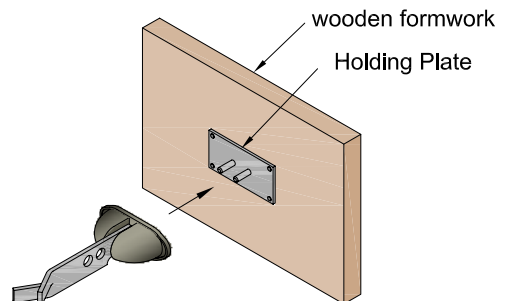
* L_s – length before bending reinforcement steel

4. Accessories of Installation

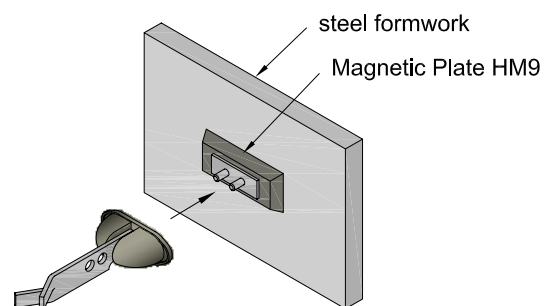
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Transport Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



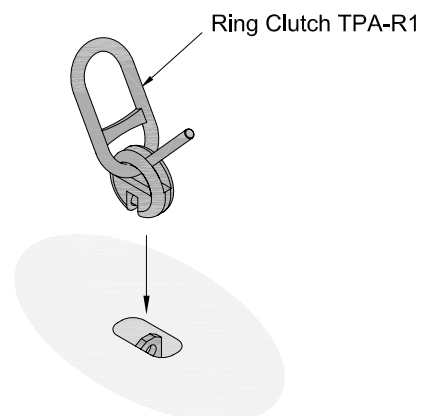
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Transport Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former to a steel formwork. The Recess Former with inserted Transport Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Transport Anchor.



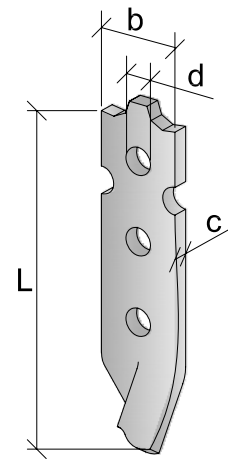
Universal Anchor TPA-U

Universal Anchor TPA-U combines the opportunities of Transport Anchor TPA-S, TPA-2, TPA-SA and TPA-SE with a very small recess in the precast element. Universal Anchor TPA-U is ideal for tilting, turning and lifting very thin precast concrete units.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional hole in the anchor is for additional pull reinforcement. The anchor head is designed so that loads are not transferred to the upper part of the concrete surface.

This is a special load group and not part of the normal load group system.

Universal Anchors TPA-U can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Materials:

- stainless steel V4 or
- zinc-plated

Main application: columns, beams, trusses, wall units, thin-walled units, thin-walled concrete elements, being lifted from a horizontal to a perpendicular

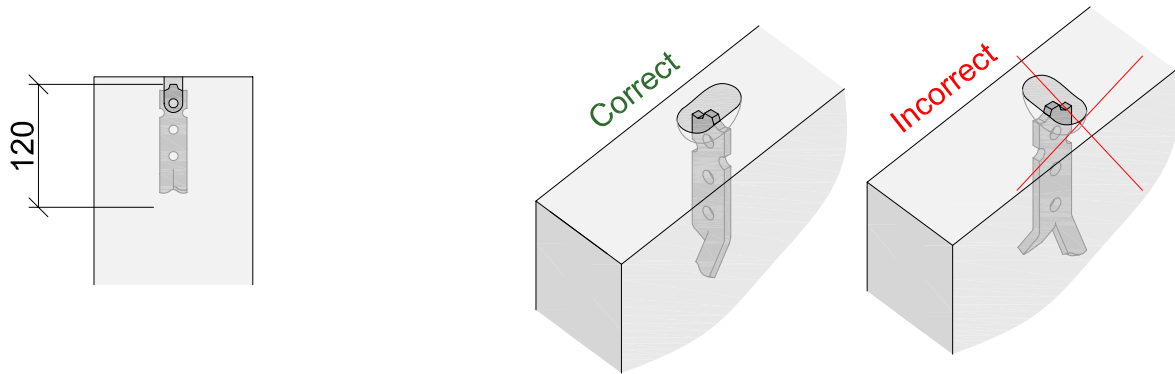
Table 1: Universal Anchor

Article	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Material	Weight [kg/100 pc]
TPA-U-1,25-12	1,25	125	30	6	10	without finish	14.6
TPA-U-1,25-152-FV	1,25	125	30	6	10	hot -dip zinc-plated	16.1
TPA-U-1,25-152-A2	1,25	125	30	6	10	stainless steel	14.6

Installation Instructions for Universal Anchor TPA-U

1. Spacing of Universal Anchors TPA-U and edge distances

Orientation of installation:



Universal Anchors TPA-U may only be installed in wall elements with the flat steel at right-angles of the slab

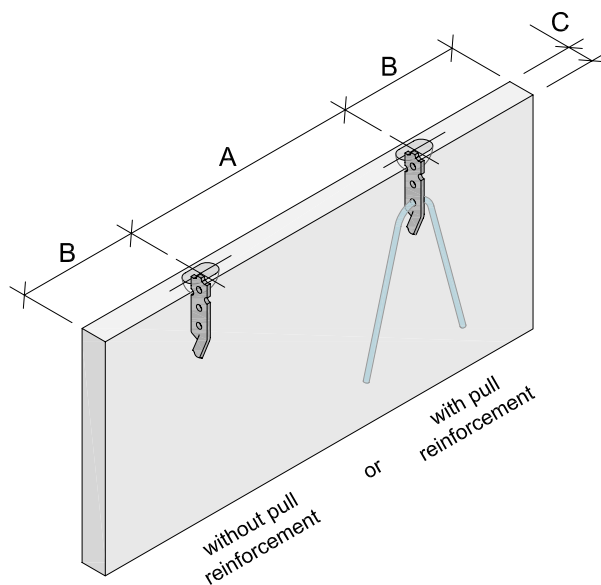
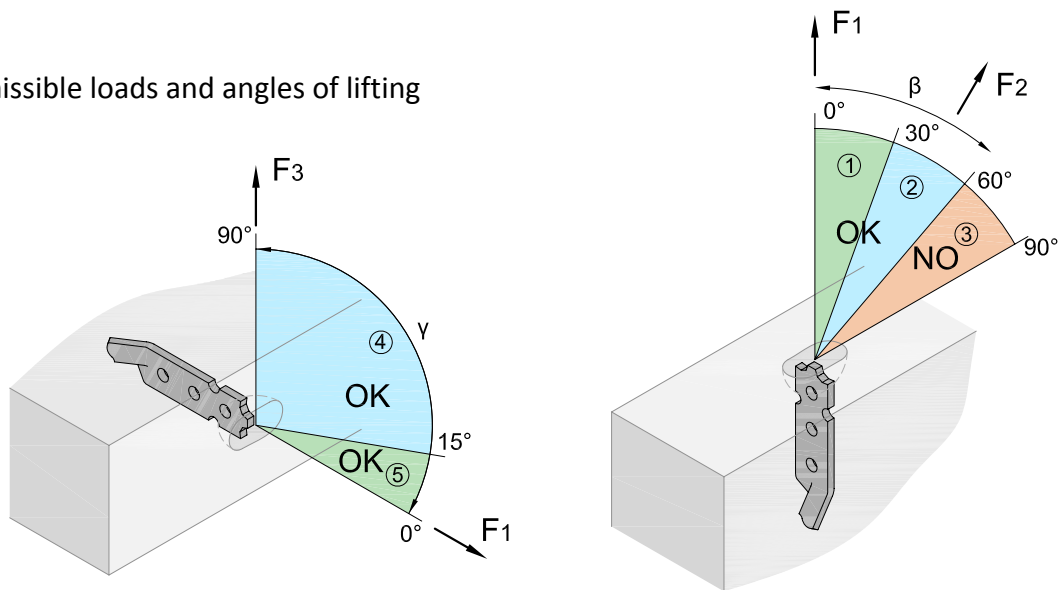


Table 2: Minimal dimensions

Article	A_{min} [mm]	$B_{min} = 0,5A$ [mm]	C_{min} [mm]
TPA-U-1,25-12	240	120	look at Table 4
TPA-U-1,25-152-FV			
TPA-U-1,25-152-A2			

2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull**
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull**
- 3) $\beta > 60^\circ$ - **not permissible**
- 4) $\gamma < 15^\circ$ - **straight pull** (tilting from tilting table)
- 5) $15^\circ < \gamma < 90^\circ$ - **transversal pull** (lifting up a laying panel)

Table 3: Required reinforcement

Reinforcement type	Angle β		Angle γ	
	$\beta < 30^\circ$	$30^\circ < \beta < 60^\circ$	$\gamma < 15^\circ$	$15^\circ < \gamma < 90^\circ$
reinforcement at anchorage zone	+	+	+	+
pull reinforcement*	- / +	- / +	- / +	- / +
transversal reinforcement**	-	+	-	+

