Column Shoe System

Rigid bolted connection for columns and girders

PFEIFER

Design & Installation

Carefree with the PFEIFER PCC Column Shoe system ...

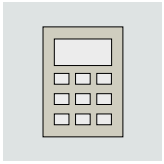
Is this what your projects are about

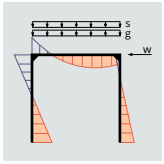
- short construction times
- efficient transport of precast concrete elements?
- safe and fast assembly?
- maximum assembly flexibility regarding the weather?
- flat foundations?
- early occupancy?

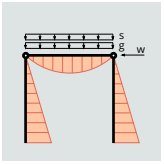
... then take advantage of the benefits of unitised construction and screw precast elements together with an instant friction-locked connection on the building site!

Software now available at:

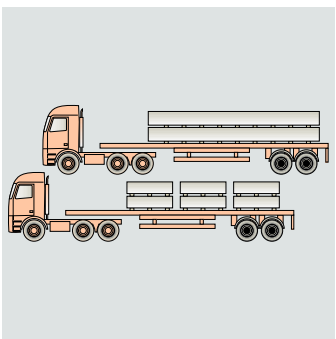
www.pfeifer.info/stuetzenfuss-pcc

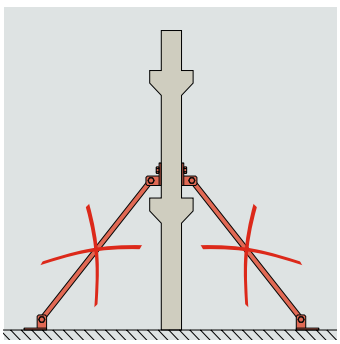


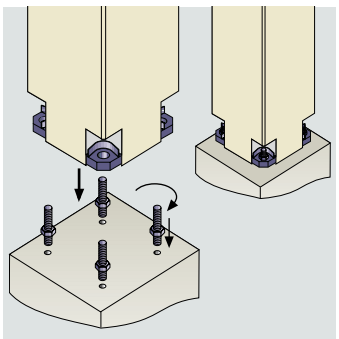




* PCC Column Shoe / PGS/G1-K Foundation Anchor







Efficiently simple and simply efficient!

Your advantages

- **Favourable precast element geometries**
  Efficient precast element transport is possible by separating the foundation and the column
- **No delays on the building site**
  Instant load-bearing bolted connection means no grout drying times
- **No elaborate measures necessary to support** the precast elements during assembly, therefore also advantages through spacious, unobstructed working areas
- **Maximum flexibility**
  Assembly can mostly be done independently of the weather – even when it's frosty
- **Flat foundations**
  Very thin foundations achievable thanks to short anchor variants
- **Very simple dimensioning**
  Simple design with standard bending dimensioning and **free software**
- **Straightforward and simple installation**
  in the precast plant and on site
- **Formal safety**
  through approvals and type-static calculation tests
- **Practicality**
  No reduction of the working load limit in case of fire due to the use of the column shoes

Range of applications

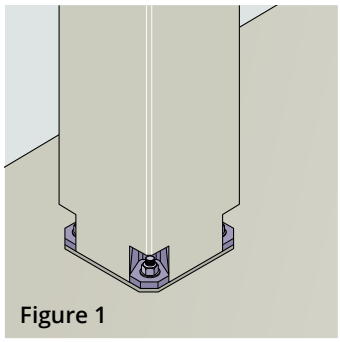


Figure 1

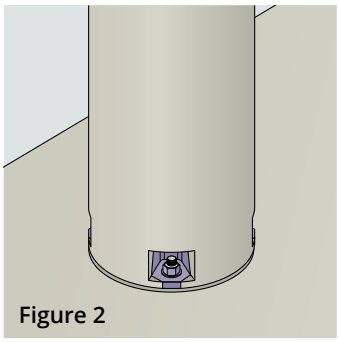


Figure 2

Rigid connection of:

- columns with foundations (figs. 1 and 2)
- Column to column connections (fig. 3)
- steel and timber columns with foundations (fig. 4)
- columns with girders (figs. 5 and 6)

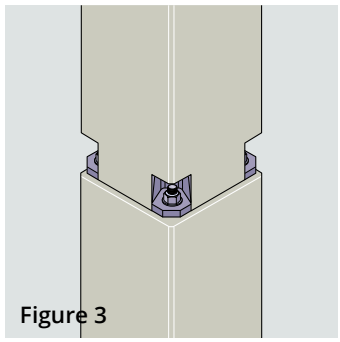


Figure 3

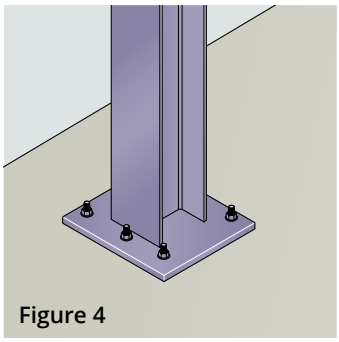


Figure 4

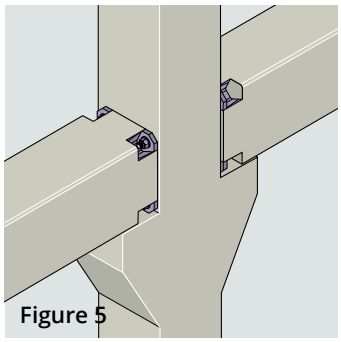


Figure 5


Figure 6

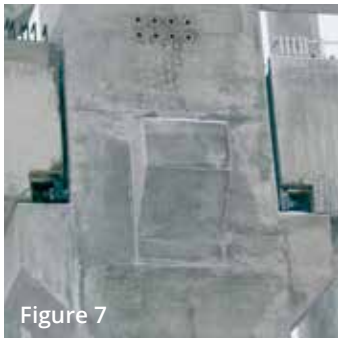


Figure 7


Figure 8


Figure 9

Special column shoe versions:

- rigid girder connection (figures 7, 8, 10 and 11)
- rigid column connection (figure 9)


Figure 10


Figure 11

- **Fast assembly process without supports**
- **Immediate load-bearing bolted connections mean no delay**
- **Flexible due to realistic tolerance ranges**
- **Weather-independent installation – even during frost**
- **Easy to connect to existing reinforcement (overlapping joint)**
- **Efficient transport of precast elements by separation of column and foundation**
- **No reduction of working load limit in case of fire**
- **Free dimensioning software**
- **European Technical Assessment (ETA)**

Component recommendation

- Column
- Girder
- Joist

Technical data

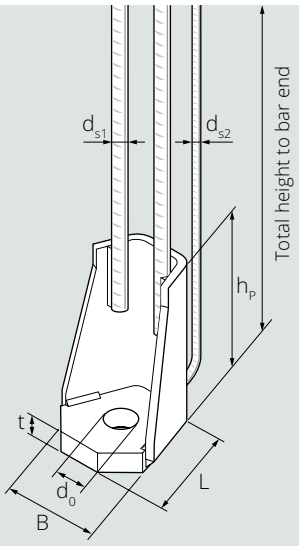
- **Material:** Bright steel

Options on request

- Further lengths

PCC Column Shoe

- For rigid bolted connections in precast concrete elements
- Use in combination with foundation anchors or female bars
- Column Shoe and foundation anchor/female bar are each concreted into one component and can be bolted together for connection. The recesses are then sealed



PCC Column Shoe

PCC Column Shoe

Type designation			PCC 16	PCC 20	PCC 24	PCC 27	PCC 30-1	PCC 30-2	PCC 36	PCC 39-1	PCC 39-2
Overall height	h	mm	745	910	1125	1135	1400	1505	–	1690	1970
Reinforcing steel diameter	d_{s1}	mm	12	14	16	20	20	25	28	28	32
Reinforcing steel diameter	d_{s2}	mm	8	8	10	10	12	16	20	14	16
Plate thickness	t	mm	15	20	25	26,5	30	35	40	35	40
Bore diameter	d_0	mm	28	30	35	40	40	45	53	55	55
Profile height	h_P	mm	145	170	190	220	230	250	285	285	300
Foot width	B	mm	89	97	100	110	119	119	132	136	132
Foot length	L	mm	90	95	100	106,5	112	121	119	125	125
Overlap length	L_S	mm	650	800	1000	1000	1260	1360	1780	1520	1800
Reference number			273703	273704	273705	532503	273706	273707	273708	438692	438693

L_s: The overlap length corresponds to total bar length for concrete quality C30/C37, good bond. Other lengths upon request.

Design resistances according to table 1 – p. 34

- **Permits slim structural element dimensions**
- **No additional connecting bolts required**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Rigid friction-locked connection**
- **Free dimensioning software**
- **General technical approval (abZ)**

Component recommendation

- Column
- Foundation

Technical data

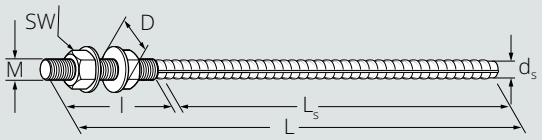
- **Material:** Bright steel

Options on request

- bent version; other lengths

PGS/G1 Foundation Anchor

- Anchor with straight bar for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes
- Foundation anchor and support foot are each concreted into a component and can be fastened together via the integrated threaded bolt. The recesses are then sealed



PGS/G1 Foundation Anchor

PGS/G1 Foundation Anchor

Type designation			PGS-16/G1-790	PGS-16/G1-1270	PGS-20/G1-970	PGS-20/G1-1570	PGS-24/G1-1110	PGS-24/G1-1810
Thread type			**M 16**	**M 16**	**M 20**	**M 20**	**M 24**	**M 24**
Overall length	**L**	**mm**	**790**	**1270**	**970**	**1570**	**1110**	**1810**
Reinforcing steel diameter	d_s	mm	16	16	20	20	25	25
Overlap length	L_S	mm	690	1170	860	1460	990	1690
Thread length	l	mm	100	100	110	110	120	120
Wrench size	SW	mm	24	24	30	30	36	36
Washer diameter	D	mm	45	45	45	45	55	55
Reference number			**281811**	**282359**	**281813**	**282360**	**281814**	**282361**

Foundationanker PGS/G1

Type designation			PGS-30/G1-1360	PGS-30/G1-2230	PGS-36/G1-1740	PGS-36/G1-2820	PGS-39/G1-2020	PGS-39/G1-3330
Thread type			**M 30**	**M 30**	**M 36**	**M 36**	**M 39**	**M 39**
Overall length	**L**	**mm**	**1360**	**2230**	**1740**	**2820**	**2020**	**3330**
Reinforcing steel diameter	d_s	mm	32	32	40	40	40	40
Overlap length	L_S	mm	1220	2090	1570	1850	1850	3160
Thread length	l	mm	140	140	170	170	170	170
Wrench size	SW	mm	46	46	55	55	60	60
Washer diameter	D	mm	65	65	75	75	75	75
Reference number			**281815**	**282362**	**281816**	**282363**	**375783**	**375785**

L_s: The foundation anchor lengths included in the tables are to be determined with the on-site conditions (concrete quality, bonding conditions, bar diameter, utilisation, bar and edge distances) according to EN 1992-1-1 para. 8.4.3 and para. 8.7.2 including NA.

Special lengths possible on request.

