Transport Anchor ST-EA

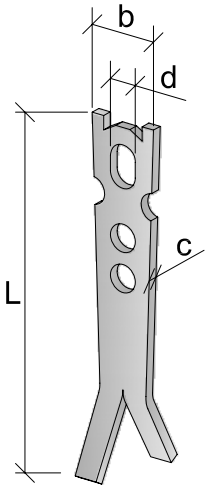
Transport Anchor ST-EA is suitable for load ranges 0,7 to 22,0. Transport Anchor ST-EA is designed for tilting panels from the horizontal to the vertical. The anchor is used for erecting and turning thin-walled precast units in both directions.

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 ST-EA can be used in concrete with a compressive strength ≥ 15 N/mm^2 and the minimum necessary surface reinforcement (for load groups 2,5 and 5,0 ≥ 130mm^2/m; for 10,0 ≥ 188mm^2/m; for 26,0 ≥ 255mm^2/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 ST-EA

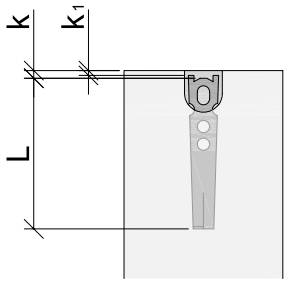
Article	Load group [t]	Load range [t]	L [mm]	b [mm]	c [mm]	d [mm]	Weight [kg/100pc]
ST-EA-1,4-20	**2,5**	1,4	200	50	6	15×15	38
ST-EA-2,5-23		2,5	230	50	10	15×15	67.4
ST-EA-4,0-27	**5,0**	4,0	270	70	12	20×20	144.6
ST-EA-5,0-29		5,0	290	70	15	20×20	189.4
ST-EA-7,5-32	**10,0**	7,5	320	100	15	29×29	376
ST-EA-10,0-39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

Installation Instructions for Transport Anchor ST-EA

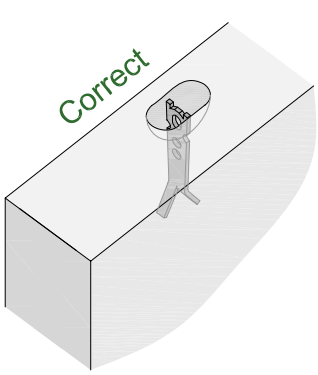
1. Spacing of Transport Anchors ST-EA and edge distances

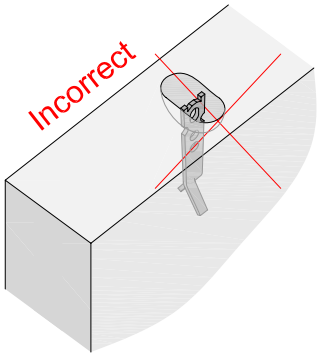
Table 2: Depth of installation

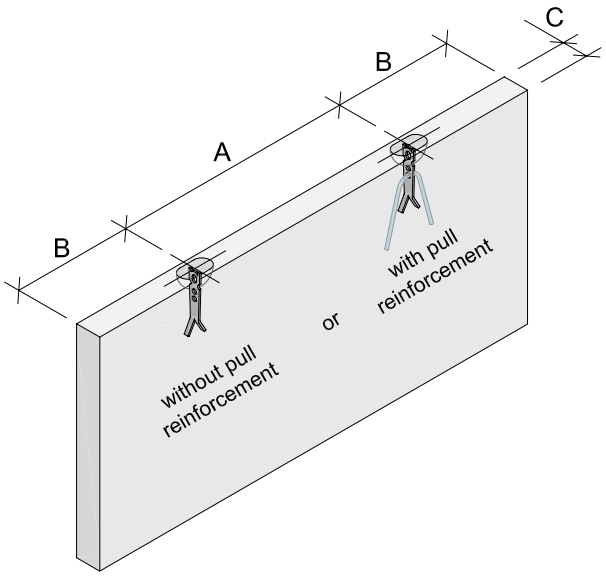
Load group [t]	k [mm]	k_1 [mm]
2,5	10	5
5,0	10	5
10,0	15	6
26,0	15	9



Orientation of installation:





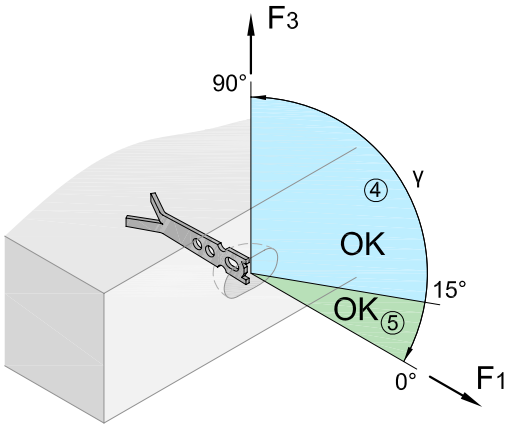


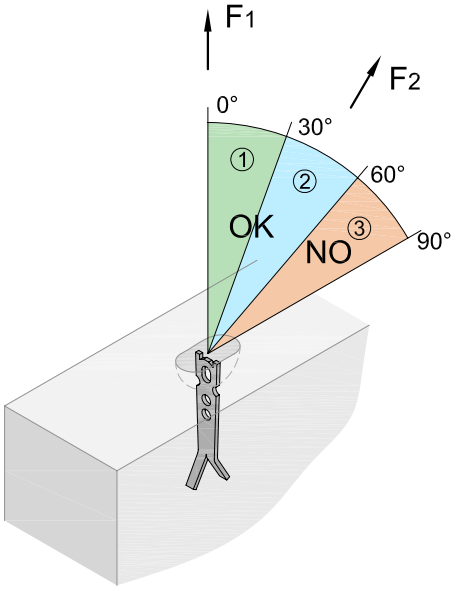
Transport Anchors ST-EA may only be installed in wall elements with the flat steel at right-angles of the slab

Table 3: Minimal dimensions

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

2. Permissible loads and angles of lifting





1) β < 30° - **straight pull**
2) 30° < β > 60° - **angled pull**
3) β > 60° - **not permissible**
4) γ < 15° - **straight pull** (tilting from tilting table)
5) 15° < γ < 90° - **transversal pull** (lifting up a laying panel)

Table 4: Required reinforcement

Reinforcement type	Angle β		Angle γ	
	β < 30°	30° < β > 60°	γ < 15°	15° < γ < 90°
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

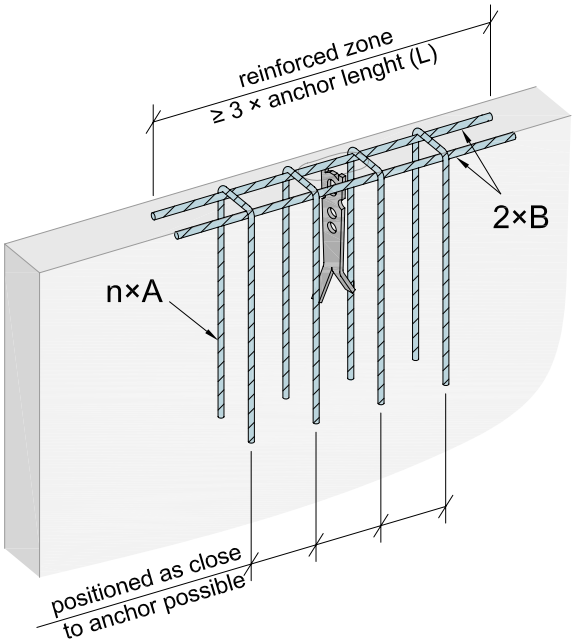
Table 5: Permissible loads

Load group [t]	Load range F [t]	Permissible loads		
		Straight pull (β<30°; γ<15°): **F_1 = 100% F [kN]**	Angled pull (30°<β<60°): **F_2* = 80% F [kN]**	Tilting (15°<γ<90°): **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 ≥ 23 N/mm², 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:

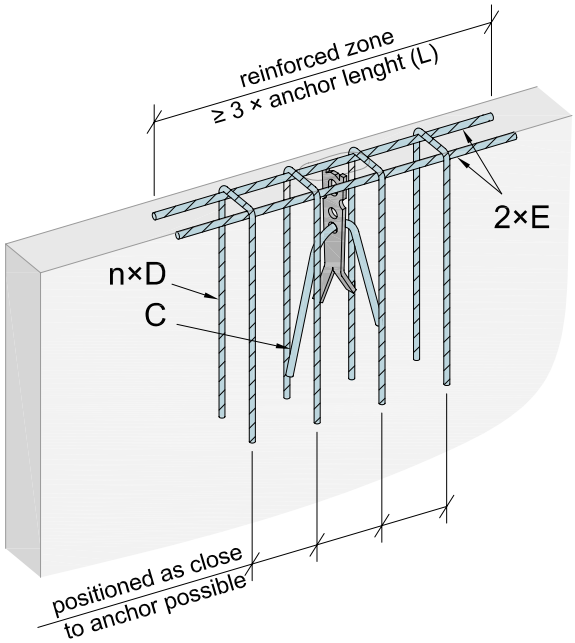
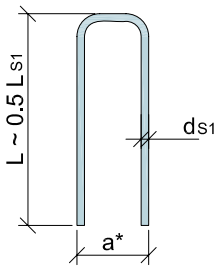