*- in very thin panels only or in panels with a single-layer reinforcement

** - transversal reinforcement also acts as angled pull reinforcement, no additional angled pull reinforcement is required

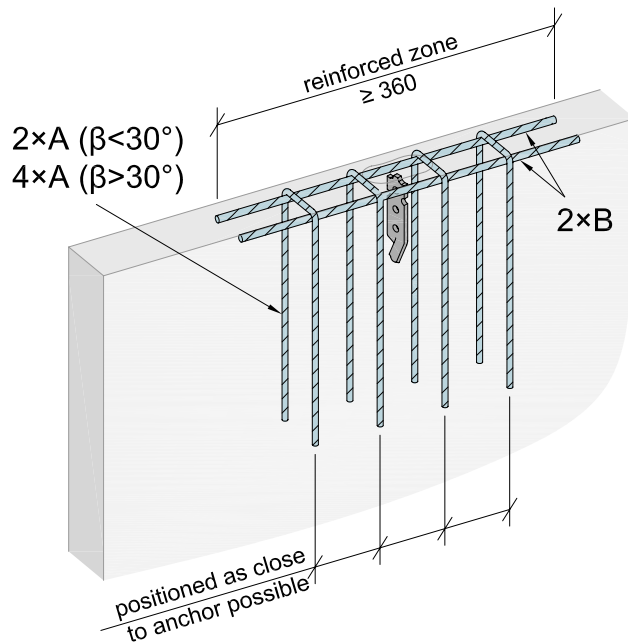
Table 4: Permissible loads

Load range F [t]	C _{min} [mm]	Permissible loads								
		Straight pull (β<30°; γ<15°): F ₁ [kN]			Angled pull (30°<β<60°): F ₂ [kN]			Tilting (15°<γ<90°): F ₃ [kN]		
		concrete strength (N/mm²)								
		≥15	≥25	≥35	≥15	≥25	≥35	≥15	≥25	≥35
1,25	60	10,0*	12,5*	12,5*	10,0*	12,5*	12,5*	-	-	-
	80	12,5*	12,5*	12,5*	10,0*	12,5*	12,5*	4,1	4,6	5,0
	100	12,5*	12,5	12,5	10,0*	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

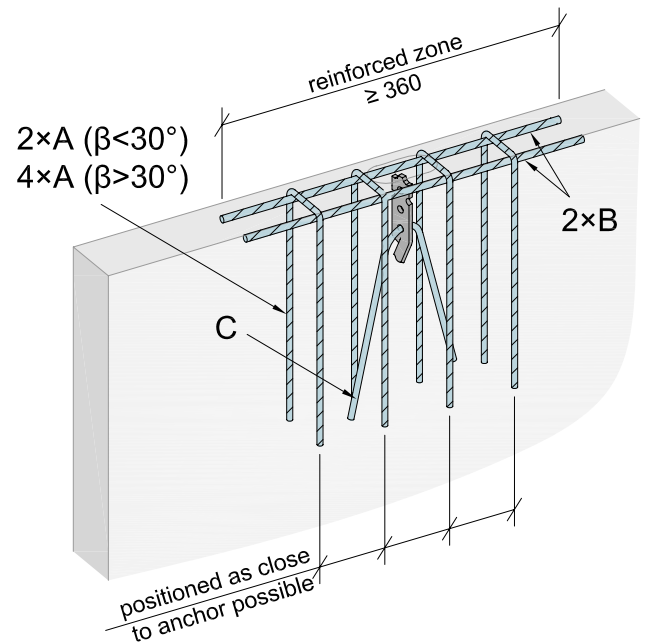
* - with additional pull reinforcement A (see next pages)

3. Reinforcement

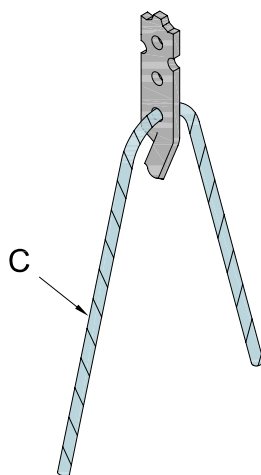
1) Reinforcement at anchorage zone
without pull reinforcement:



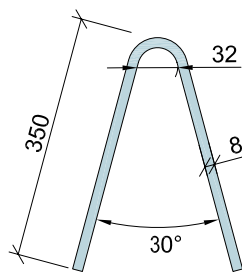
2) Reinforcement at anchorage zone
without pull reinforcement:



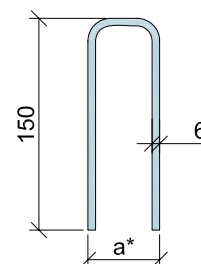
Pull reinforcement:



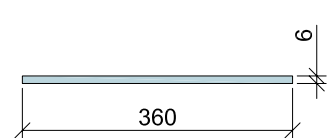
A reinforcement bar:



B reinforcement bar:

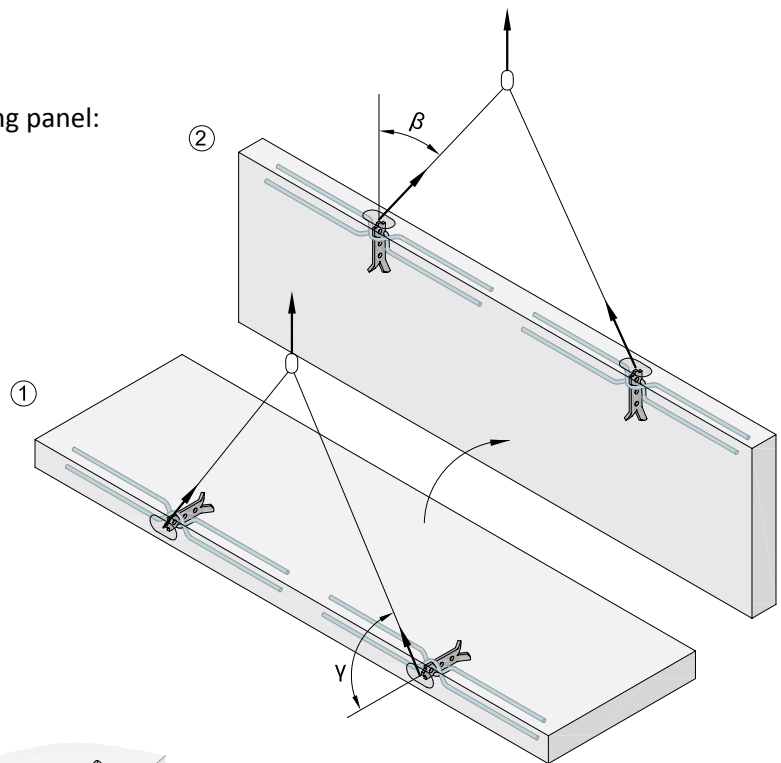


C reinforcement bar:

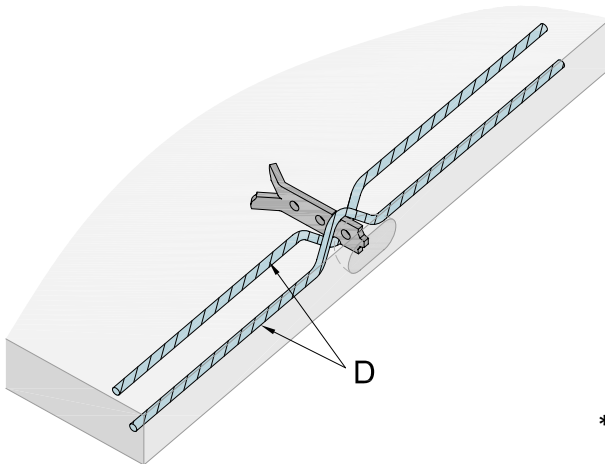


Reinforcement steel:
Yield strength 500N/mm²
Tensile strength 550 N/mm

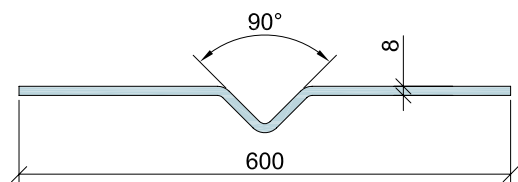
Transversal pull while lifting up a lying panel:



Transversal pull reinforcement:



A reinforcement bar:



* – length before bending reinforcement steel

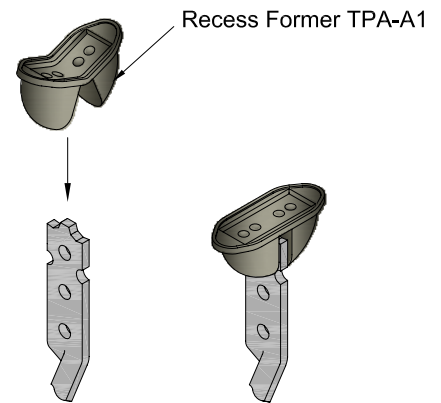
Reinforcement steel:

Yield strength 500N/mm²

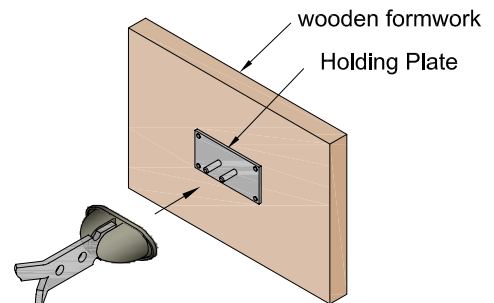
Tensile strength 550 N/mm²

4. Accessories of Installation

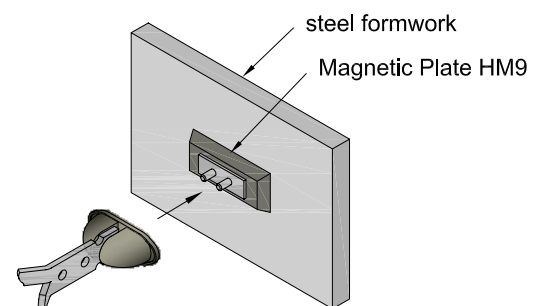
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Universal Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



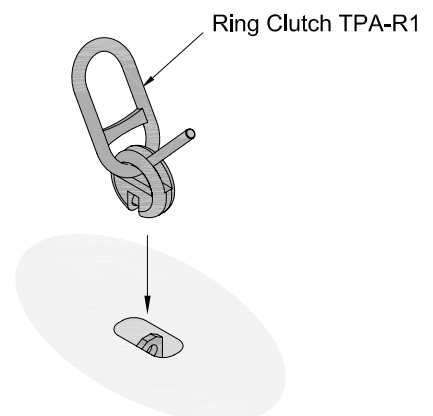
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Universal Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Universal Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Universal Anchor.



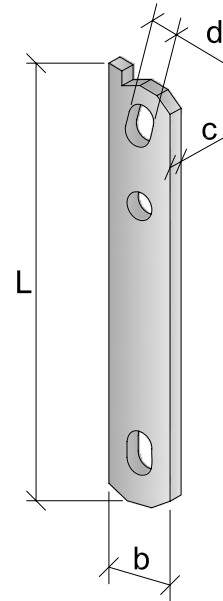
Sandwich Panel Anchor TPA-ST

Sandwich Panel Anchor TPA-ST is suitable for load ranges 0,7 to 22,0 and 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.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. Additional holes in the anchor are for additional reinforcement.

The components of the system are classified in load groups. Every load group corresponds to the permissible load of a Lifting Clutches to which anchors of the different load rates of a load group can be connected.

Sandwich Panel Anchors TPA-ST can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).


Material:

- stainless steel A4

Finish:

- without or
- hot-dip zinc-plated

Application: sandwich panels

Table 1: Sandwich Panel Anchor TPA-ST (without finish)

Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-ST-2,5-25	2,5	2,5	250	40	10	18×22	58
TPA-ST-5,0-30	5,0	5,0	300	60	16	26×30	180
TPA-ST-7,5-35	10,0	7,5	350	60	15	26×30	278
TPA-ST-10,0-35		10,0	350	80	20	35×46	359
TPA-ST-17,0-40	26,0	17,0	400	100	20	35×46	610

Table 2: Sandwich Panel Anchor TPA-ST (hot-dip zinc-plated)

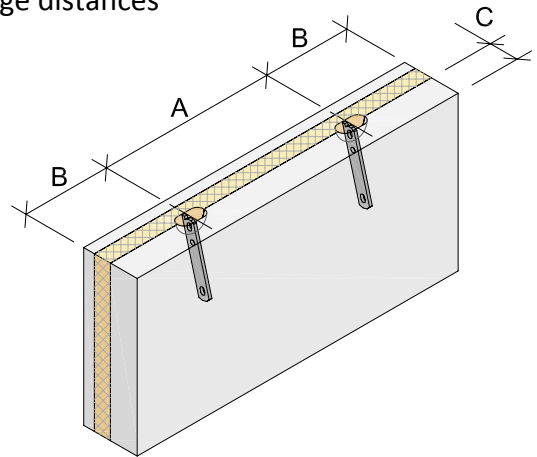
Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
TPA-ST-2,5-25-F	2,5	2,5	250	40	10	18×22	63.8
TPA-ST-5,0-30-F	5,0	5,0	300	60	16	26×30	198
TPA-ST-7,5-35-F	10,0	7,5	350	60	15	26×30	305.8
TPA-ST-10,0-35-F		10,0	350	80	20	35×46	394.9
TPA-ST-17,0-40-F	26,0	17,0	400	100	20	35×46	671

Installation Instructions for Sandwich Panel Anchors TPA-ST

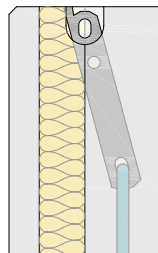
1. Spacing of Sandwich Panel Anchors TPA-ST and edge distances

Table 3: Minimal dimensions

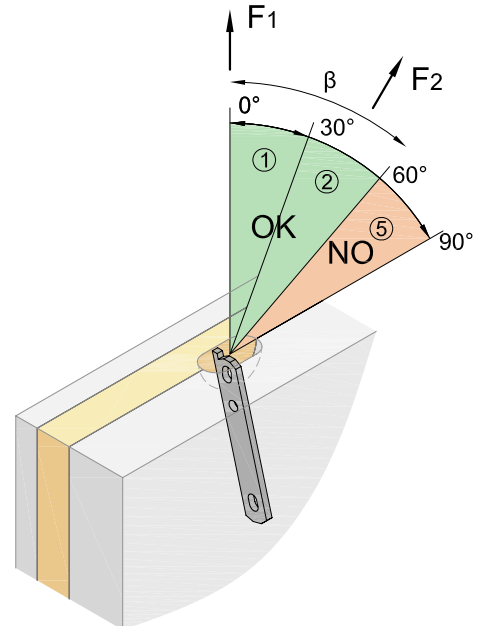
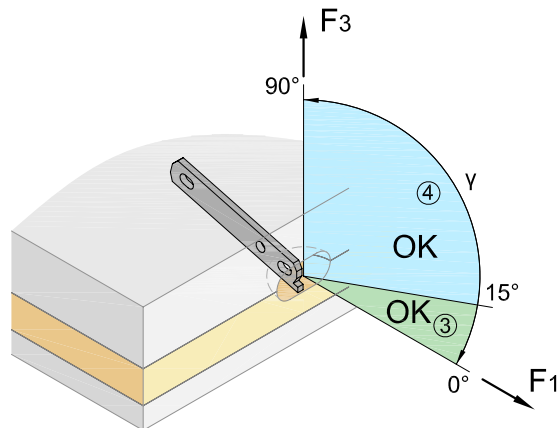
Article	A [mm]	B [mm]	2xC [mm]
TPA-ST-2,5-25 (-F)	200	145	280
TPA-ST-5,0-30 (-F)	190	145	380
TPA-ST-7,5-35 (-F)	290	195	530
TPA-ST-10,0-35 (-F)	225	165	450
TPA-ST-17,0-40 (-F)	285	195	570



Orientation of installation:



2. Permissible loads and angles of lifting



- 1) $\beta < 30^\circ$ - **straight pull** with pull reinforcement + reinforcement at anchorage zone
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull** with pull reinforcement + reinforcement at anchorage zone
- 3) $\beta > 60^\circ$ - not permissible
- 4) $\gamma < 15^\circ$ - **straight pull** (tilting from tilting table) with pull reinforcement + reinforcement at anchorage zone
- 5) $\gamma = 90^\circ$ - **transversal pull** (tilting) with pull reinforcement + reinforcement at anchorage zone + transversal reinforcement

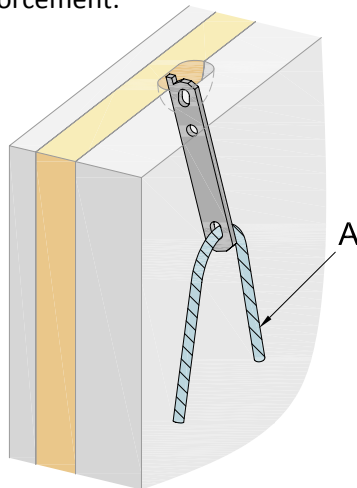
Table 4: Permissible loads

Load group [t]	Load range F [t]	Permissible loads		
		Straight pull ($\beta < 30^\circ$; $\gamma < 15^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]	Tilting: ($\gamma = 90^\circ$): F_3 [kN]
2,5	2,5	25	21,2	8
5,0	5,0	50	40	18
10,0	7,5	75	60	26
	10,0	100	80	35
26,0	17,0	170	136	50

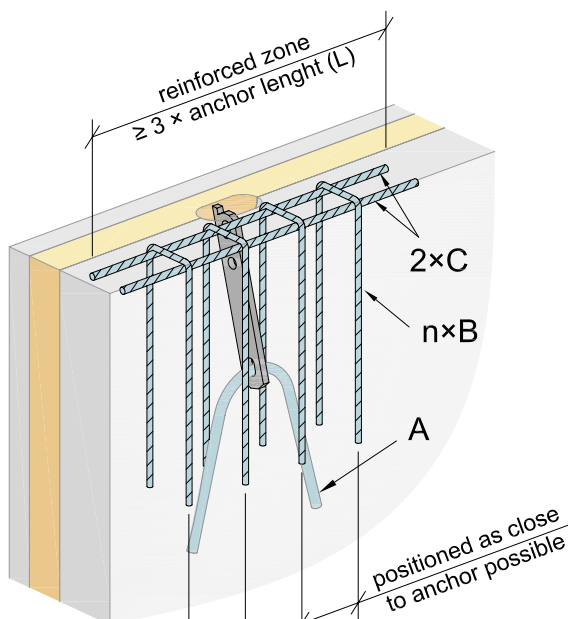
* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement

Pull reinforcement:



Reinforcement at anchorage zone:



A reinforcement bar:

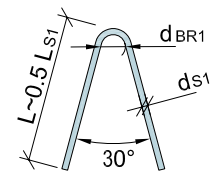
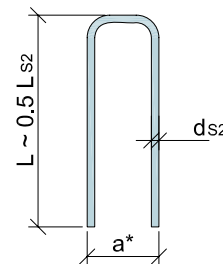


Table 5: Pull reinforcement bar A (according to DIN 1045-1)

Load group [t]	Load range [t]	d_{s1} [mm]	d_{BR1} [mm]	L_{s1} [mm]
2,5	2,5	14	56	800
5,0	5,0	16	84	1200
10,0	7,5	25	175	1400
	10,0	25	175	1800
26,0	17,0	28	196	2500

B reinforcement bar:



C reinforcement bar:

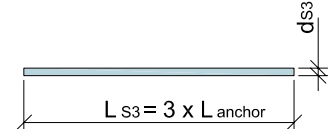
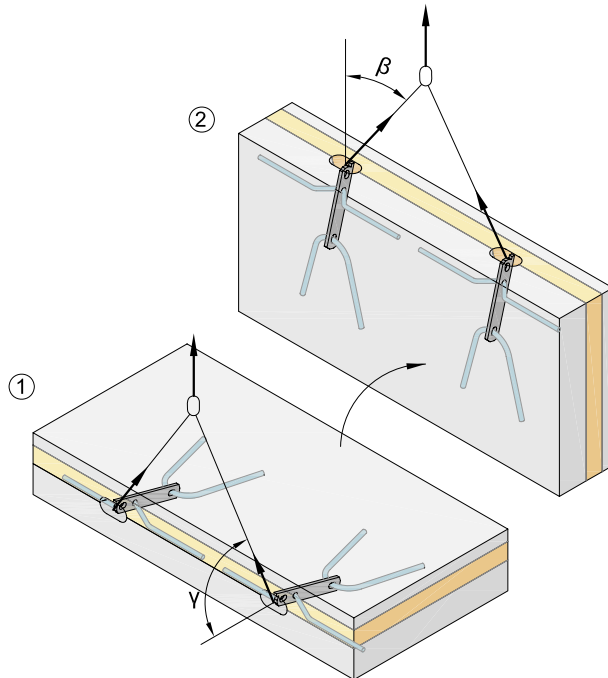


Table 6: Pull reinforcement bars B, C (according to DIN 1045-1)

Load group [t]	Load range [t]	number of B [pc]	d_{s2} [mm]	L_2 [mm]	d_3 [mm]
2,5	2,5	2	8	600	6
5,0	5,0	2	8	800	6
10,0	7,5	2	10	800	10
	10,0	4	10	800	12
26,0	17,0	4	12	1200	14

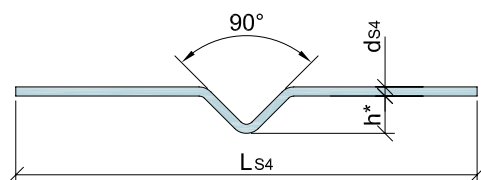
Reinforcement steel: Yield strength 500 N/mm^2
Tensile strength 550 N/mm^2

Transversal pull while lifting up a lying panel:



The transversal pull reinforcement must be fixed to the Sandwich Panel Anchor with a tying wire. Close contact is important!

D reinforcement bar:



* h- depends on the component thickness (but at least as per table)

Transversal pull reinforcement:

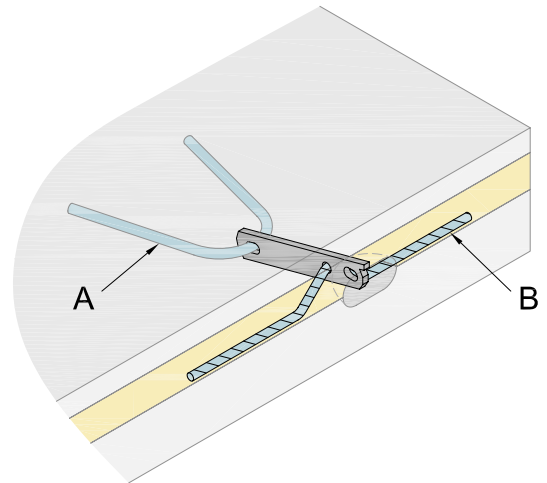


Table 7: Transversal pull reinforcement bar D (acc. to DIN 1045-1)

Load group [t]	Load range [t]	d_{s4} [mm]	L_{s4}^* [mm]	h [mm]
2,5	2,5	10	600	≥ 60
5,0	5,0	14	700	≥ 80
10,0	7,5	16	800	≥ 100
	10,0	20	900	≥ 120
26,0	17,0	20	1100	≥ 140

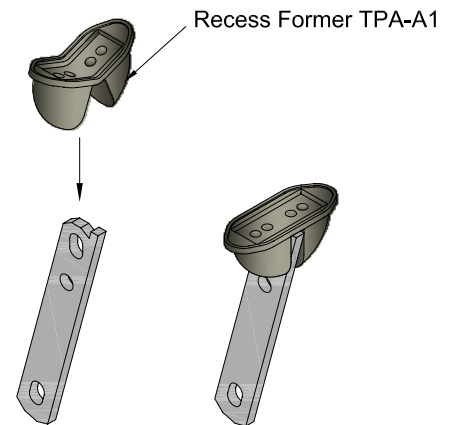
* L_s – length before bending reinforcement steel

Reinforcement steel: Yield strength 500N/mm²

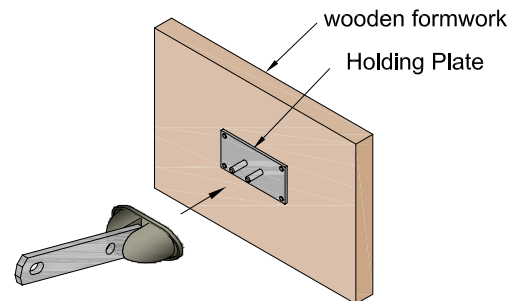
Tensile strength 550 N/mm²

4. Accessories of Installation

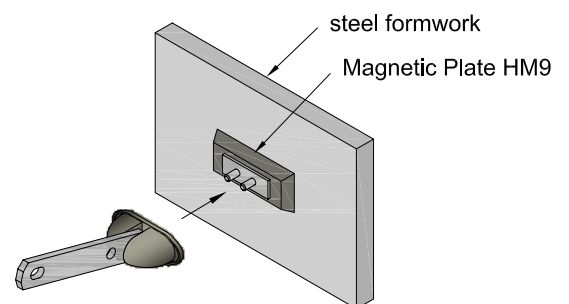
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Sandwich Panel Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Sandwich Panel Anchor must be pressed on the Holding Plate.



Magnetic Plate HM6 (for more information, look at page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Sandwich Panel Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Sandwich Panel Anchor.

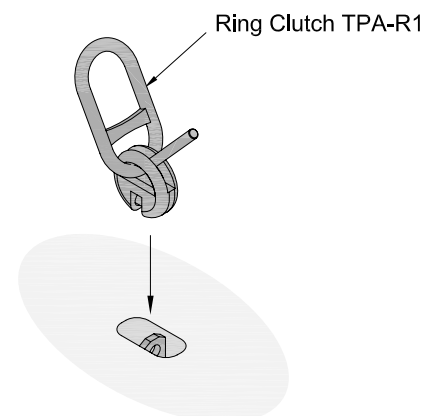


Plate Anchor TPA-P

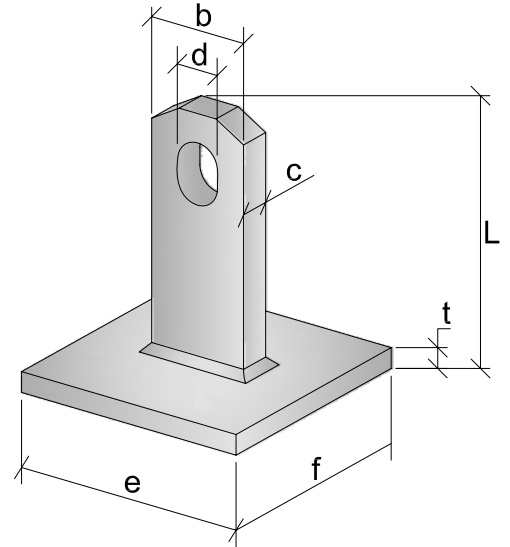
Plate Anchor TPA-P is suitable for use in the thinnest of slabs.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional reinforcement is placed over the plate of anchor.

The components of the system are classified in load groups. Every load group corresponds to the permissible load of a lifting clutches to which anchors of the different load rates of a load group can be connected.

The stress transfer to the concrete occurs through the reinforcement bar, which is laid over the plate crosswise.

