APL Anchor Plates

Dimensioning notes

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Product description

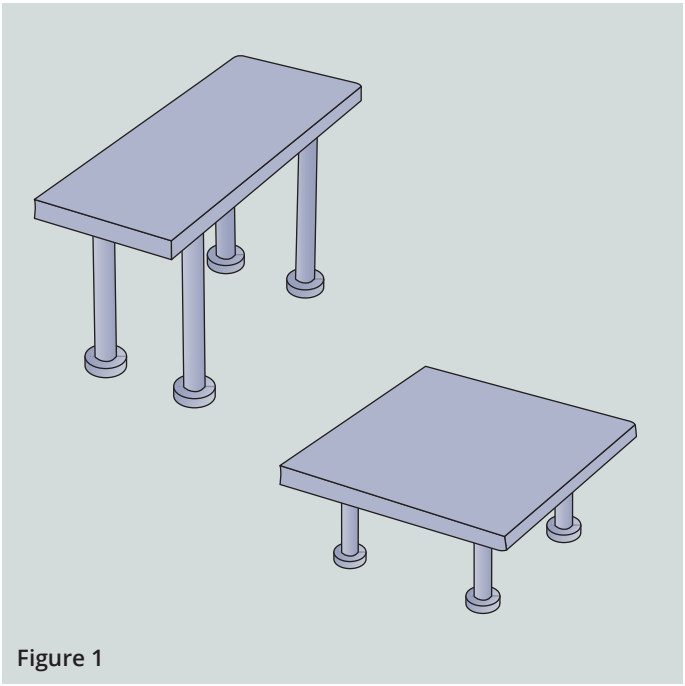

Figure 1

Anchor plates consist of a steel plate with welded headed studs and are used to fasten steel components to concrete elements. To this end the anchor plates are cast in the concrete element. The headed studs (manufacturer: Köco) serve as anchorage. During the installation state the steel plate is flush with the surface of the concrete. A steel component can be welded to this side.

Anchor plates can transmit normal and shear forces as well as bending and torsional moments. These forces are transmitted from the welded steel components via the steel plate of the anchor plate into the headed studs and from there into the surrounding concrete.

The number of headed studs and their dimensions as well as the geometry of the steel plates can vary depending on the selected type or the individual configuration. In addition, two different surface treatments are available: painted (underside and edges of the steel plate) and hot-dip galvanized. Both variants offer the usual corrosion protection for structural steelwork.

The resistances of the APL anchor plates are influenced by the user's application conditions.
The user can thus determine the applicable resistance for his installation situation and the conditions prevailing there, also with the welded part and type of stress, by means of suitable dimensioning software (see QR code link). Guiding values for resistances under special circumstances are listed in Table 2 of the section „Carrying capacities for pre-dimensioning" only for estimation under favourable conditions.

Mounting parameters

Table 1: Assembly parameters for headed studs

		Nominal size of headed stud [mm]				
		13	16	19	22	25
Minimum embedment depth	h_{ef} [mm]	50	50	75	75	75
Minimum axis distance	s_{min} [mm]	70	80	100	100	100
Minimum edge distance	c_{min} [mm]	50	50	70	70	100
Minimum component thickness	h_{min} [mm]	$H^{1} + c_{nom}{}^{2}$				

[1] H = height of the entire anchor plate, dimensions according to the product overview
[2] c_{nom} = necessary concrete cover according to national regulations

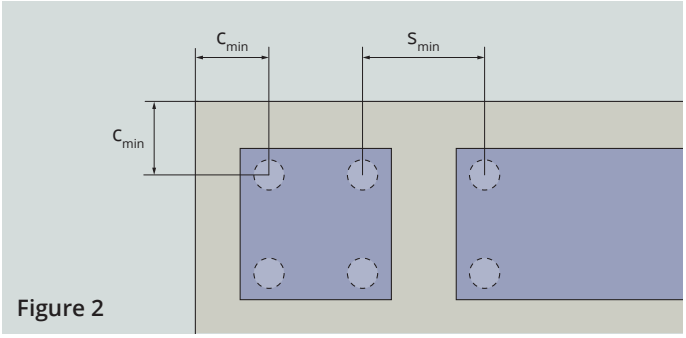

Figure 2

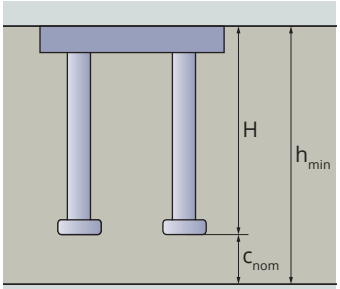

Figure 3

Dimensioning

Dimensioning software free of charge:
Download now at:
www.koeco.net

Software: Köco StudCalc-Pro

Carrying capacities for pre-dimensioning

For the pre-selection of an optimum anchor plate size, the maximum stress that the anchor plate can accept is determined when only a direct stress is acting (normal force, shear force or moment). The stresses or resistances determined in Table 2 are to be taken as a selection aid for the pre-dimensioning and are not a substitute for the actual proof recording. The use of the Köco StudCalc-Pro software is recommended for the actual proof recording. This software also allows the interaction when different forces are acting simultaneously.