Design resistances according to table 1 – p. 34

- **Permits thinner foundations**
- **No additional connecting bolts required**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Rigid friction-locked connection**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Free dimensioning software**
- **General technical approval (abZ)**

Component recommendation

- Column
- Foundation

Technical data

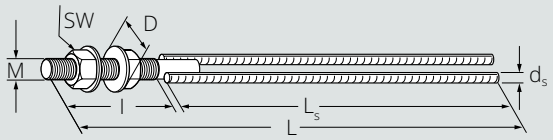
- **Material:** Bright steel

Options on request

- one-sided or double-sided curved design, other lengths

PGS/G2 Foundation Anchor

- Anchor with two straight bars for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes
- Foundation anchor and column shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed



PGS/G2 Foundation Anchor

PGS/G2 Foundation Anchor

Type designation			PGS-24/G2	PGS-30/G2	PGS-36/G2	PGS-39/G2	PGS-42/G2	PGS-48/G2	PGS-56/G2
Thread type			**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Overall length	**L**	**mm**	**770**	**1025**	**1310**	**1520**	**1485**	**1735**	**2005**
Reinforcing steel diameter	d_s	mm	16	25	28	28	32	40	40
Overlap length	L_S	mm	635	870	1125	1335	1290	1530	1780
Thread length	l	mm	120	140	170	170	180	190	210
Protrusion	V	mm	635	870	1125	1335	1290	1530	1780
Wrench size	SW	mm	36	46	55	60	65	75	85
Washer diameter	D	mm	55	65	75	75	78	92	105
Reference number			**176066**	**176067**	**176068**	**448465**	**176069**	**176070**	**176071**

L_s: The foundation anchor lengths included in the tables are to be determined with the on-site conditions (concrete quality, bonding conditions, bar diameter, utilisation, bar and edge distances) according to EN 1992-1-1 para. 8.4.3 and para. 8.7.2 including NA.

Special lengths possible on request.

Design resistances according to table 1 – p. 34

- **No additional connecting bolts required**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Rigid friction-locked connection**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Free dimensioning software**
- **General technical approval (abZ)**

Component recommendation

- Column
- Foundation

Technical data

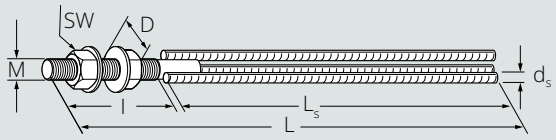
- **Material:** Bright steel

Options on request

- Further lengths

PGS/G3 Foundation Anchor

- Anchor with three straight bars for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes
- Foundation anchor and column shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed



PGS/G3 Foundation Anchor

PGS/G3 Foundation Anchor

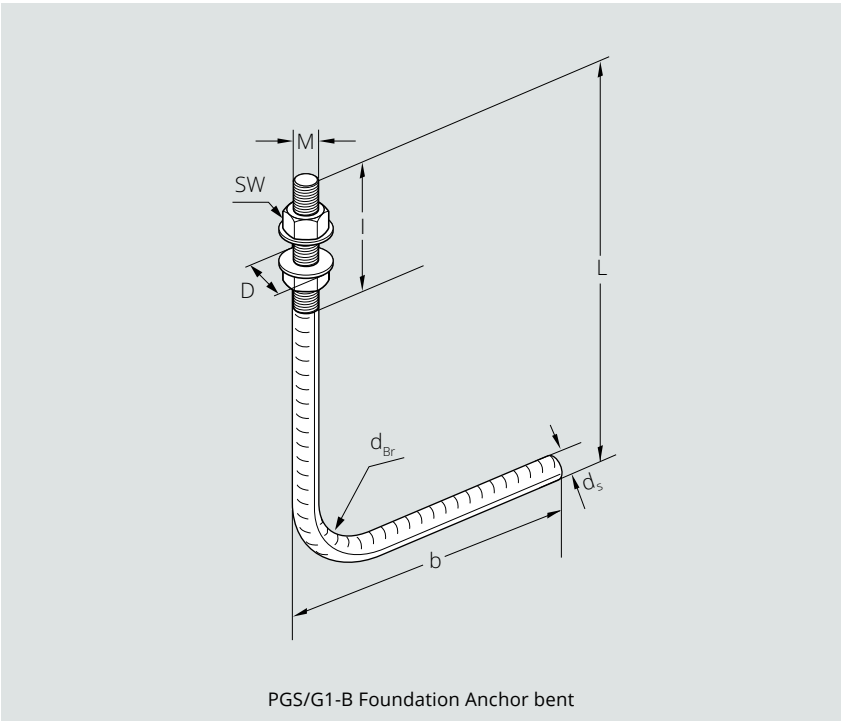
Type designation			PGS-24/G3	PGS-30/G3	PGS-36/G3	PGS-39/G3	PGS-42/G3	PGS-48/G3	PGS-56/G3
Thread type			**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Overall length	**L**	**mm**	**700**	**890**	**1040**	**1195**	**1150**	**1245**	**1605**
Reinforcing steel diameter	d_s	mm	12	20	25	25	28	32	32
Overlap length	L_S	mm	565	735	855	1010	955	1040	1380
Thread length	l	mm	120	140	170	170	180	190	210
Wrench size	SW	mm	36	46	55	60	65	75	85
Washer diameter	D	mm	55	65	75	25	78	92	105
Reference number			**176060**	**176061**	**176062**	**448569**	**176063**	**176064**	**176065**

L_s: The foundation anchor lengths included in the tables are to be determined with the on-site conditions (concrete quality, bonding conditions, bar diameter, utilisation, bar and edge distances) according to EN 1992-1-1 para. 8.4.3 and para. 8.7.2 including NA.

Special lengths possible on request.

Design resistances according to table 1 – p. 34

PGS/G1-B Foundation Anchor bent

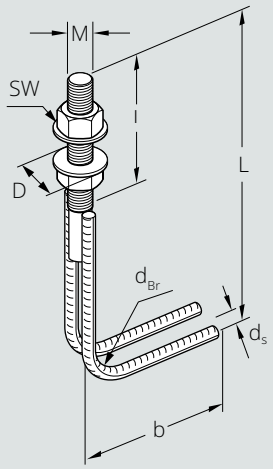


PGS/G1-B Foundation Anchor bent

PGS/G1-B Foundation Anchor bent

Type designation			**PGS-16/G1-B**	**PGS-20/G1-B**	**PGS-24/G1-B**	**PGS-30/G1-B**	**PGS-36/G1-B**
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**
Thread length	l	mm	100	110	120	140	170
Washer diameter	D	mm	45	45	55	65	75
Reinforcing steel diameter	d_s	mm	16	20	25	32	40
Diameter bending roller	$d_{Br\ min}$	mm	60	133	165	220	300
	L/b/d_{Br}	mm	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification
Reference number			**020337**	**020338**	**020339**	**020340**	**020341**

PGS/G2-B1 Foundation Anchor bent on one side

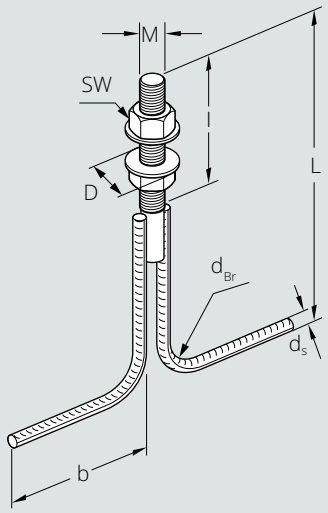


PGS/G2-B1 Foundation Anchor bent on one side

PGS/G2-B1 Foundation Anchor bent on one side

Type designation			**PGS-24/G2-B1**	**PGS-30/G2-B1**	**PGS-36/G2-B1**	**PGS-42/G2-B1**	**PGS-48/G2-B1**	**PGS-56/G2-B1**
Thread type			**M 24**	**M 30**	**M 36**	**M 42**	**M 48**	**M 56**
Thread length	l	mm	120	140	170	180	190	210
Washer diameter	D	mm	55	65	75	78	92	105
Reinforcing steel diameter	d_s	mm	16	25	28	32	40	40
Diameter bending roller	d_{Br}	mm	160	250	280	320	400	400
	L/b/ $d_{Br\ min}$	mm	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification
Measure 1 Minimum	L_{min}	mm	312	430	496	549	645	645
Measure 2 Minimum	b_{min}	mm	176	275	308	352	440	440
Reference number			**020302**	**020303**	**020304**	**020305**	**020306**	**020307**

PGS/G2-B2 Foundation Anchor bent on both sides



PGS/G2-B2 Foundation Anchor bent on both sides

PGS/G2-B2 Foundation Anchor bent on both sides

Type designation			**PGS-24/G2-B2**	**PGS-30/G2-B2**	**PGS-36/G2-B2**	**PGS-42/G2-B2**	**PGS-48/G2-B2**	**PGS-56/G2-B2**
Thread type			**M 24**	**M 30**	**M 36**	**M 42**	**M 48**	**M 56**
Thread length	l	mm	120	140	170	180	190	210
Washer diameter	D	mm	55	65	75	78	92	105
Reinforcing steel diameter	d_s	mm	16	25	28	32	40	40
Diameter bending roller	$d_{Br\ min}$	mm	160	250	280	320	400	400
	L/b/d_{Br}	mm	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification
Measure 1 Minimum	L_{min}	mm	312	430	496	549	645	645
Measure 2 Minimum	b_{min}	mm	176	275	308	352	440	440
Reference number			**020216**	**020217**	**020218**	**020219**	**020220**	**020221**

- **Low anchor height for less interference in the component**
- **No additional connecting bolts required**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Rigid friction-locked connection**
- **Subsequent adjustment u nder load possible with the aid of nuts**
- **Free dimensioning software**
- **General technical approval abZ)**
- **European Technical Assessment (ETA)**

Component recommendation

- Foundation

Technical data

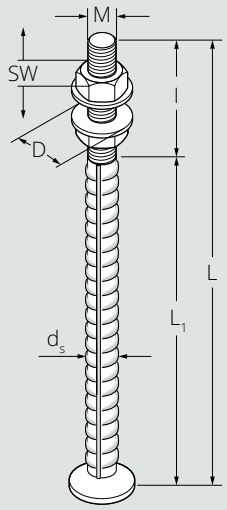
- **Material:** Bright steel

Options on request

- Further lengths

PGS/G1-K Foundation Anchor

- Anchor with swaged anchor base for anchoring static loads in the concrete base
- Use in combination with column shoes
- Foundation anchor and column shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed



G1-K Anchor Bolts

PGS/G1-K Foundation Anchor

Type designation			PGS-16/ G1-K-230	PGS-16/ G1-K-280	PGS-20/ G1-K-300	PGS-20/ G1-K-350	PGS-24/ G1-K-370	PGS-24/ G1-K-430	PGS-27/ G1-K-400	PGS-27/ G1-K-480
Thread type			**M16**	**M 16**	**M 20**	**M 20**	**M24**	**M 24**	**M27**	**M27**
Overall length	**L**	**mm**	**230**	**280**	**300**	**350**	**370**	**430**	**400**	**480**
Reinforcing steel diameter	d_s	mm	18	18	22	22	25	25	28	28
Development length	L_1	mm	130	180	190	240	250	310	270	350
Thread length	l	mm	100	100	110	110	120	120	130	130
Wrench size	SW	mm	SW 24	24	SW 30	30	SW 36	36	SW 41	SW 41
Washer diameter	D	mm	45	45	45	45	55	55	60	60
Reference number			**546710**	**281337**	**546711**	**281338**	**546712**	**281339**	**546713**	**546714**

PGS/G1-K Foundation Anchor

Type designation			PGS-30/ G1-K-440	PGS-30/ G1-K-500	PGS-30/ G1-K-550	PGS-36/ G1-K-580	PGS-36/ G1-K-700	PGS-39/ G1-K-620	PGS-39/ G1-K-700	PGS-39/ G1-K-750
Thread type			**M30**	**M30**	**M 30**	**M36**	**M 36**	**M39**	**M39**	**M 39**
Overall length	**L**	**mm**	**440**	**500**	**550**	**580**	**700**	**620**	**700**	**750**
Reinforcing steel diameter	d_s	mm	32	32	32	40	40	40	40	40
Development length	L_1	mm	300	360	410	410	530	450	530	580
Thread length	l	mm	140	140	140	170	170	100	100	170
Wrench size	SW	mm	SW 46	SW 46	46	SW 55	55	SW 60	SW 60	60
Washer diameter	D	mm	65	65	65	75	75	75	75	75
Reference number			**546715**	**225926**	**281340**	**546716**	**281341**	**547642**	**546717**	**289222**

Design resistances according to table 1 – p. 34

- **Thin foundations thicknesses are possible**
- **Low anchor height for less interference in the component**
- **No additional connecting bolts required**
- **Simple bolted connection with column shoe via integrated bolt**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Rigid friction-locked connection**
- **Free dimensioning software**
- **General technical approval (abZ)**