Plate Anchors TPA-P can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Materials:

- stainless steel A4 or
- zinc-plated

Main application: very thin ceiling slabs with surface-embedded anchors

Table 1: Plate Anchor TPA-P

Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	e × f [mm]	t [mm]	Weight [kg/100pc]
TPA-P-1,4-05	2,5	1,4	50	30	6	14×20	80 × 80	8	45
TPA-P-2,5-08		2,5	80	30	10	14×20	80 × 80	8	56
TPA-P-5,0-12	5,0	5,0	120	40	15	18×22	100 × 100	10	122
TPA-P-10,0-16	10,0	10,0	160	60	20	26×30	140 × 140	12	311

Other lengths are available on request!

Installation Instructions for Plate Anchor TPA-P

1. Spacing of Plate Anchors TPA-P and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]
2,5	10
5,0	10
10,0	15

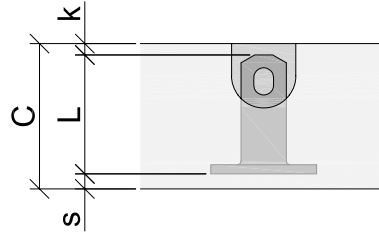
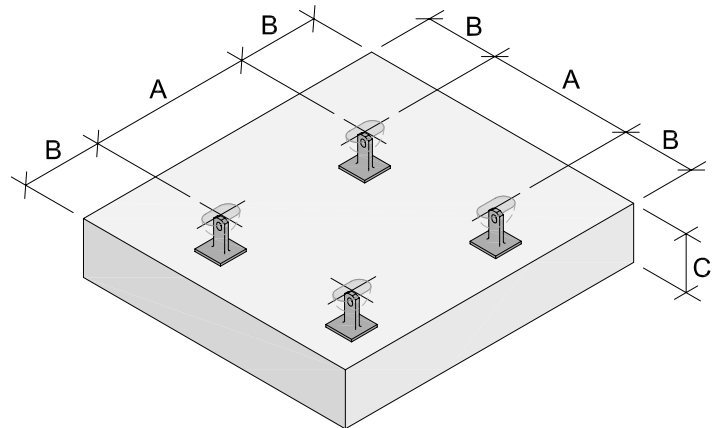


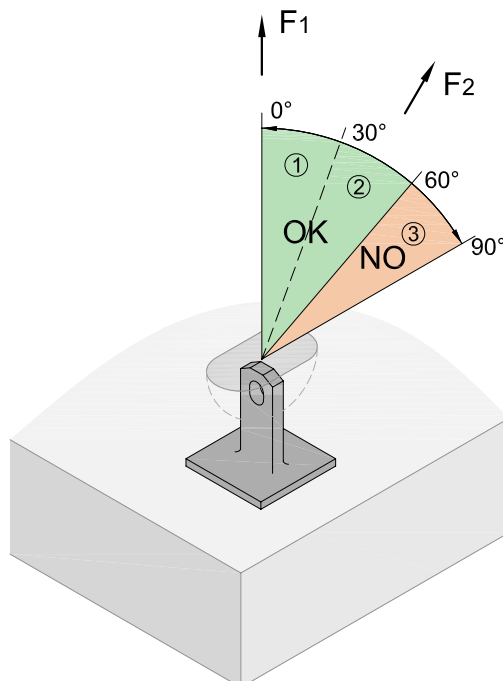
Table 3: Minimal dimensions

Article	A _{min} [mm]	B _{min} [mm]	C _{min} * [mm]
TPA-P-1,4-05	230	115	80
TPA-P-2,5-08	330	165	110
TPA-P-5,0-12	450	240	150
TPA-P-10,0-16	660	330	195

*the minimum panel thickness was determined by taking the concrete cover s to 20 mm to section. For other uses and environmental conditions, the concrete cover must be increased so enlarging the panel thickness.



2. Permissible loads and angles of lifting



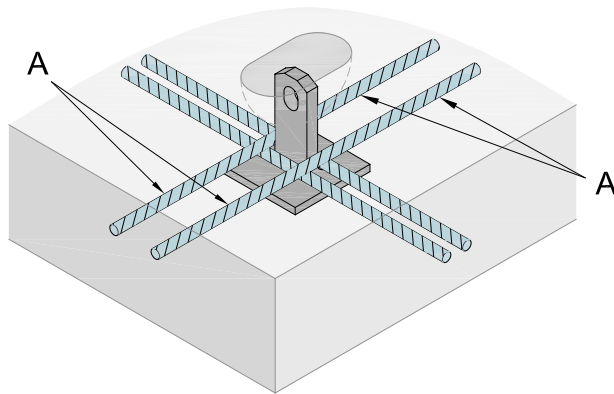
- 1) $\beta < 30^\circ$ - **straight pull** with reinforcement over the plate
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull** with reinforcement over the plate
- 3) $\beta > 60^\circ$ - not permissible

Table 4: Permissible loads

Load group [t]	Load range F [t]	Permissible loads	
		Straight pull ($\beta < 30^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]
2,5	1,4	14	11,2
	2,5	25	20
5,0	5,0	50	40
10,0	10,0	100	80

* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement



Position the reinforcement bars as close as possible.

A reinforcement bar:

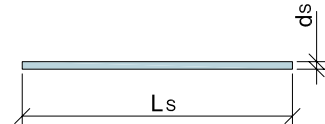


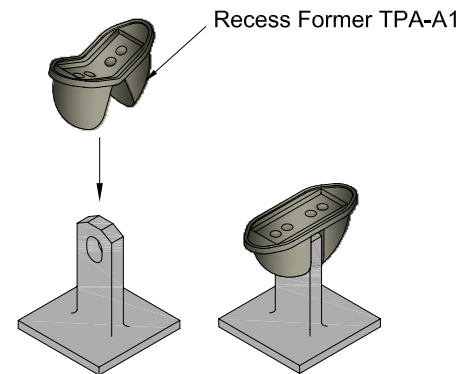
Table 5: Reinforcement bar A (according to DIN 1045-1)

Article	Load range [t]	d_s [mm]	L_s [mm]
TPA-P-1,4-05	1,4	8	200
TPA-P-2,5-08	2,5	10	300
TPA-P-5,0-12	5,0	12	450
TPA-P-10,0-16	10,0	16	600

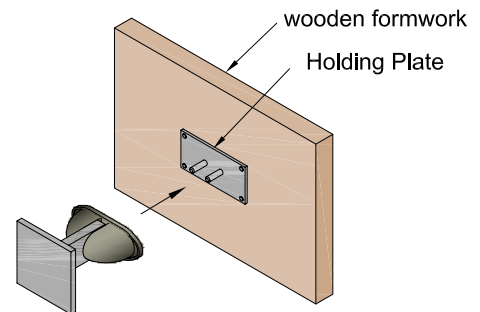
Reinforcement steel: Yield strength 500 N/mm^2 ,
Tensile strength 550 N/mm^2

4. Accessories of Installation

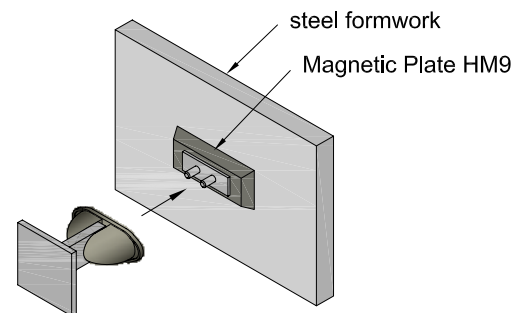
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Plate Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



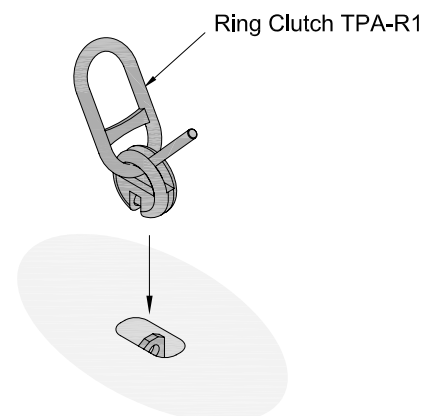
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Plate Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Plate Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Plate Anchor.



Flat Foot Anchor TPA-F

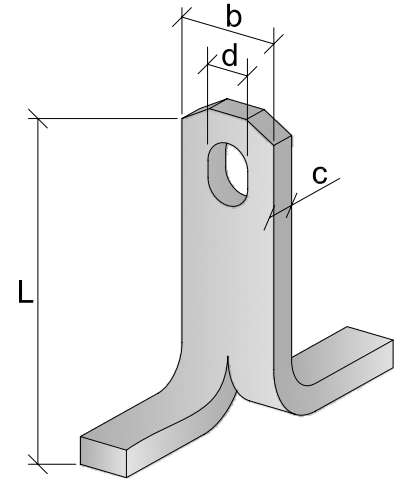
Flat Foot Anchor TPA-F is suitable for use in slabs.

The anchor head is provided with a hole, into which is fitted the locking bolt of the Lifting Clutch. The additional reinforcement is placed over the foot of anchor.

The components of the system are classified in load groups. Every load group corresponds to the permissible load of a lifting clutches to which anchors of the different load rates of a load group can be connected.