Table 2: Maximum carrying capacity when only one of the forces is acting and with a prespecified connecting profile surface – selection of Z, Q, M

Type	Tensile force Z [kN]	Shear force Y/X [kN]	Moments M_x [kNm]	Moments M_y [kNm]	Moments M_z [kNm]	Connecting profile S355, γ =1,0 [mm x mm x mm]
APL 100x100x8-58-4x13-S355	19	47	1,0	1,0	2,3	48x48x4
APL 100x100x8-83-4x13-S355	29	69	1,5	1,5	3,3	48x48x4
APL 100x100x8-108-4x13-S355	47	94	2,7	2,7	4,6	78x78x4
APL 100x150x10-60-4x13-S355	23	53	1,5	1,2	3,0	34x84x4
APL 100x150x10-85-4x13-S355	34	75	2,4	2,1	4,2	34x84x4
APL 100x150x10-110-4x13-S355	50	101	3,7	3,0	5,7	60x120x5
APL 100x200x12-62-4x13-S355	24	61	2,0	1,5	4,2	20x105x5
APL 100x200x12-87-4x13-S355	34	85	3,2	2,4	5,8	20x105x5
APL 100x200x12-112-4x13-S355	53	111	4,9	3,5	7,7	30x155x5
APL 100x200x12-162-4x13-S355	86	118	8,6	6,0	8,2	50x160x5
APL 120x300x15-165-4x16-S355	96	182	13,2	7,9	17,9	46x260x8
APL 150x150x10-60-4x13-S355	24	57	1,4	1,4	3,6	55x55x5
APL 150x150x10-85-4x13-S355	34	80	2,4	2,4	5,1	55x55x5
APL 150x150x10-110-4x13-S355	53	107	4,0	4,0	6,7	113x113x5
APL 150x150x12-162-4x13-S355	84	118	7,2	7,2	7,5	115x115x5
APL 200x200x12-62-4x13-S355	29	74	2,1	2,1	6,2	40x40x5
APL 200x200x12-87-4x13-S355	39	98	2,4	2,4	8,3	40x40x5
APL 200x200x12-112-4x13-S355	61	118	5,6	5,6	10,0	130x130x5
APL 200x200x12-162-4x16-S355	94	182	9,5	9,5	15,4	157x157x8
APL 200x300x15-165-4x16-S355	103	182	14,0	11,0	19,2	115x222x8
APL 250x250x15-165-4x16-S355	103	182	14,3	14,3	21,9	169x169x8
APL 300x300x15-165-4x16-S355	112	182	15,7	15,7	23,2	201x201x8

Calculations performed with: Köco StudCalc-Pro 3.1.0

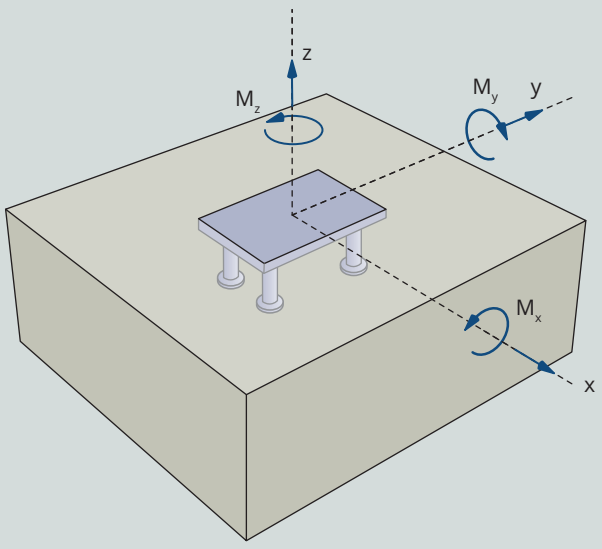

Figure 4

Assumptions for the results in Table 2:

- Concrete quality: C25/30
- Crack condition of the anchoring base: Cracked concrete
- No influence by component edges or thicknesses
- Wide area reinforcement, bar spacing a ≥ 150 mm for all Ø, a ≥ 100 mm for Ø ≤ 10 mm
- No edge reinforcement
- No loads/moments applied off-centre
- No stand-off installation
- No additional reinforcement
- Steel plate material: S355
- Elastic plate dimensioning (taking into account the rigidity of the steel plate/headed studs as well as the concrete embedment of the steel plate/stud head)
- Partial safety factor for steel plate γ_m = 1.0

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06.20