Component recommendation

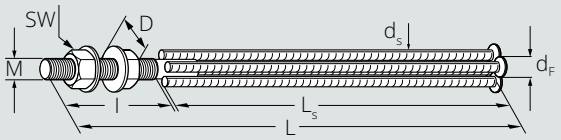
- Foundation

Technical data

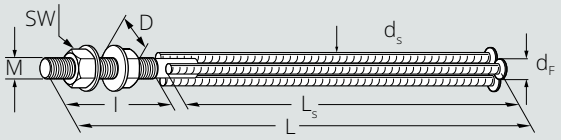
- **Material:** Bright steel

PGS/G2-K, G3-K and G4-K Foundation Anchors

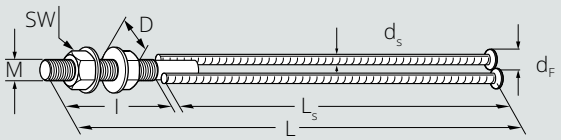
- Anchor with two, three or four swaged anchor bases for the anchoring of static loads in the concrete base
- Load introduction via the anchor bases into the component
- Use in combination with column shoes
- Foundation anchor and column shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed



PGS/G4-K



PGS/G3-K



PGS/G2-K

PGS/G2-K, G3-K and G4-K Foundation Anchors

Type designation			PGS-30/ G2-K	PGS-36/ G4-K	PGS-39/ G3-K	PGS-42/ G4-K	PGS-45/ G4-K	PGS-48/ G3-K	PGS-52/ G4-K	PGS-56/ G4-K	PGS-60/ G4-K
Thread type			**M 30**	**M 36**	**M 39**	**M 42**	**M 45**	**M 48**	**M 52**	**M 56**	**M 60**
Overall length	**L**	**mm**	**655**	**740**	**880**	**915**	**980**	**1015**	**1140**	**1265**	**1330**
Reinforcing steel diameter	d_s	mm	25	20	25	25	25	32	32	32	32
Overlap length	L_S	mm	500	555	675	700	765	800	890	1000	1055
Thread length	l	mm	140	170	190	200	200	200	235	250	260
Wrench size	SW	mm	SW 46	SW 55	SW 60	SW 65	SW 70	SW 75	SW 80	SW 85	SW 90
Washer diameter	D	mm	65	75	75	78	85	92	98	105	110
Reference number			**506913**	**506914**	**506915**	**506916**	**506917**	**506918**	**506919**	**506920**	**506921**

PGS/G1-DK Foundation Anchor

- **Minimum foundation thicknesses possible**
- **High design resistance values for tensile and compressive forces**
- **No additional connecting bolts required**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Rigid friction-locked connection**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Free dimensioning software**
- **General technical approval (abZ)**

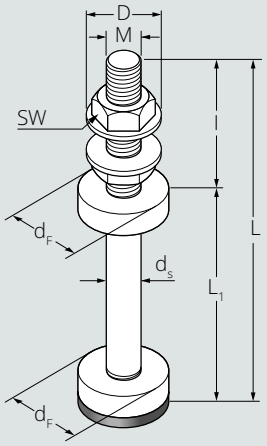
- Anchor with two pressure plates for anchoring static loads in the concrete base
- The two pressure plates can safely transmit the highest tensile and compressive forces
- Use in combination with column shoes
- Foundation anchor and column shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed.

Component recommendation

- Foundation

Technical data

- **Material:** Bright steel



PGS/G1-DK Foundation Anchor

PGS/G1-DK Foundation Anchor

Type designation			PGS-16/ G1-DK	PGS-20/ G1-DK	PGS-24/ G1-DK	PGS-30/ G1-DK	PGS-36/ G1-DK	PGS-42/ G1-DK	PGS-48/ G1-DK	PGS-56/ G1-DK
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**	**M 42**	**M 48**	**M 56**
Overall length	**L**	**mm**	**291**	**361**	**433**	**642**	**753**	**884**	**1015**	**1215**
Bar diameter	d_s	mm	16	20	24	30	36	42	48	56
Development length	L_1	mm	180	240	300	490	590	715	825	1005
Wrench size	SW	mm	SW 24	SW 30	SW 36	SW 46	SW 55	SW 65	SW 75	SW 85
Washer diameter	D	mm	45	45	55	65	75	78	92	105
Foot diameter	d_F	mm	40	50	60	85	100	115	130	150
Thread length	l	mm	110	120	130	150	160	170	190	210
Reference number			**222891**	**222892**	**222894**	**222895**	**222896**	**222897**	**222898**	**222899**

Design resistances according to table 1 – p. 34

- **No obtrusive threaded bolts protruding from the structural element**
- **Permits thinner foundations**
- **Simple bolted connection with column shoe/wall shoe via integrated bolt**
- **Free dimensioning software**
- **Rigid friction-locked connection**
- **Complete system for the transfer of tensile and transversal shear forces**
- **Type-approved**

Component recommendation

- Column
- Foundation
- Precast wall

Technical data

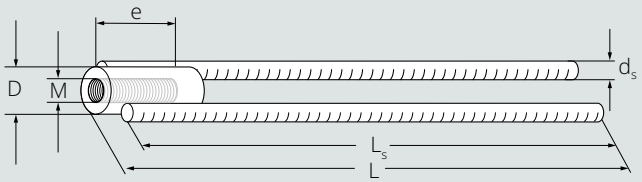
- **Material:** Bright steel

Options on request

- one-sided or double-sided curved design, other lengths

PGS/H2 Foundation Anchor

- Anchor with two straight bars for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes or wall shoes and connecting bolts
- Foundation anchor and column shoe/ wall shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed.



Foundation anchor PGS/H2 for PCC und PWS

PGS/H2 Foundation Anchor

Type designation			**PGS-16/H2**	**PGS-20/H2**	**PGS-24/H2**	**PGS-30/H2**	**PGS-36/H2**	**PGS-39/H2**	**PGS-42/H2**	**PGS-48/H2**	**PGS-56/H2**
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Overall length	**L**	**mm**	**510**	**600**	**645**	**880**	**1135**	**1345**	**1300**	**1540**	**1790**
Reinforcing steel diameter	d_s	mm	10	12	16	25	28	28	32	40	40
Overlap length	L_S	mm	500	590	635	870	1125	1335	1290	1530	1780
Socket diameter	D	mm	25	30	40	50	60	65	70	80	90
Thread engagement length	e	mm	24	30	36	45	54	59	63	72	84
Reference number			**200809**	**200811**	**200812**	**200813**	**200814**	**442416**	**200815**	**200816**	**200817**
External cap small (see page 29)											
Reference number			**118636**	**118642**	**118644**	**118647**	**118649**	**445445**	**135313**	**159041**	**137582**
PFEIFER PVB/PGV connecting bolts (see page 19)											
Reference number			**203111**	**203112**	**203113**	**203114**	**203115**	**445445**	**159040**	**159041**	**159042**

L_s: The foundation anchor lengths included in the tables are to be determined with the on-site conditions (concrete quality, bonding conditions, bar diameter, utilisation, bar and edge distances) according to EN 1992-1-1 para. 8.4.3 and para. 8.7.2 including NA.

Special lengths possible on request.

Design resistances according to table 1 – p. 34

- **No obtrusive threaded bolts protruding from the structural element**
- **Permits thinner foundations**
- **Simple bolted connection with column shoe/wall shoe via connecting bolt**
- **Free dimensioning software**
- **Rigid friction-locked connection**
- **Complete system for the transfer of tensile and transversal shear forces**
- **Type-approved**

Component recommendation

- Column
- Precast wall
- Foundation

Technical data

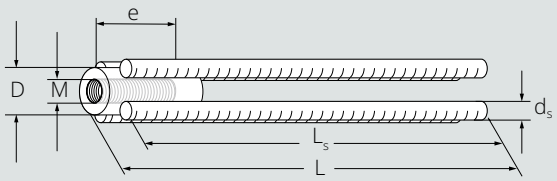
- **Material:** Bright steel

Options on request

- Further lengths

PGS/H4 Foundation Anchor

- Anchor with four straight bars for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes or wall shoes and connecting bolts
- Foundation anchor and column shoe/ wall shoe are each concreted into one component and can be connected to each other via the integrated threaded bolt. The recesses are then sealed.



Foundation anchor PGS/H4 for PCC und PWS

PGS/H4 Foundation Anchor

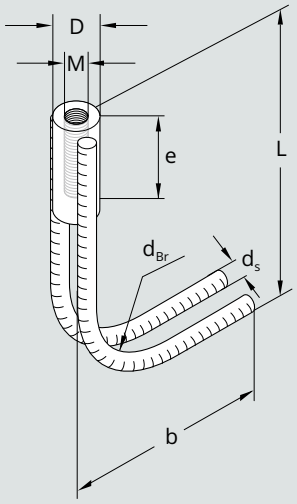
Type designation			PGS-20/H4	PGS-24/H4	PGS-30/H4	PGS-36/H4	PGS-39/H4	PGS-42/H4	PGS-48/H4	PGS-56/H4
Thread type			**M 20**	**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Overall length	**L**	**mm**	**375**	**445**	**705**	**815**	**960**	**860**	**1160**	**1205**
Reinforcing steel diameter	d_s	mm	10	12	16	20	20	25	25	28
Overlap length	L_S	mm	365	435	695	805	950	850	1150	1195
Socket diameter	D	mm	35	40	50	60	65	70	80	90
Thread engagement length	e	mm	30	36	45	54	59	63	72	84
Reference number			**200818**	**200819**	**200820**	**200821**	**442419**	**200822**	**200823**	**200824**
External cap small (see page 29)										
Reference number			**118642**	**118644**	**118647**	**118649**	**445445**	**135313**	**159041**	**137582**
PFEIFER PVB/PGV connecting bolts (see page 19)										
Reference number			**203112**	**203113**	**203114**	**203115**	**445445**	**159040**	**159041**	**159042**

L_s: The foundation anchor lengths included in the tables are to be determined with the on-site conditions (concrete quality, bonding conditions, bar diameter, utilisation, bar and edge distances) according to EN 1992-1-1 para. 8.4.3 and para. 8.7.2 including NA.

Special lengths possible on request.

Design resistances according to table 1 – p. 34

PGS/H2-B1 Foundation Anchor bent on one side

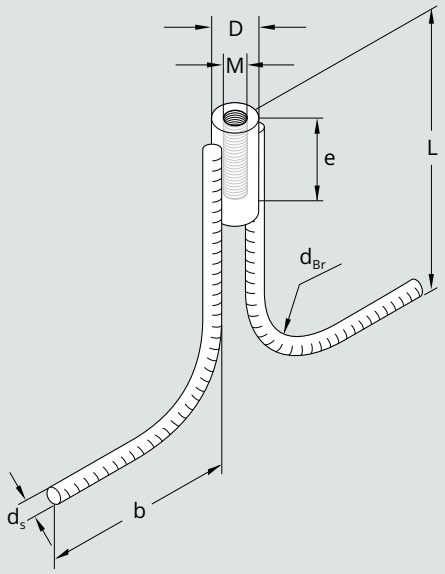


PGS/H2-B1 Foundation Anchor bent on one side

PGS/H2-B1 Foundation Anchor bent on one side

Type designation			**PGS-16/ H2-B1**	**PGS-20/ H2-B1**	**PGS-24/ H2-B1**	**PGS-30/ H2-B1**	**PGS-36/ H2-B1**	**PGS-39/ H2-B1**	**PGS-42/ H2-B1**	**PGS-48/ H2-B1**	**PGS-56/ H2-B1**
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Measure 1 Minimum	L_{min}	mm	140	159	192	285	321	321	364	450	450
Measure 2 Minimum	b_{min}	mm	110	132	176	275	308	308	352	440	440
Thread engagement length	e	mm	24	30	36	45	54	59	63	72	84
Washer diameter	D	mm	25	30	40	50	60	65	70	80	90
Reinforcing steel diameter	d_s	mm	10	12	16	25	28	28	32	40	40
Diameter bending roller	d_{Br}	mm	100	120	160	250	280	280	320	400	400
	L/b/d_{Br}	mm	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification
Reference number			**020262**	**020263**	**020264**	**020265**	**020266**	**020444**	**020267**	**020268**	**020269**
External cap small (see page 29)											
Reference number			**118636**	**118642**	**118644**	**118647**	**118649**	**445445**	**135313**	**159041**	**137582**
PFEIFER PVB/PGV connecting bolts (see page 19)											
Reference number			**203111**	**203112**	**203113**	**203114**	**203115**	**445445**	**159040**	**159041**	**159042**