The stress transfer to the concrete occurs through the reinforcement bar, which is laid over the foot crosswise.

Flat Foot Anchors TPA-F can be used in concrete with a compressive strength $\geq 15 \text{ N/mm}^2$ and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 $\geq 130 \text{ mm}^2/\text{m}$; for 10,0 $\geq 188 \text{ mm}^2/\text{m}$; for 26,0 $\geq 255 \text{ mm}^2/\text{m}$).



Materials:

- stainless steel A4 or
- zinc-plated

Main application: ceiling slabs with surface-embedded anchors, tubes

Table 1: Flat Foot Anchor TPA-F

Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/ 100pc]
TPA-F-0,7-06	2,5	0,7	60	30	5	14×20	7.6
TPA-F-1,4-06		1,4	60	30	6	14×20	11
TPA-F-2,0-07		2,0	70	30	8	14×20	18.4
TPA-F-2,5-07		2,5	70	30	10	14×20	20.5
TPA-F-3,0-09	5,0	3,0	90	40	10	18×22	40.8
TPA-F-4,0-11		4,0	110	40	12	18×22	49
TPA-F-5,0-12		5,0	120	40	15	18×22	69.4
TPA-F-5,3-15	10,0	5,3	150	60	12	26×30	99.6
TPA-F-7,5-17		7,5	170	60	15	26×30	142.8
TPA-F-10,0-20		10,0	200	60	20	26×30	226.8
TPA-F-12,5-22	26,0	12,5	220	80	20	34×46	414
TPA-F-17,0-27		17,0	270	80	25	34×46	580
TPA-F-22,0-31		22,0	310	80	25	34×46	756

Installation Instructions for Flat Foot Anchor TPA-F

1. Spacing of Flat Foot Anchors TPA-F and edge distances

Table 2: Depth of installation

Load group [t]	k [mm]
2,5	10
5,0	10
10,0	15
26,0	15

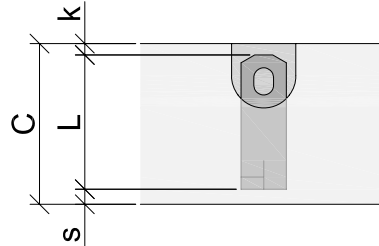
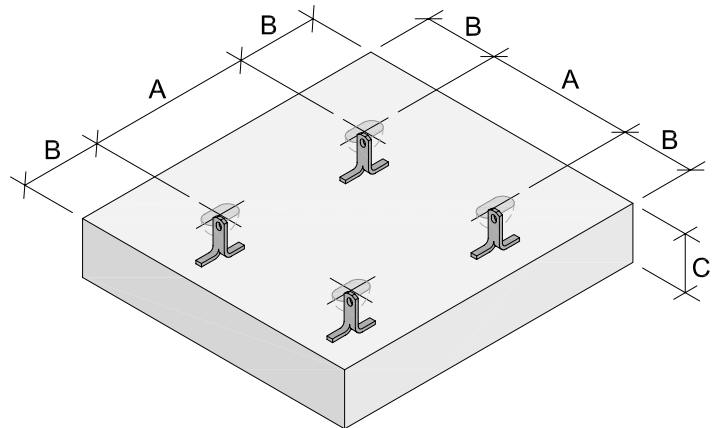


Table 3: Minimal dimensions

Article	A _{min} [mm]	B _{min} [mm]	C _{min} * [mm]
TPA-P-0,7-06	280	140	90
TPA-P-1,4-06	280	140	90
TPA-P-2,0-07	300	150	100
TPA-P-2,5-07	320	160	100
TPA-P-3,0-09	380	190	120
TPA-P-4,0-11	460	230	140
TPA-P-5,0-12	520	260	150
TPA-P-7,5-17	680	340	205
TPA-P-10,0-20	800	400	235
TPA-P-12,5-22	880	440	255
TPA-P-17,0-27	1080	540	305
TPA-P-22,0-31	1240	620	345



*the minimum panel thickness was determined by taking the concrete cover s to 20 mm to section. For other uses and environmental conditions, the concrete cover must be increased so enlarging the panel thickness

2. Permissible loads and angles of lifting

- 1) $\beta < 30^\circ$ - **straight pull** with reinforcement over the foot
- 2) $30^\circ < \beta < 60^\circ$ - **angled pull** with reinforcement over the foot
- 3) $\beta > 60^\circ$ - not permissible

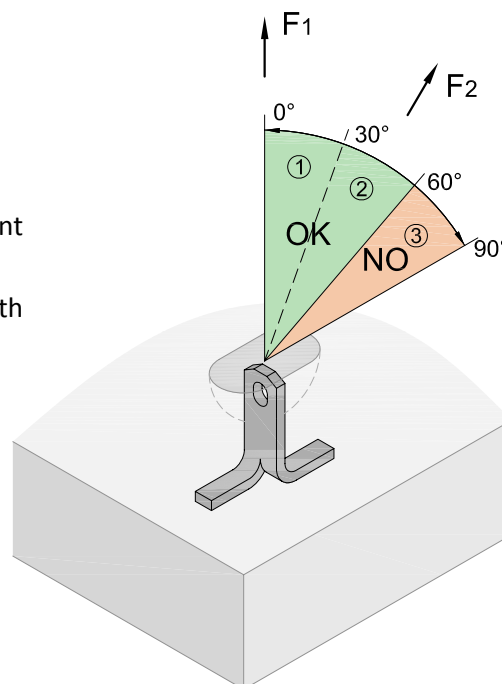
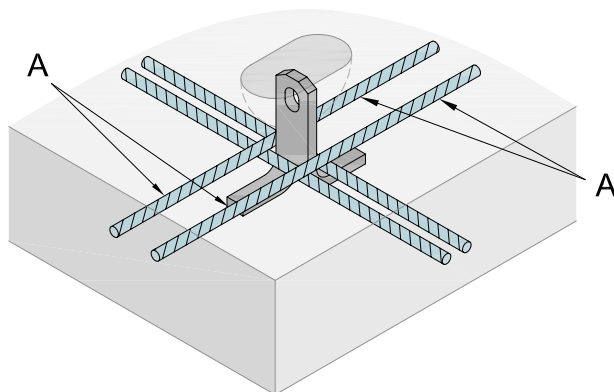


Table 6: Permissible loads

Load group [t]	Load range F [t]	Permissible loads	
		Straight pull ($\beta < 30^\circ$): $F_1 = 100\% F$ [kN]	Angled pull ($30^\circ < \beta < 60^\circ$): $F_2^* = 80\% F$ [kN]
2,5	0,7	7	5,6
	1,4	14	11,2
	2,0	20	16
	2,5	25	20
5,0	3,0	30	24
	4,0	40	32
	5,0	50	40
10,0	5,3	53	42,4
	7,5	75	60
	10,0	100	80
26,0	14,0	140	112
	22,0	220	176

* if concrete strength $\geq 23 \text{ N/mm}^2$, F_2 can be taken 100% F

3. Reinforcement



Position the reinforcement bars as close as possible.

A reinforcement bar:

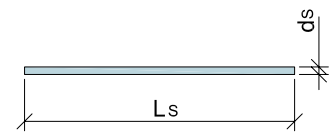


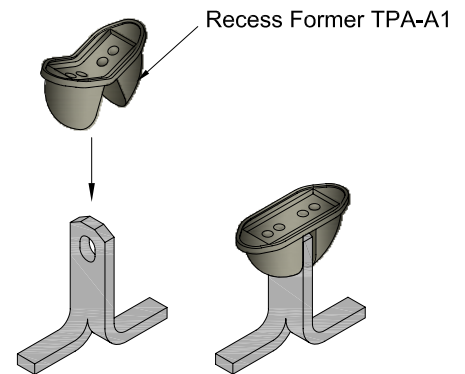
Table 5: Reinforcement bar A (according to DIN 1045-1)

Article	d_s [mm]	L_s [mm]
TPA-P-0,7-06	8	200
TPA-P-1,4-06	8	250
TPA-P-2,0-07	8	300
TPA-P-2,5-07	8	300
TPA-P-3,0-09	10	400
TPA-P-4,0-11	12	450
TPA-P-5,0-12	12	500
TPA-P-7,5-17	14	600
TPA-P-10,0-20	14	600
TPA-P-12,5-22	16	750
TPA-P-17,0-27	16	900
TPA-P-22,0-31	20	1100

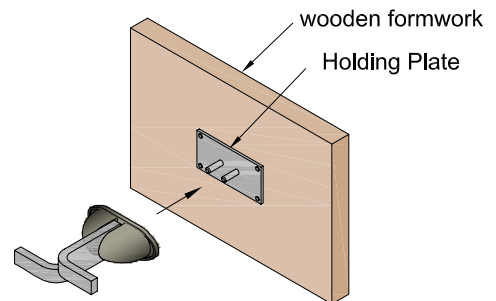
Reinforcement steel: Yield strength 500 N/mm^2 ,
Tensile strength 550 N/mm^2

4. Accessories of Installation

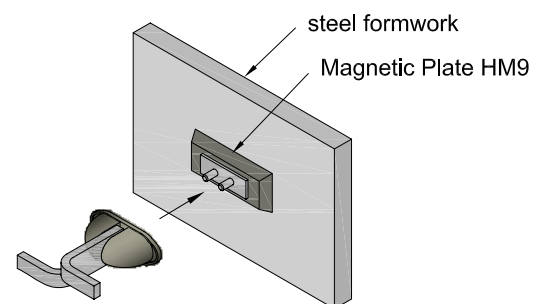
Recess Former TPA-A1 (for more information, look at pages 50-51) is used to attach Flat Foot Anchor to the formwork. The Recess Former in open position will be put over the anchor head. Closing the Recess Former will fix the anchor tightly.