Table 6: Anchor zone (without pull reinforcement) reinforcement bars A, B (according to DIN 1045-1)

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

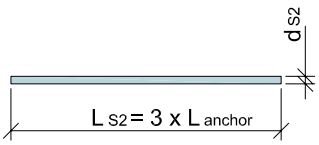
Reinforcement steel: Yield strength 500N/mm², Tensile strength 550 N/mm²

A reinforcement bar:



a – depends on the panle thickness

B reinforcement bar:



Pull reinforcement:

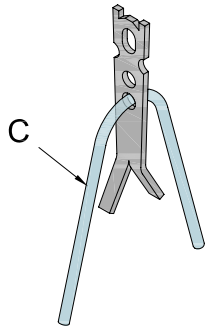
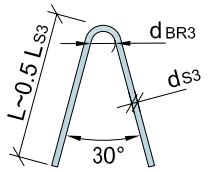


Table 7: Pull reinforcement bar C (according to DIN 1045-1)

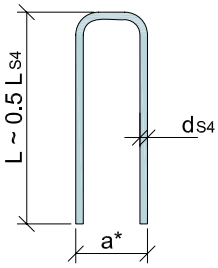
Article	d_{s3} [mm]	d_{BR3} [mm]	L_{s3} [mm]		
			concrete strength [N/mm²]		
			≥15	≥25	≥35
ST-EA-1,4-20	10	40	650	520	425
ST-EA-2,5-23	12	48	1000	800	650
ST-EA-4,0-27	16	64	1200	960	780
ST-EA-5,0-29	16	64	1500	1200	975
ST-EA-7,5-32	20	140	1750	1400	1140
ST-EA-10,0-3.9	20	140	1900	1520	1235
ST-EA-12,5-50	25	175	2200	1760	1430
ST-EA-17,0-50	28	196	2500	8000	1625
ST-EA-22,0-50	28	196	3000	2400	1950

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

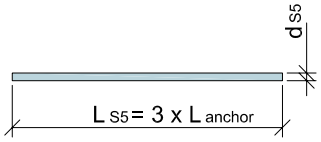
C reinforcement bar:



D reinforcement bar:



E reinforcement bar:



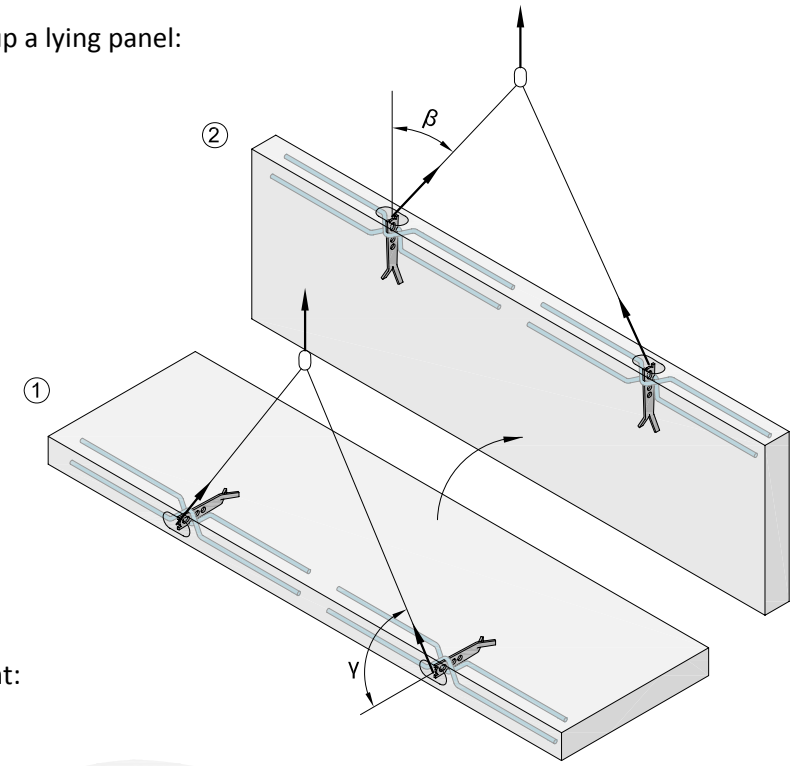
*- a depends on the component thickness

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

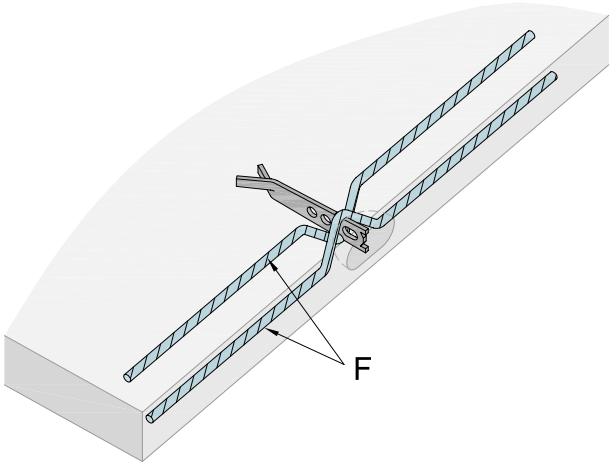
Article	β<30°				β>30°			
	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]	number of D [pc]	d_{s2} [mm]	L_{s2} [mm]	d_{s3} [mm]
ST-EA-1,4-20	2	6	400	6	4	6	400	8
ST-EA-2,5-23	2	6	500	6	4	6	500	8
ST-EA-4,0-27	2	8	700	6	4	8	800	12
ST-EA-5,0-29	2	8	800	6	4	10	800	12
ST-EA-7,5-32	2	10	800	10	4	10	800	12
ST-EA-10,0-3.9	4	10	800	12	6	10	1000	14
ST-EA-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:

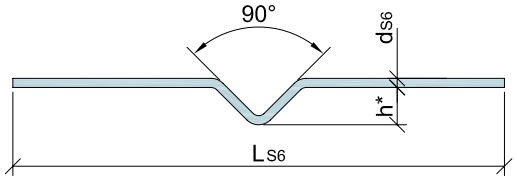


Transversal pull reinforcement:



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

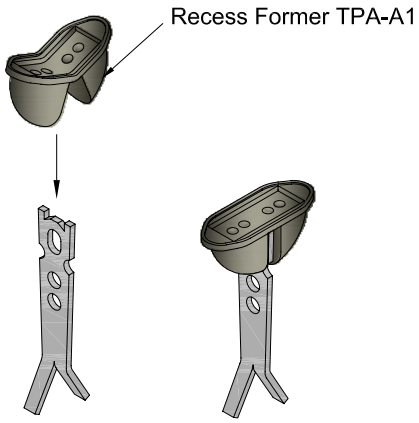
Table 9: Transversal pull reinforcement bar F (acc. to DIN 1045-1)

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

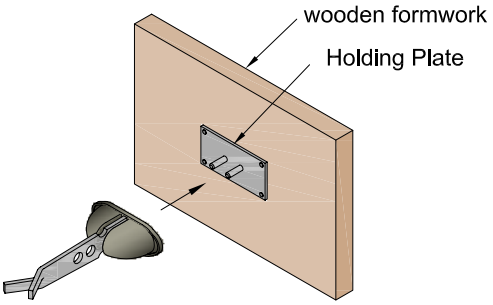
Reinforcement steel: Yield strength 500N/mm²
Tensile strength 550 N/mm²

* L_s – length before bending reinforcement steel

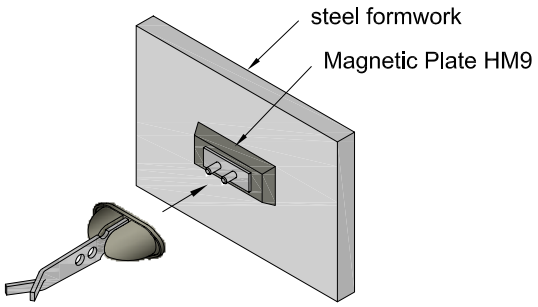
4. Accessories of Installation



Recess Former TPA-A1 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 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 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 the load group is inserted in the concrete recess over the head of Transport Anchor.