PGS/H2-B2 Foundation Anchor bent on both sides



PGS/H2-B2 Foundation Anchor bent on both sides

PGS/H2-B2 Foundation Anchor bent on both sides

Type designation			**PGS-16/ H2-B2**	**PGS-20/ H2-B2**	**PGS-24/ H2-B2**	**PGS-30/ H2-B2**	**PGS-36/ H2-B2**	**PGS-39/ H2-B2**	**PGS-42/ H2-B2**	**PGS-48/ H2-B2**	**PGS-56/ H2-B2**
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Measure 1 Minimum	L_{min}	mm	140	159	192	285	321	321	364	450	450
Measure 2 Minimum	b_{min}	mm	110	132	176	275	308	308	352	440	440
Thread engagement length	e	mm	24	30	36	45	54	59	63	72	84
Washer diameter	D	mm	25	30	40	50	60	65	70	80	90
Reinforcing steel diameter	d_s	mm	10	12	16	25	28	28	32	40	40
Diameter bending roller	d_{Br}	mm	100	120	160	250	280	280	320	400	400
	L/b/d_{Br}	mm	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification	Customer specification
Reference number			**020254**	**020255**	**020256**	**020257**	**020258**	**020443**	**020259**	**020260**	**020261**
External cap small (see page 29)											
Reference number			**118636**	**118642**	**118644**	**118647**	**118649**	**445445**	**135313**	**159041**	**137582**
PFEIFER PVB/PGV connecting bolts (see page 19)											
Reference number			**203111**	**203112**	**203113**	**203114**	**203115**	**445445**	**159040**	**159041**	**159042**

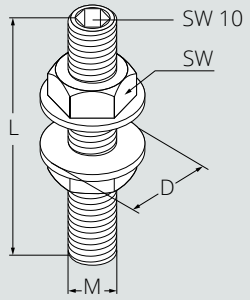
- **No obtrusive threaded bolts protruding from the structural element**
- **Simple bolted connection with column shoe via connecting bolt**
- **High-tensile material**
- **Subsequent adjustment under load possible with the aid of nuts**
- **Rigid friction-locked connection**
- **Type-approved**

Technical data

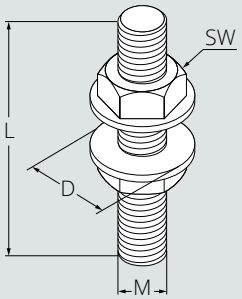
- **Material:** Bright steel

PFEIFER PVB/PGV connecting bolts for PCC and PWC

- For connecting column shoes and foundation anchors, type H/female bar
- Bolt can be fastened into the foundation anchor/female bar shortly before installation. The column shoe can then be fitted on top and tightened. Nuts and washers allow height adjustment and alignment under load



PGV Connecting Bolt



PVB Connecting Bolt

PFEIFER PVB/PGV connecting bolts for PCC and PWC

Type designation			PVB/ PGV-16	PVB/ PGV-20	PVB/ PGV-24	PVB/ PGV-30	PVB/ PGV-36	PVB/ PGV-39	PVB/ PGV-42	PVB/ PGV-48	PVB/ PGV-56
Thread type			**M 16**	**M 20**	**M 24**	**M 30**	**M 36**	**M 39**	**M 42**	**M 48**	**M 56**
Wrench size	SW	mm	SW 24	SW 30	SW 36	SW 46	SW 55	SW 60	SW 65	SW 75	SW 85
Washer diameter	D	mm	45	45	55	65	75	75	78	92	105
Threaded rod length	L	mm	130	145	160	195	230	240	240	270	300
Reference number			**203111**	**203112**	**203113**	**203114**	**203115**	**445445**	**159040**	**159041**	**159042**

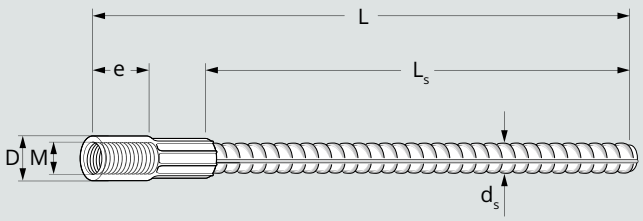
- **No obtrusive threaded bolts protruding from the structural element**
- **Permits thinner foundations**
- **Simple bolted connection with column shoe via connecting bolt**
- **Rigid friction-locked connection**
- **Complete system for the transfer of tensile forces**

Technical data

- **Material:** Reinforcing steel bar B500 A/B

PH-MU female bar for PCC

- Anchor with a straight bar for anchoring static loads in the concrete base
- Load transfer into the component via bond using an end anchorage or overlapping joint according to standard
- Use in combination with column shoes and connecting bolts
- Female bar and column shoe are each concreted into one component. Can be bolted together for connection via a separate connecting bolt. The recesses are then sealed



PH-MU female bar

PH-MU Female Bar – bare steel

Type designation			PH-MU-16/570	PH-MU-16/800	PH-MU-16/1500	PPH-MU-20/1020	PH-MU-20/1440	PH-MU-20/2000	PH-MU-24/1280	PH-MU-24/1800
Thread type			**M 16**	**M 16**	**M 16**	**M 20**	**M 20**	**M 20**	**M 24**	**M 24**
Overall length	L	mm	570	800	1500	1020	1440	2000	1280	1800
Overlap length	L_s	mm	520	750	1450	955	1375	1935	1195	1715
Thread engagement length	e	mm	20	20	20	24	24	24	32	32
Socket diameter	D	mm	22,3	22,3	22,3	28,8	28,8	28,8	35,3	35,3
Reinforcing steel diameter	d_s	mm	12	12	12	16	16	16	20	20
Reference number			**119057**	**119058**	**119059**	**119067**	**119069**	**119070**	**119073**	**119075**
PFEIFER PVB/PGV connecting bolts (see page 19)										
Reference number			**203111**	**203111**	**203111**	**203112**	**203112**	**203112**	**203113**	**203113**

PH-MU Female Bar – bare steel

Type designation			PH-MU-24/3000	PH-MU-30/1600	PH-MU-30/2260	PH-MU-30/3600	PH-MU-36/1790	PH-MU-36/2530	PH-MU-36/3600
Thread type			**M 24**	**M 30**	**M 30**	**M 30**	**M 36**	**M 36**	**M 36**
Overall length	L	mm	3000	1600	2260	3600	1790	2530	3600
Overlap length	L_s	mm	2915	1497	2157	3497	1666	2406	3476
Thread engagement length	e	mm	32	40	40	40	42	42	42
Socket diameter	D	mm	35,3	44,1	44,1	44,1	51,0	51,0	51,0
Reinforcing steel diameter	d_s	mm	20	25	25	25	28	28	28
Reference number			**119076**	**119081**	**119082**	**119083**	**119088**	**119089**	**119090**
PFEIFER PVB/PGV connecting bolts (see page 19)									
Reference number			**203113**	**203114**	**203114**	**203114**	**203115**	**203115**	**203115**

Design resistances according to table 1 – p. 34

Note:

Reduced design resistances must be considered! The full design resistance of the column shoes cannot be used.

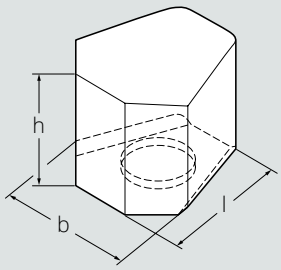
- **Easy implementation of a threaded opening**
- **Different versions – different service lives**
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Polystyrene

Moulding insert corner installation for PCC

- For the professional execution of the necessary recess for fastening of PCC columns
- Special moulding inserts are added before concreting to secure the formwork to prevent the column shoe from being filled with concrete. After demoulding, the moulding inserts are removed, leaving a precisely fitting recess for fastening. This is cast after assembly



Polystyrene

Moulding insert corner installation for PCC

Type designation			AKE-S-16	AKE-S-20	AKE-S-24	AKE-S-27	AKE-S-30-1	AKE-S-30-2	AKE-S-36	AKE-S-39-1	AKE-S-39-2
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-27**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Box length	l	mm	90	95	100	106,5	112,5	121	119	125	124
Box width	b	mm	89	97	100	110	119	119	132	136	131,5
Box height	h	mm	75	85	95	105	105	105	125	130	135
Reference number			**278934**	**278935**	**278936**	**549450**	**278937**	**278938**	**278939**	**442816**	**442817**
Retaining bush (see page 27)											
Reference number			**275657**	**275658**	**275659**	**549454**	**275660**	**275661**	**275662**	**443004**	**443005**
Fixing screw (see page 28)											
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

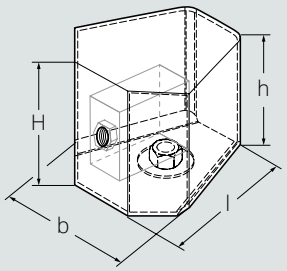
- **Easy implementation of a threaded opening**
- **Different versions – different service lives**
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Rubber

Moulding insert corner installation for PCC

- For the professional execution of the necessary recess for fastening of PCC columns
- Special moulding inserts are added before concreting to secure the formwork to prevent the column shoe from being filled with concrete. After demoulding, the moulding inserts are removed, leaving a precisely fitting recess for fastening. This is cast after assembly



Rubber

Moulding insert corner installation for PCC

Type designation			**AKE-G-16**	**AKE-G-20**	**AKE-G-24**	**AKE-G-30-1**	**AKE-G-30-2**	**AKE-G-36**	**AKE-G-39-1**	**AKE-G-39-2**
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Thread type			M 16	M 16	M 16	M 16	M 16	M 16	M 16	M 16
Box length	l	mm	88	93	98	111	119	117	123	122
Box width	b	mm	89	97	100	119	119	132	136	132
Box height, high side	H	mm	75	85	95	105	105	125	130	135
Box height, low side	h	mm	67,3	76,9	87,4	96,3	95,6	115,8	120	125
Reference number			**337908**	**337909**	**337910**	**337911**	**337912**	**337913**	**442822**	**442823**
Positioning socket (see page 26)										
Reference number			**279424**	**279425**	**279426**	**279427**	**279428**	**279429**	**443016**	**443017**
Fixing screw (see page 28)										
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

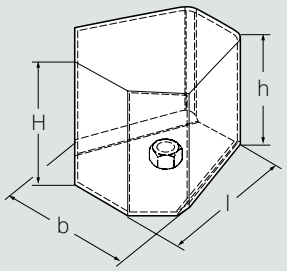
- **Easy implementation of a threaded opening**
- **Different versions – different service lives**
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Metal

Moulding insert corner installation for PCC

- For the professional execution of the necessary recess for fastening of PCC columns
- Special moulding inserts are added before concreting to secure the formwork to prevent the column shoe from being filled with concrete. After demoulding, the moulding inserts are removed, leaving a precisely fitting recess for fastening. This is cast after assembly



Metal

Moulding insert corner installation for PCC

Type designation			**AKE-M-16**	**AKE-M-20**	**AKE-M-24**	**AKE-M-30-1**	**AKE-M-30-2**	**AKE-M-36**	**AKE-M-39-1**	**AKE-M-39-2**
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Thread type			M 16	M 16	M 16	M 16	M 16	M 16	M 16	M 16
Box length	l	mm	88	93	98	111	119	117	123	122
Box width	b	mm	89	97	97	119	119	132	136	132
Box height, high side	H	mm	75	85	85	105	105	125	130	135
Box height, low side	h	mm	67,3	76,9	87,4	96,3	95,6	115,8	120	125
Colour coding			Sulphur yellow	Light blue	Silver grey	Emerald green	Pure white	Flame red	Water blue	Sun yellow
Reference number			**325859**	**325860**	**325861**	**325862**	**325863**	**325864**	**442818**	**442819**
Positioning socket (see page 26)										
Reference number			**279424**	**279425**	**279426**	**279427**	**279428**	**279429**	**443016**	**443017**
Fixing screw (see page 28)										
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