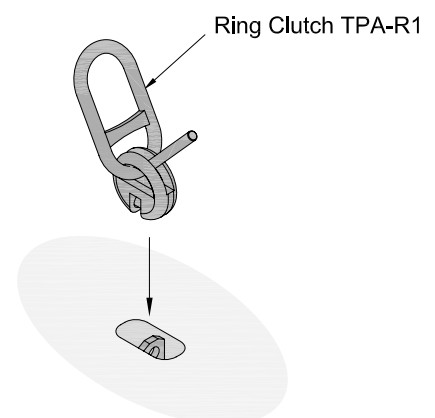
Holding Plate (for more information, look at page 52) is used to fasten Recess Former TPA-A1 to a wooden formwork. The Recess Former with inserted Flat Foot Anchor must be pressed on the Holding Plate.



Magnetic Plate HM9 (for more information, look at page 53) is used to fasten Recess Former TPA-A1 to a steel formwork. The Recess Former with inserted Flat Foot Anchor must be pressed on the Magnetic Plate.



To transport a precast concrete unit, the appropriate **Ring Clutch TPA-R1** (for more information, look at page 54-56) for the load group is inserted in the concrete recess over the head of Flat Foot Anchor.

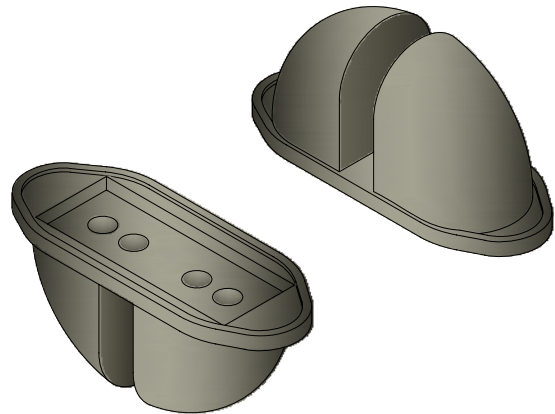


Recess Former TPA-A1

Recess Formers TPA-A1 are used to attach anchors of Transport Anchor System TPA (Transport Anchors TPA-S, TPA-2, TPA-SA, TPA-SE, Universal Anchor TPA-U, Sandwich Panel Anchor TPA-ST, Plate Anchor TPA-P or Flat Foot Anchor TPA-F) to the formwork.

To fasten the Recess Former TPA-A1 on to a wooden formwork Holding Plate is used and for fastening on to a steel formwork Magnetic Plate HM9 is used.

The components of the system are classified in load groups. Every load group has a special Recess Former.



Materials:

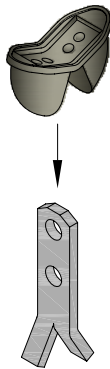
- plastic

Table 1: Recess Former TPA-A1

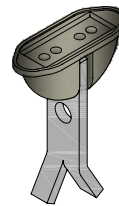
Article	Load group [t]
TPA-A-2,5	2,5
TPA-A-5,0	5,0
TPA-A-10,0	10,0
TPA-A-26,0	26,0

Installation Instructions for Recess Former TPA-A1

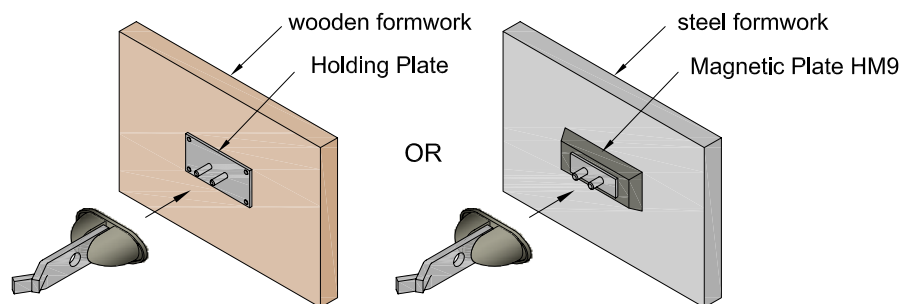
1. The Recess Former in open position will be put over the anchor head.



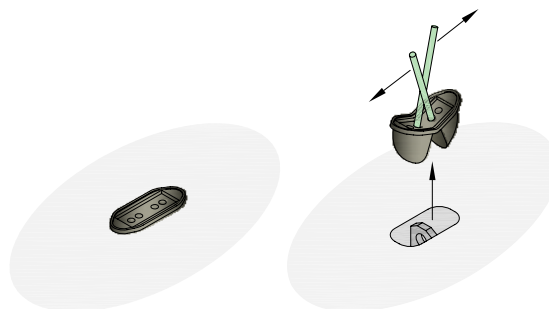
2. Closing the Recess Former will fix the anchor tightly.



3. The Recess Former with Anchor must be pressed on the **Holding Plate** (for more information, see page 52) or **Magnetic Plate HM9** (for more information, see page 53)

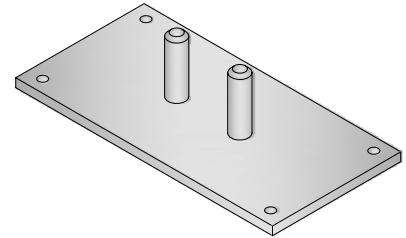


4. To strip the Recess Former, two rods are inserted in the holes in the Recess Former, which is then levered out by scissors action. This technique will guarantee a long life time for the Recess Former.



Holding Plate

Holding Plate is used to fasten Recess Former TPS-A1 with anchors of Transport Anchor System TPA (Transport Anchors TPA-S, TPA-2, TPA-SA, TPA-SE, Universal Anchor TPA-U, Sandwich Panel Anchor TPA-ST, Plate Anchor TPA-P or Flat Foot Anchor TPA-F) to a wooden formwork.

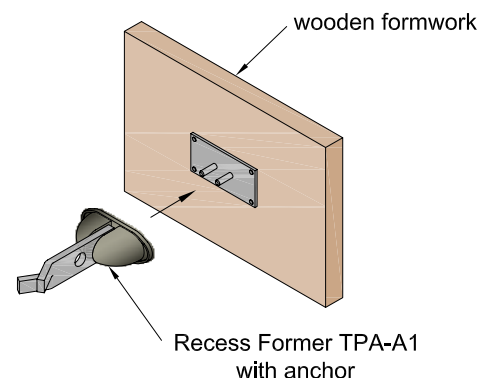
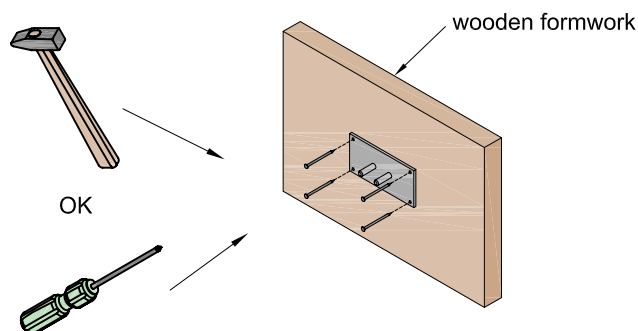


Materials:
• steel

Table 1: Holding Plate

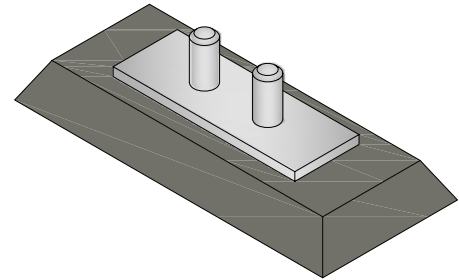
Article	Load group [t]
TPA-H1-1,25	1,25
TPA-H1-2,5	2,5
TPA-H1-5,0	5,0
TPA-H1-10,0	10,0
TPA-H1-26,0	26,0

1. Nail or screw the Holding Plate on to a formwork
2. Press on the Recess Former (see pages 50-51)



Magnetic Plate HM9

Magnetic Plate HM9 is used to fasten Recess Former TPA-A1 with anchors of Transport Anchor System TPA (Transport Anchors TPA-S, TPA-2, TPA-SA, TPA-SE, Universal Anchor TPA-U, Sandwich Panel Anchor TPA-ST, Plate Anchor TPA-P or Flat Foot Anchor TPA-F) to a steel formwork.