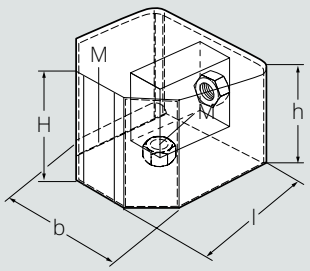
- **Easy implementation of a threaded opening**
- **Different versions – different service lives**
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Rubber

Moulding insert lateral installation for PCC

- For the professional execution of the necessary recess for fastening of PCC columns
- Special moulding inserts are added before concreting to secure the formwork to prevent the column shoe from being filled with concrete. After demoulding, the moulding inserts are removed, leaving a precisely fitting recess for fastening. This is cast after assembly



Rubber

Moulding insert lateral installation for PCC

Type designation			AKS-G-16	AKS-G-20	AKS-G-24	AKS-G-30-1	AKS-G-30-2	AKS-G-36	AKS-G-39-1	AKS-G-39-2
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Thread type			M 16	M 16	M 16	M 16	M 16	M 16	M 16	M 16
Box length	l	mm	90	95	100	112,25	121	119	123	122
Box width	b	mm	106	116	120	146	146	169	163	161
Box height, high side	H	mm	103,5	114	117,5	144	142,5	158	130	125
Box height, low side	h	mm	75	85	95	105	105	125	120	115
Reference number			**432551**	**432553**	**432554**	**432555**	**432556**	**432557**	**442824**	**442825**
Positioning socket (see page 26)										
Reference number			**279424**	**279425**	**279426**	**279427**	**279428**	**279429**	**443016**	**443017**
Fixing screw (see page 28)										
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

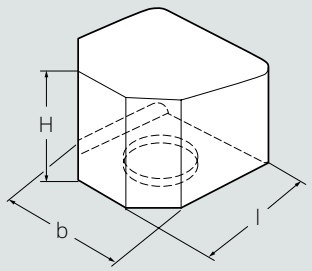
- **Easy implementation of a threaded opening**
- **Different versions – different service lives**
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Polystyrene

Moulding insert lateral installation for PCC

- For the professional execution of the necessary recess for fastening of PCC columns
- Special moulding inserts are added before concreting to secure the formwork to prevent the column shoe from being filled with concrete. After demoulding, the moulding inserts are removed, leaving a precisely fitting recess for fastening. This is cast after assembly



Polystyrene

Moulding insert lateral installation for PCC

Type designation			AKS-S-16	AKS-S-20	AKS-S-24	AKS-S-27	AKS-S-30-1	AKS-S-30-2	AKS-S-36	AKS-S-39-1	AKS-S-39-2
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-27**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Box length	l	mm	90	95	100	106,5	112,5	121	119	125	124
Box width	b	mm	106	116,5	120,5	134	146,5	146,5	160,5	167	157
Box height	H	mm	75	85	95	105	105	105	125	130	125
Reference number			**278982**	**278983**	**278984**	**549452**	**278985**	**278986**	**278987**	**442831**	**442832**
Retaining bush (see page 27)											
Reference number			**275657**	**275658**	**275659**	**549454**	**275660**	**275661**	**275662**	**443004**	**443005**
Fixing screw (see page 28)											
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

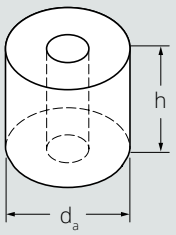
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Socket material:** Steel, galvanised

Positioning socket for PCC

- Assembly tool for usage in combination with rubber and metal moulding inserts
- Fills the hole on the underside of the column shoe exactly and tapers it to the diameter of a suitable fixing screw
- Proper fixing and positioning of the column shoes on the formwork with the help of a separately available fixing screw



PCC positioning socket

Positioning socket for PCC

Type designation			**POS-16**	**POS-20**	**POS-24**	**POS-27**	**POS-30-1**	**POS-30-2**	**POS-36**	**POS-39-1**	**POS-39-2**
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-27**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Thread type			**M 16**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**
Outer diameter	d_a	mm	26	28	33	38	38	43	51	53	53
Overall height	h	mm	14	19	24	29	29	34	39	34	39
Reference number			**279424**	**279425**	**279426**	**549520**	**279427**	**279428**	**279429**	**443016**	**443017**
Fixing screw (see page 28)											
Reference number			**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

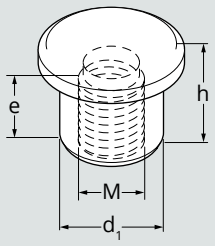
- **Fitting accuracy – coordinated system components**
- **Clean and professional formwork fixing**

Technical data

- **Material:** Steel, galvanised

Retaining bush for PCC

- Assembly tool for usage in combination with polystyrene moulding inserts
- The head of the retaining bush fits exactly into the recess on the underside of the moulding insert and remains in position
- Professional fixing and positioning of the column shoes on the formwork with the help of the fixing screw. This can be screwed through the formwork into the internal thread of the retaining bush



PCC Retaining Bush

Retaining bush for PCC

Type designation			**HB-16**	**HB-20**	**HB-24**	**HB-27**	**HB-30-1**	**HB-30-2**	**HB-36**	**HB-39-1**	**HB-39-2**
For type			**PCC-16**	**PCC-20**	**PCC-24**	**PCC-27**	**PCC-30-1**	**PCC-30-2**	**PCC-36**	**PCC-39-1**	**PCC-39-2**
Thread type			**M 10**	**M 10**	**M 10**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**	**M 16**
Butt diameter	d_1	mm	26	28	33	38	38	43	51	53	53
Overall height	h	mm	20	25	30	35	35	40	45	42	47
Thread engagement length	e	mm	14	19	24	29	29	34	39	34	39
Reference number			**275657**	**275658**	**275659**	**549454**	**275660**	**275661**	**275662**	**443004**	**443005**
Fixing screw (see page 28)											
Reference number			**118544**	**118544**	**118544**	**118547**	**118547**	**118547**	**118547**	**118547**	**118547**

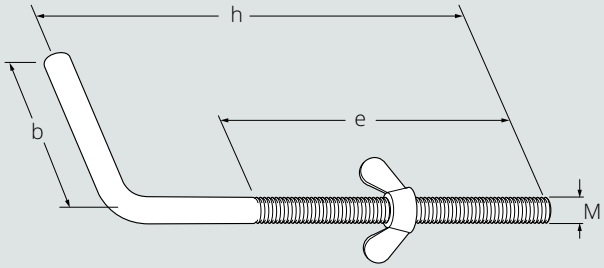
- **Can be easily hand-tightened via L-shape and wing nut**
- **Suitable for different formwork thicknesses**
- **Reusability**

Technical data

- **Material:** Steel, galvanised

Fixing screw

- Can be used in combination with various PFEIFER accessories for formwork fixings



Fixing screw

Fixing screw						
Type designation			**FIX-ZN-6**	**FIX-ZN-8**	**FIX-ZN-10**	**FIX-ZN-16**
Thread type			**M 6**	**M 8**	**M 10**	**M 16**
Flank width	b	mm	60	60	60	60
Thread engagement length	e	mm	80	80	110	130
Overall height	h	mm	120	120	150	180
Reference number			**118542**	**118543**	**118544**	**118547**

Combination options – Assembly accessories

		Installation method		
Corner installation		Retaining bush HB 16 to HB-24 with fixing screw M 10	Retaining bush HB-30-1 to HB-39-2 with fixing screw M 16	Positioning socket POS-16 to POS-39-2 with fixing screw M 16
Corner installation	Moulding insert polystyrene corner	✓	✓	
	Moulding insert rubber corner			✓
	Moulding insert metal corner			✓
Side installation	Moulding insert polystyrene side	✓	✓	
	Moulding insert rubber side			✓

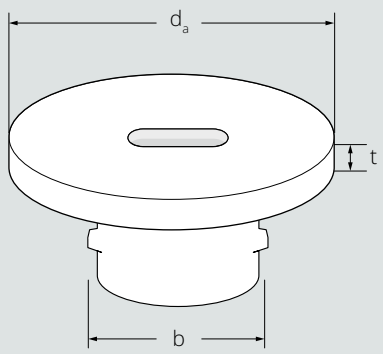
- **Time-saving anchor closures**
- **Economical**

Technical data

- **Material:** Plastic

External cap small

- Flexible closure of threaded anchors



External cap small

External cap small

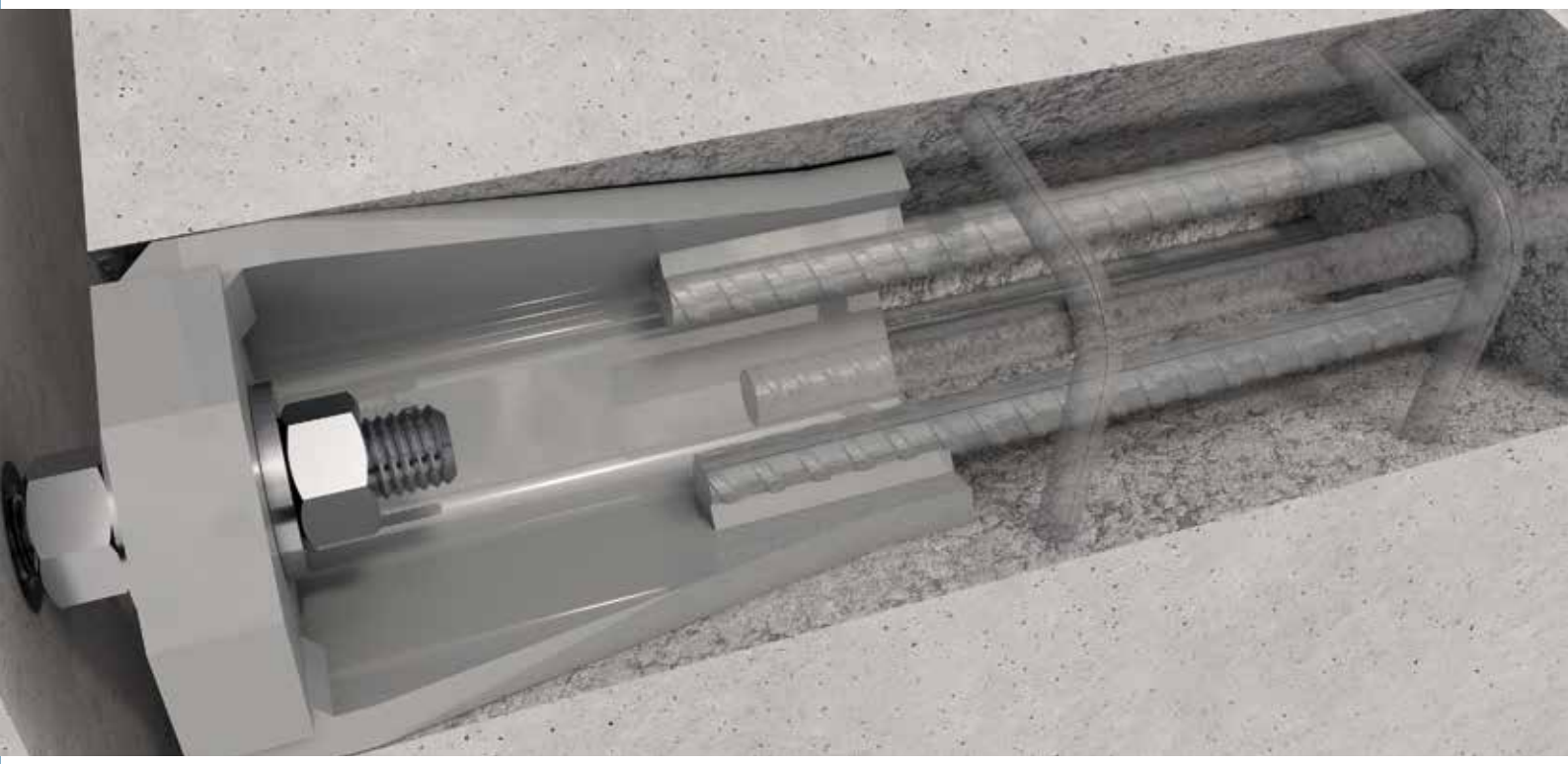
Type designation			ASK-12	ASK-16	ASK-20	ASK-24	ASK-30
For type/size			Rd12	Rd16	Rd20	Rd24	Rd30
Outer diameter	d_a	mm	18,5	25,5	31,5	35	44
Flank width	b	mm	12	16	20	24	30
Plate thickness	t	mm	2	2,5	3	3	3,5
Reference number			**118632**	**118636**	**118642**	**118644**	**118647**

External cap small

Type designation			ASK-36	ASK-42	ASK-52	ASK-56	ASK-60
For type/size			Rd36	Rd42	Rd52	Rd56	Rd60
Outer diameter	d_a	mm	52,5	73	59,5	75	80
Flank width	b	mm	36	52	42	56	60
Plate thickness	t	mm	3,5	4	4	4	4
Reference number			**118649**	**118653**	**135313**	**137582**	**137583**

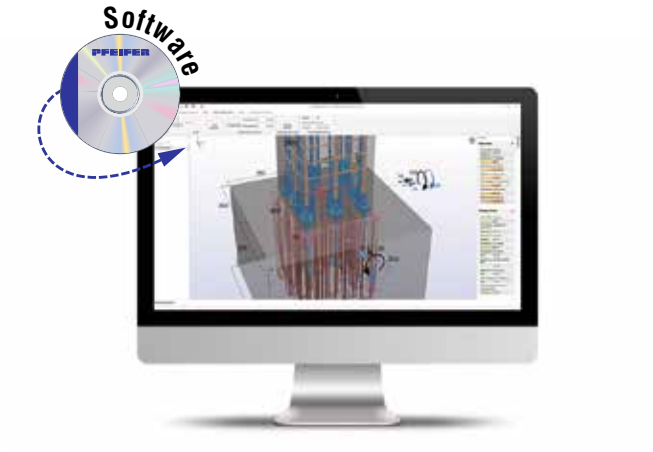
Dimensioning

Dimensioning tools



Software

The dimensioning software is available free of charge after a short registration procedure. This allows you to perform a quick and easy dimensioning for the column shoe system and create a verifiable printout.



Download now or use directly online at:

www.pfeifer-suite.info

Tables

There are easy dimensioning tables available for quick preliminary dimensioning of the column shoe system as a rigid bolted connection of concrete elements. The geometric dimensions of the column and the wind zone serve as the input values.

Download now or use directly online at:

www.pfeifer.info/stuetzenfuss-pcc

Downloads

Application

Component recommendations

Connecting element	Anchoring base		
	Foundation	Column	Joist
PCC Column Shoe	✗	✓	✓
Foundation anchors PGS/G1	✓	✓	✓
Foundation anchors PGS/G2	✓	✓	✓
Foundation anchors PGS/G3	✓	✓	✓
Foundation anchors PGS/G1-K	✓	✗	✗
Foundation anchors PGS/G1-DK	✓	✗	✗
Foundation anchors PGS/H2	✓	✓	✓
Foundation anchors PGS/H4	✓	✓	✓
PH-MU female bar	✓	✓	✓

Approvals and type-static calculation tests

Download now at:
www.pfeifer.info/stuetzenfusssystem

Static systems

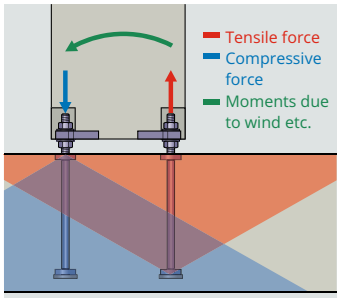


Figure 12

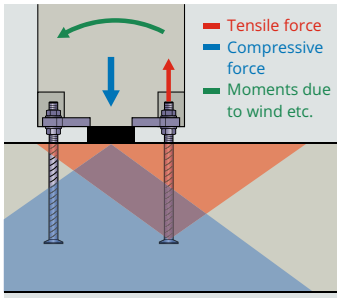


Figure 13

The static calculation distinguishes between the assembly state (Fig. 12/13) and the final state (Fig. 14).

Here, the bolt cross-section can be applied according to a standard reinforced concrete bending dimensioning according to EN 1992-1-1. The substitute cross-sections can be taken from Table 1.

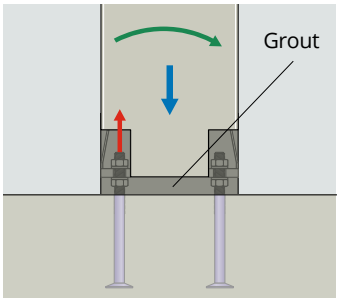


Figure 14

Note:

TR068 (Design of structural connections with Column Shoes) is also to be observed especially for the proofs of the column shoes.

Minimum requirement for components

Column:
- Concrete quality ≥ C30/37
- Additional reinforcement according to section "Column" (Page 35)
- Reinforcement based on column dimensioning

Foundation:
- Concrete quality ≥ C20/25, good bond
- Additional reinforcement according to approval/standard
- Reinforcement based on foundation design

Combination variants

Exemplary representations of potential combination variants to explain important dimensions. All combinations in table 1.

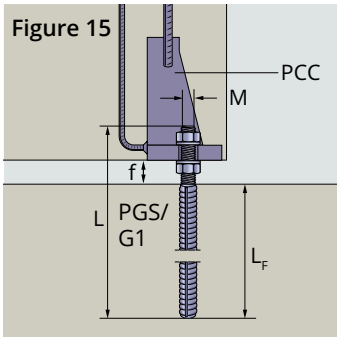


Figure 15

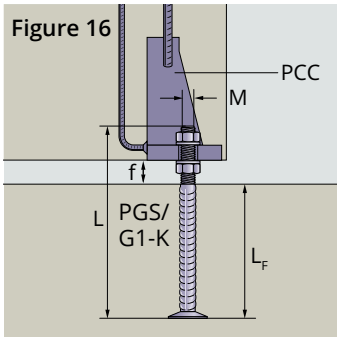


Figure 16

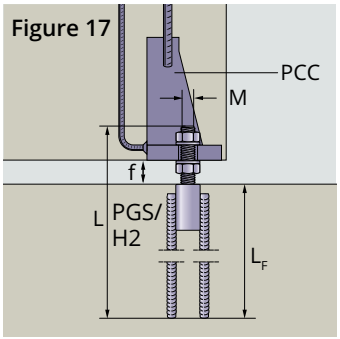


Figure 17

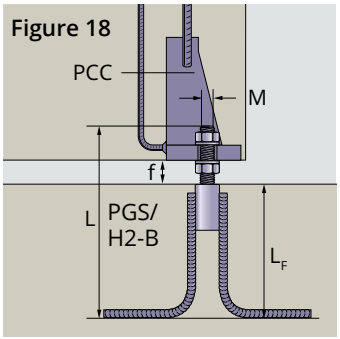


Figure 18

Combination variants

Table 1: Combination variants

Foundation anchor/female bar	Column shoe	Thread size	Length L [mm]	System resistance N_{Rd} [kN]	Static substitute cross-section BSt [mm^2]	Embedment depth L_F [mm]	Maximum joint thickness f [mm]
PGS-16-G1	PCC-16	M 16	790/1270	61,7	142	690/1170	50
PGS-16-G1-K		M 16	280	61,7	142	180	50
PGS-16-G1-DK		M 16	290	68,0	156	180	50
PGS-16-H2		M 16	615	68,0	156	510	50
PGS-16-H2-B		M 16	on request	68,0	156	–	50
PH-MU-12		M 16	on request	49,2	114	–	50
PH-MU-16		M 20	on request	68,0	156	–	50
PGS-20-G1	PCC-20	M 20	970/1570	96,2	222	860/1460	50
PGS-20-G1-K		M 20	350	96,2	222	240	50
PGS-20-G1-DK		M 20	360	97,0	223	240	50
PGS-20-H2		M 20	715	97,0	223	600	50
PGS-20-H4		M 20	490	97,0	223	375	50
PGS-20-H2-B		M 20	on request	97,0	223	–	50
PH-MU-16		M 20	on request	87,4	201	–	50
PH-MU-20		M 24	on request	97,0	223	–	50
PGS-24-G1	PCC-24	M 24	1110/1810	138,5	319	990/1690	50
PGS-24-G1-K		M 24	430	138,5	319	310	50
PGS-24-G1-DK		M 24	430	139,0	320	300	50
PGS-24-G2		M 24	770	139,0	320	650	50
PGS-24-G3		M 24	700	139,0	320	580	50
PGS-24-G2-B		M 24	on request	139,0	320	–	50
PGS-24-H2		M 24	770	139,0	320	645	50
PGS-24-H4		M 24	570	139,0	320	445	50
PGS-24-H2-B		M 24	on request	139,0	320	–	50
PH-MU-20		M 24	on request	136,6	314	–	50
PGS-27-G1-K	PCC-27	M 27	400/480	180	414	270/350	55
PGS-30-G1	PCC-30-1	M 30	1360/2230	220,0	506	1220/2090	60
PGS-30-G1-K		M 30	550	220,0	506	410	60
PGS-30-G1-DK		M 30	640	220,0	506	490	60
PGS-30-G2		M 30	1025	220,0	506	885	60
PGS-30-G3		M 30	890	220,0	506	750	60
PGS-30-G2-B		M 30	on request	220,0	506	–	60
PGS-30-H2		M 30	1030	220,0	506	880	60
PGS-30-H4		M 30	855	220,0	506	705	60
PGS-30-H2-B		M 30	on request	220,0	506	–	60
PH-MU-25		M 30	on request	213,4	491	–	60
PGS-36-G1	PCC-30-2	M 36	1740/2820	299,0	687	1570/2650	60
PGS-36-G1-K		M 36	700	299,0	687	410	60
PGS-30-G1-DK		M 30	640	299,0	687	490	60
PGS-30-G2		M 30	1025	299,0	687	885	60
PGS-30-G3		M 30	890	299,0	687	750	60
PGS-30-G2-B		M 30	on request	299,0	687	–	60
PGS-30-H2		M 30	1030	299,0	687	880	60
PGS-30-H4		M 30	855	299,0	687	705	60
PGS-30-H2-B		M 30	on request	299,0	687	–	60
PH-MU-28		M 36	on request	267,7	615	–	60
PGS-36-G1	PCC-36	M 36	1740/2820	320,9	738	1570/2650	70
PGS-36-G1-K		M 36	700	320,9	738	530	70
PGS-39-G1		M 39	2020/3330	383,4	881	1850/3160	70
PGS-39-G1-K		M 39	750	383,4	881	580	70
PGS-36-G1-DK		M 36	750	435,3	1001	590	70
PGS-36-G2		M 36	1310	436,0	1002	1140	70
PGS-36-G3		M 36	1040	436,0	1002	870	70
PGS-36-G2-B		M 36	on request	436,0	1002	–	70
PGS-36-H2		M 36	1310	436,0	1002	1135	70
PGS-36-H4		M 36	990	436,0	1002	815	70
PGS-36-H2-B		M 36	on request	436,0	1002	–	70
PGS-39-G1	PCC-39-1	M 39	2020/3330	383,0	881	1850/3160	70
PGS-39-G1-K		M 39	750	383,0	881	580	70
PGS-36-G1-DK		M 36	750	383,0	881	590	70
PGS-36-G2		M 36	1310	383,0	881	1140	70
PGS-36-G3		M 36	1040	383,0	881	870	70
PGS-36-G2-B		M 36	on request	383,0	881	–	70
PGS-36-H2		M 36	1310	383,0	881	1135	70
PGS-36-H4		M 36	990	383,0	881	815	70
PGS-36-H2-B		M 36	on request	383,0	881	–	70
PGS-42-G1-DK	PCC-39-2	M 42	885	521,0	1198	715	70
PGS-39-G2		M 39	1540	521,0	1198	1350	70
PGS-39-G3		M 39	1215	521,0	1198	1025	70
PGS-39-G2-B		M 39	on request	521,0	1198	–	70
PGS-39-H2		M 39	1525	521,0	1198	1345	70
PGS-39-H4		M 39	1140	521,0	1198	960	70
PGS-39-H2-B		M 39	on request	521,0	1198	–	70

Reinforcement layout and dimensioning of the PCC Column Shoe

The PCC Column Shoes are integrated in the column reinforcement. The two front reinforcement bars form an overlapping joint with the longitudinal reinforcement of the column. The transverse reinforcement in the region of the overlapping joints between the main anchoring bars of the PCC Column Shoes and the respective longitudinal reinforcement of the column is not part of this description. Also not part of the software! The proofs shall be provided in the individual case by the responsible planner within the context of the static calculation of the precast elements according to the applicable standard. The reinforcing steel stirrups, pos. 1/2 shown in figures 19–21 are intended for the absorption of regular tensile forces arising from tensile and compressive stresses acting on the PCC Column Shoes. The determination of the overlap lengths and shear reinforcement of the main anchoring bars shall be in accordance with EN 1992-1-1, section 8.4 or 8.7 respectively. It is assumed that the column shoes are installed in linear elements (e.g. columns) in factory production, taking into account maximum cross-sectional dimensions of 500 mm, and that common external/surface vibrators are used for compacting. For this application case, good bonding conditions can be assumed in accordance with EN 1992-1-1/NA, NCI to 8.4.2.