Materials:

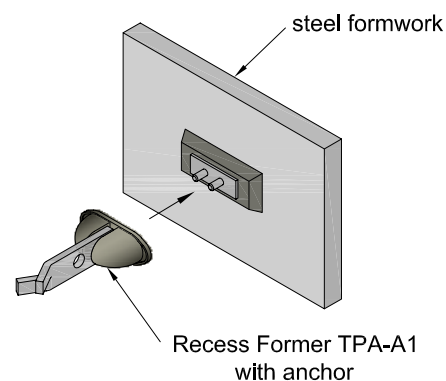
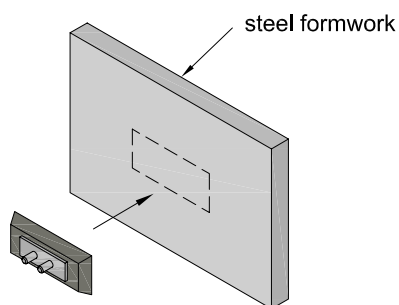
- permanent magnet
- steel

Table 1: Magnetic Plate HM9

Article	Load group [t]
TPA-HM-2,5	2,5
TPA-HM-5,0	5,0
TPA-HM-10,0	10,0
TPA-HM-26,0	26,0

1. Magnetic Plate grips the steel formwork.

2. Press on the Recess Former (see pages 50-51)

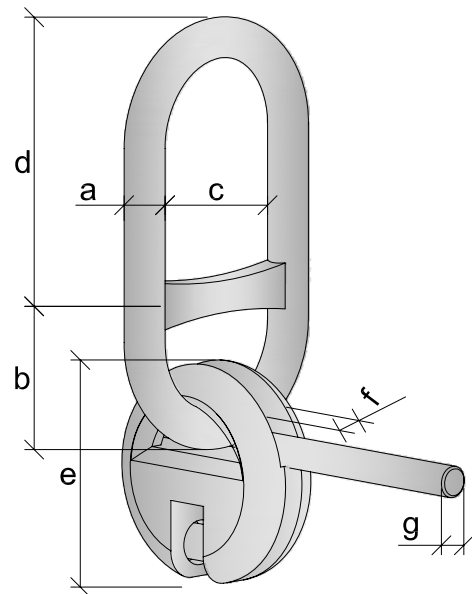


Ring Clutch TPA-R1

To transport a precast concrete unit, the appropriate Ring Clutch TPA-R1 for the load group is inserted in the concrete recess over the head of anchor of Transport Anchor System TPA (Transport Anchors TPA-S, TPA-2, TPA-SA, TPA-SE, Universal Anchor TPA-U, Sandwich Panel Anchor TPA-ST, Plate Anchor TPA-P or Flat Foot Anchor TPA-F).

The Ring Clutch can be subjected to loads in any direction.

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.



Material:

- special-quality flat steel

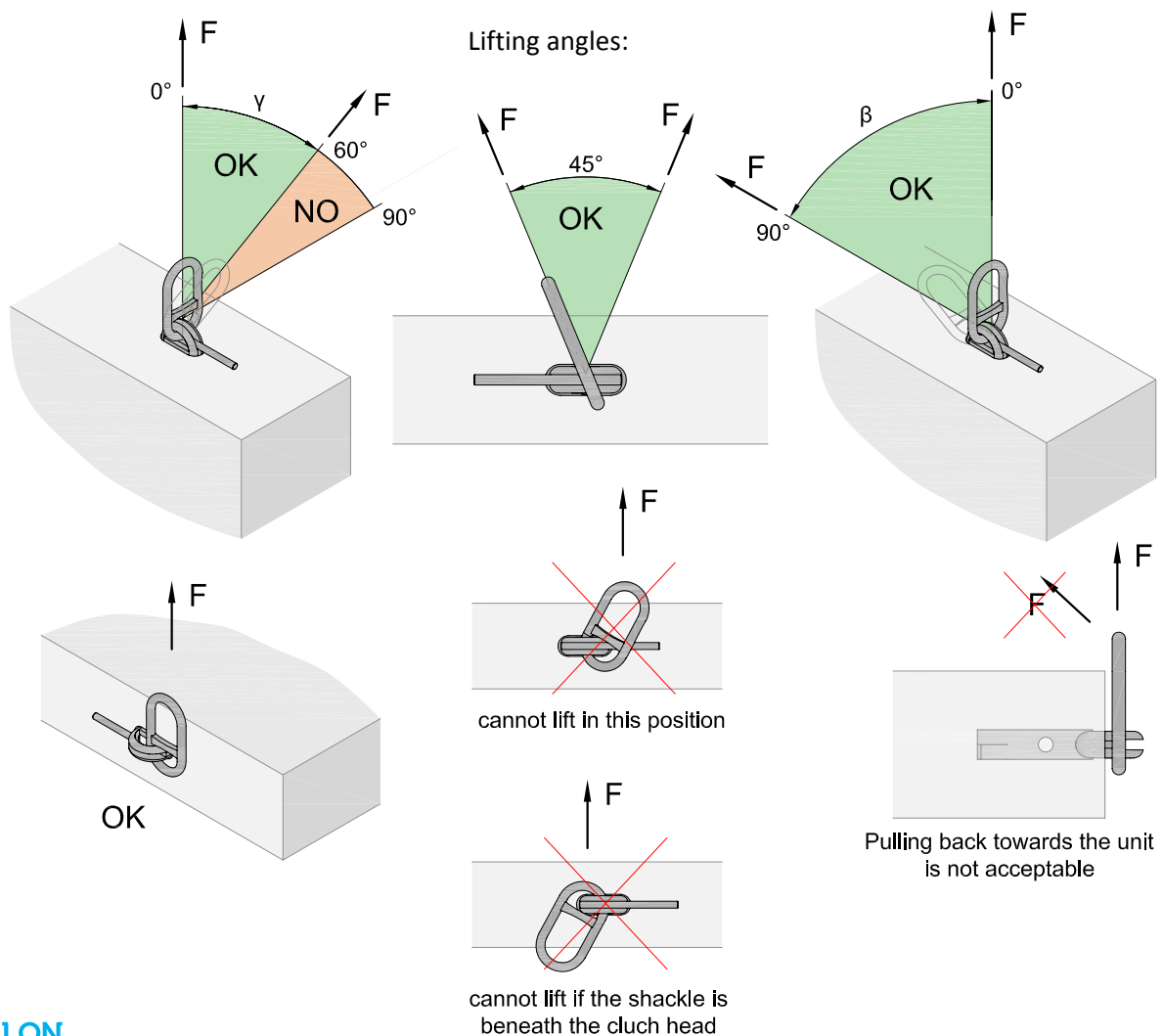
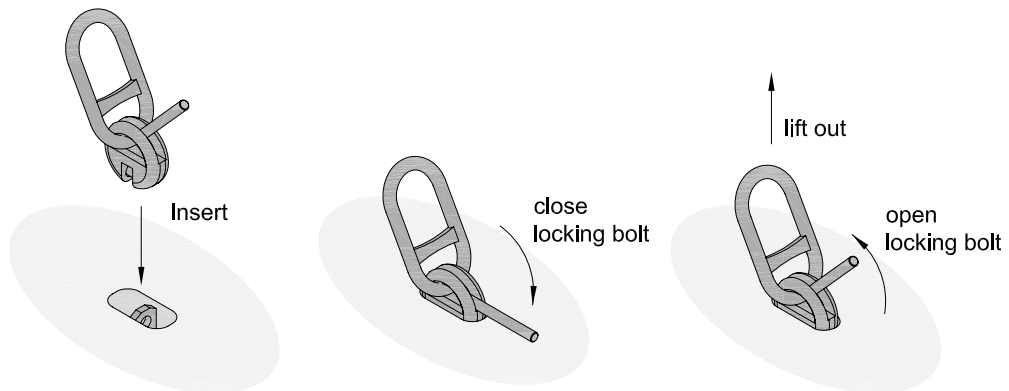
Table 1: Ring Clutch TPA-R1

Article	Load group [t]	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]
TPA-R1-2,5	2,5	14	49	50	90	79	27
TPA-R1-5,0	5,0	18	69	70	124	98	36
TPA-R1-10,0	10,0	25	115	90	171.7	137	50
TPA-R1-26,0	26,0	36	100	90	200	210	72

Instructions for use of Ring Clutch TPA-R1

1. Handling and use

Inserting and releasing the Ring Clutch TPA-R1:

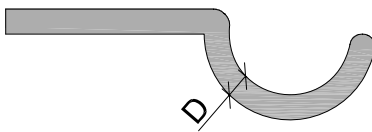


2. Condition of Ring Clutch TPA-R1

Ring Clutches TPA-R1 has to be controlled by an expert at least once a year. 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 2.

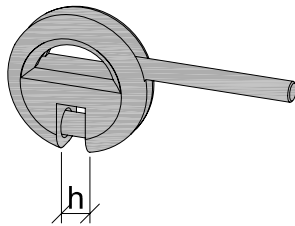
Table 2: Dimension of locking bolt



Load group [t]	nominal D [mm]	minimum D [mm]
1,25	8 +0.4 / -0.6	7
2,5	13 +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 +0.9 / -0.5	31

- Clutch head
If the clutch head is deformed or the mouth opening is enlarged, the ring clutch has to be withdrawn and cannot be repaired. For allowable tolerance due to wear see the table 3.

Table 3: Dimension of clutch head



Load group [t]	nominal h [mm]	minimum h [mm]
1,25	7 ± 0.12	8
2,5	12 ± 0.5	13.5
5,0	18 +0,5 / -1,0	19.5
10,0	22 ± 0,5	23.5
26,0	34 +2,0 / -1,0	37