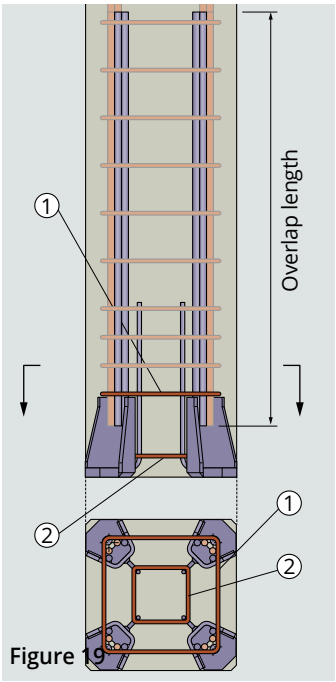


Figure 19

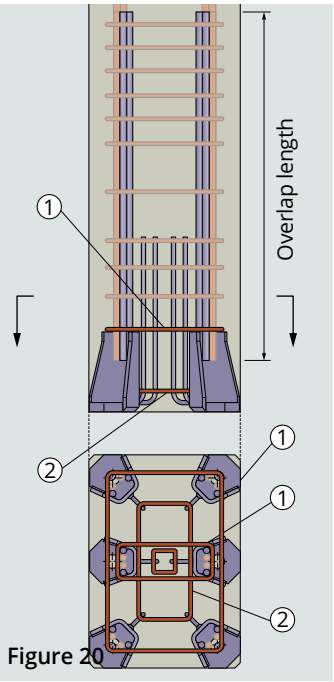


Figure 20

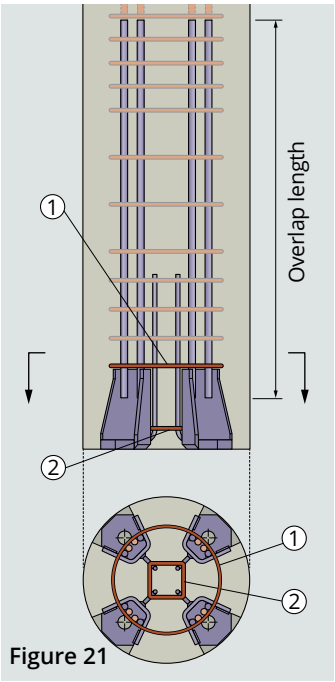


Figure 21

Table 2: Additional links depending on column shoe arrangement

Type designation	Array of 4		General (Figure 20)		Round column		Overlap length1[1)]	Total height of the Column Shoe
	Pos.1/2 [cm²]	Ø [mm]	Pos.1/2 [cm²]	Ø [mm]	Pos.1/2 [cm²]	Ø [mm]	[mm]	[mm]
PCC-16	0,13	8	0,18	8	0,25/0,18	8	650	745
PCC-20	0,19	8	0,27	8	0,36/0,27	8	800	910
PCC-24	0,29	8	0,41	8	0,55/0,41	8	1000	1125
PCC-27	0,47	8	0,66	8	0,89/0,66	10/8	1040	1135
PCC-30-1	0,64	8	0,91	8	1,21/0,91	10/8	1260	1400
PCC-30-2	0,90	8	1,27	10	1,70/1,27	12/10	1360	1505
PCC-36	0,97	8	1,37	10	1,83/1,37	12/10	1780	1950
PCC-39-1	0,90	8	1,27	10	1,70/1,27	12/10	1520	1690
PCC-39-2	1,18	10	1,67	12	2,23/1,76	12	1800	1970

[1)] corresponds to total bar length, sufficient for overlap starting from C 30/37, good bond

Column

Installation parameters for PCC Column Shoe and bolt position

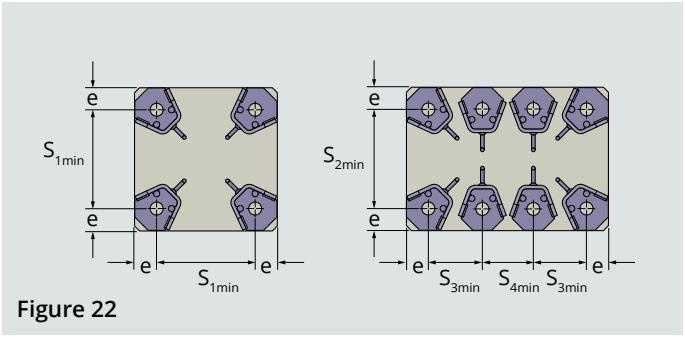


Figure 22

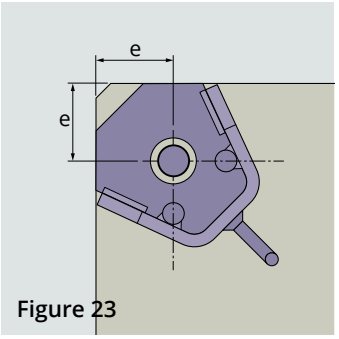


Figure 23

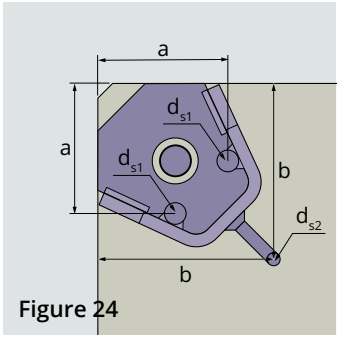


Figure 24

Table 3: Installation parameters for PCC Column Shoe and bolt position

Type designation	e [mm]	S_{1min} [mm]	S_{2min} [mm]	S_{3min} [mm]	S_{4min} [mm]	a [mm]	b [mm]	d_{s1}	d_{s2}
PCC-16	50	145	175	85	100	79	107	12	8
PCC-20	50	155	190	105	115	84	113	14	8
PCC-24	50	180	225	110	120	86	125	16	10
PCC-27	50	205	255	125	130	92	122	20	10
PCC-30-1	50	220	280	150	145	99	143	20	12
PCC-30-2	50	265	340	155	145	98	163	25	16
PCC-36	60	275	355	165	165	105	177	28	20
PCC-39-1	60	255	325	165	165	108	169	28	14
PCC-39-2	60	255	350	185	–	106	170	32	16

Column to column connection

Concrete cover for PGS/H2 Foundation Anchor

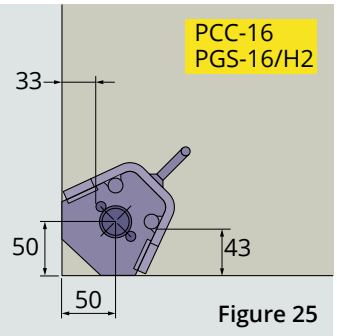


Figure 25

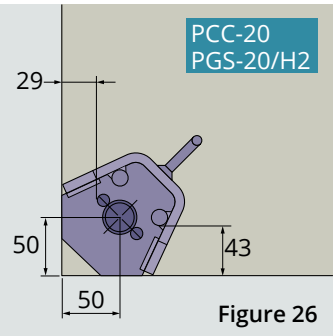


Figure 26

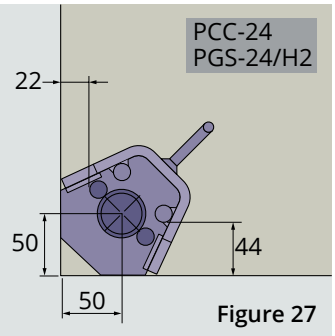


Figure 27

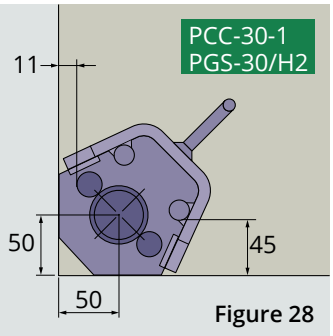


Figure 28

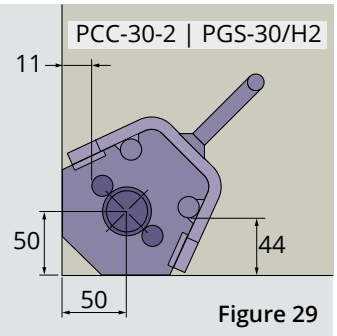


Figure 29

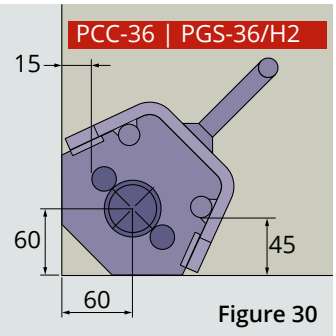


Figure 30

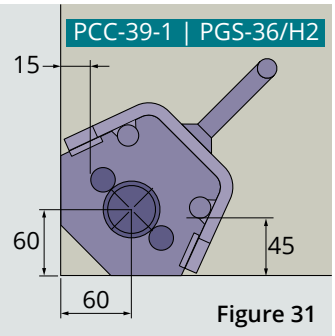


Figure 31

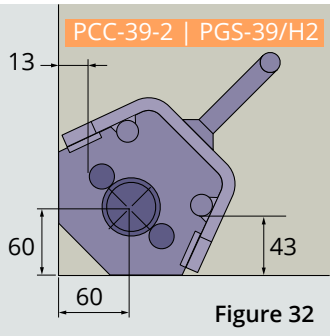


Figure 32

Concrete cover for PGS/G2 Foundation Anchor

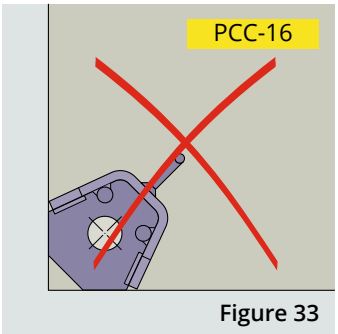


Figure 33

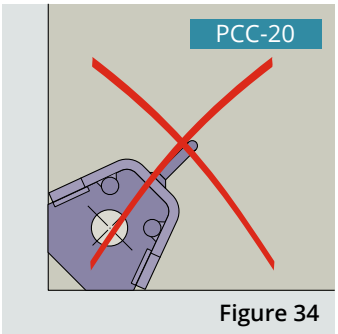


Figure 34

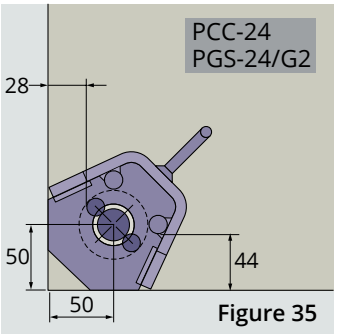


Figure 35

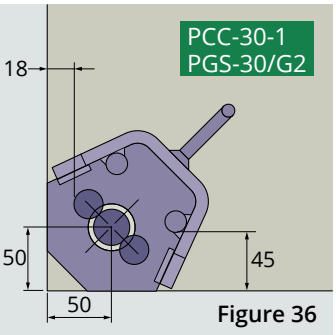


Figure 36

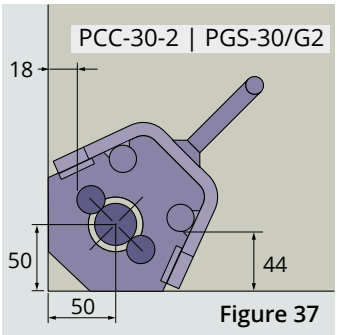


Figure 37

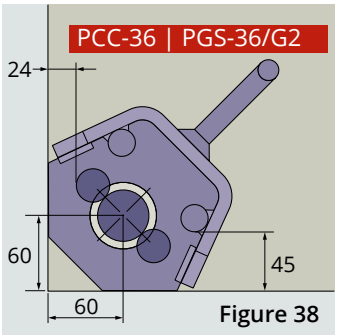


Figure 38

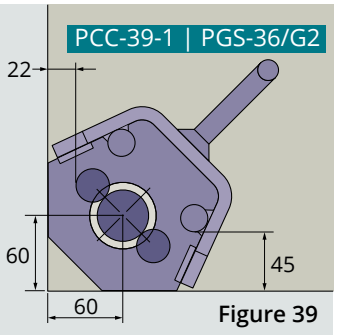


Figure 39

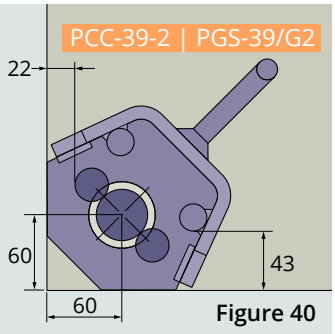


Figure 40

Concrete cover for PGS/G1-K Foundation Anchor

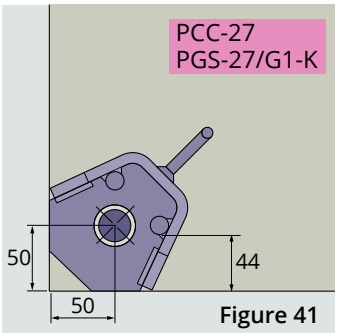


Figure 41

Foundation

Reinforcement layout and dimensioning for anchor with straight bar end PGS/G1, G2, G3, H2 and H4

The bars of the foundation anchors that are subject to tensile stresses must be connected to the foundation with an overlapping joint. If necessary, the bond stress may be increased for this (all-sided concrete cover of ≥ 10 Ø secured by reinforcement and axis spacing s of the joints of ≥10 Ø – cf. EN 1992-1-1/NA/NA/NCI). The larger of the diameters is decisive for the calculation of the overlapping joint! For this purpose, an overlapping joint must first be executed with a bent additional reinforcement. For the bending roller diameter D_{min}, chose the one for inclined bars (10 Ø to 20 Ø). The coefficient α_6, which covers the proportion of the joined bars, must be considered (joint proportion 100%). This reinforcement must be overlapped with a second joint with the foundation reinforcement in accordance with EN 1992-1-1/NA/NCI. The coefficient α_6, may be determined here with a joint proportion of ≤ 33%, since the joints are usually offset. The foundation must be verified for bending and punching shear.

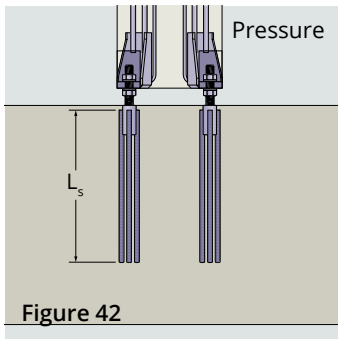


Figure 42

Note:

In the case of the anchors with a straight bar end, the anchoring is done via an overlapping joint according to the valid standard. The applicable constructive rules of the standard must be adhered to when installing the anchors.

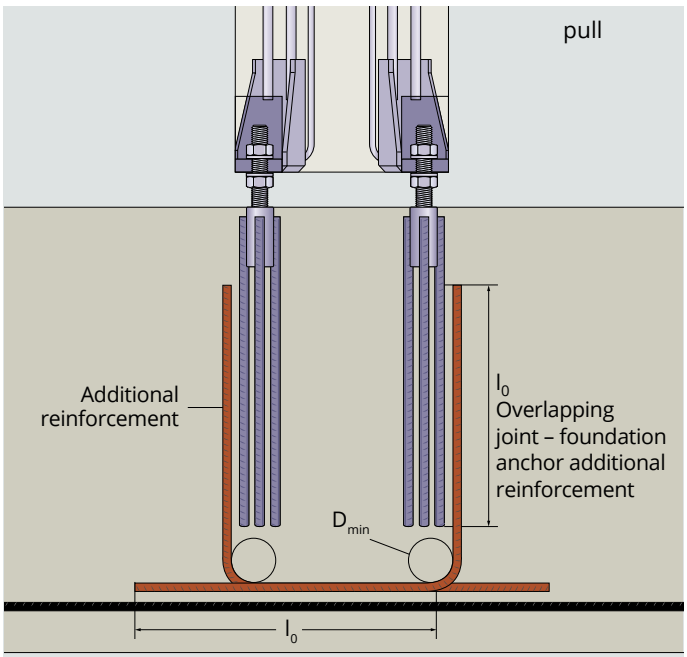


Figure 43 Overlapping joint – addition – foundation reinforcement

Caution:

Include the required shear reinforcement according to EN 1992-1-1 para. 8.7.4.

Dimensioning of anchor with anchoring element PGS/G1-K and G1-DK

The bars of the foundation anchors with anchor base that are subject to tensile stresses must be verified in accordance with EN 1992-4. Here, the corresponding types of failure according to EN 1992-4 and "punching shear" of the anchors during assembly, as well as a classic bending dimensioning with the corresponding tensile forces per anchor are to be calculated.

The foundation must be verified for bending and punching shear.

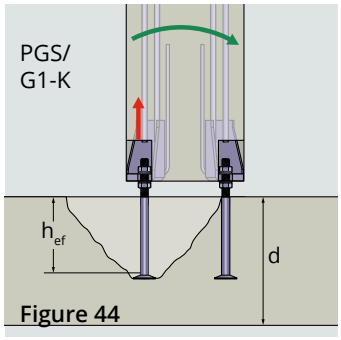


Figure 44

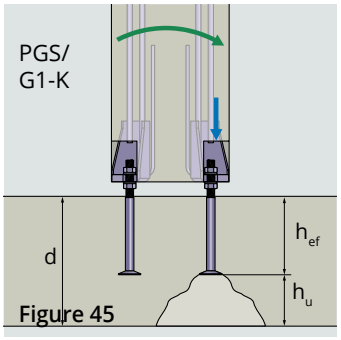


Figure 45

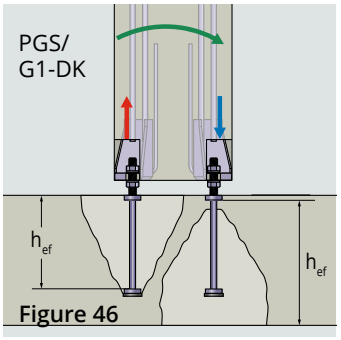


Figure 46

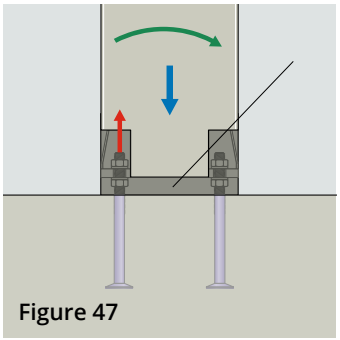


Figure 47

Foundation

Installation parameters for foundation anchors PGS/G1-K and G1-DK

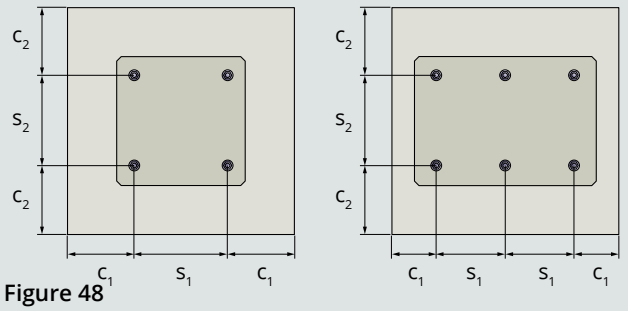


Figure 48

Note:

The specified minimum gaps do not give any indication as to the working load limit regarding the proof of concrete failure. This proof must always be provided separately.

Table 4: Installation parameters for foundation anchors PGS/G1-K and G1-DK

Type designation	Development length [mm]	c_{1min}/c_{2min} [mm]	s_{1min}/s_{2min} [mm]	Depth of anchoring h_{ef} [mm]	Minimum part thickness d[1)] [mm]
PGS-16/G1-DK	180	50	90	163	235
PGS-20/G1-DK	240	55	100	220	300
PGS-24/G1-DK	300	60	110	277	360
PGS-30/G1-DK	490	73	135	462	550
PGS-36/G1-DK	590	80	150	556	650
PGS-42/G1-DK	715	80	165	672	770
PGS-48/G1-DK	825	88	180	770	880
PGS-56/G1-DK	1005	105	200	950	1100
PGS-16/G1-K	130/180	50	80	120/170	180/230
PGS-20/G1-K	190/240	70	100	178/228	240/290
PGS-24/G1-K	250/310	70	100	237/297	300/360
PGS-27/G1-K	270/350	90	120	256/336	320/400
PGS-30/G1-K	300/360/410	100	130	285/345/395	350/410/460
PGS-36/G1-K	410/530	130	150	392/512	460/580
PGS-39/G1-K	450/530/580	130	150	432/512/562	500/580

[1)] Concrete cover with 50 mm (h_u) assumed

Retention reinforcement required according to EN 1992-4

Transversal shear force transfer

The proof of the shear force takes place in accordance with TR068 (Design of structural connections with Column Shoes) in accordance with fig. 49, applying a friction component. This is also applied when using the free dimensioning software.

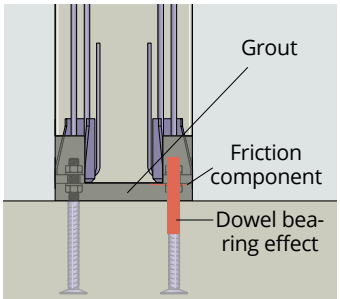


Figure 49

As soon as the transversal shear force exceeds the friction, the load-bearing effect of the dowels is applied.

Alternative solutions for transversal shear force transfer are shown in figs. 50–52:

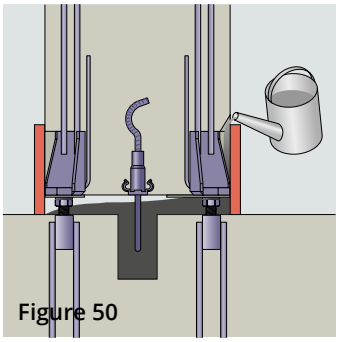


Figure 50

Shear force transfer via additional shear force elements, such as a shear force dowel, DB anchor or cast-in-concrete steel profile. Increased transversal shear force transmission is possible after the hardening of the infill concrete.

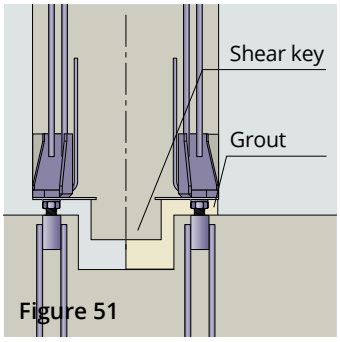


Figure 51

Shear force transmission via concrete shear key. Increased transversal shear force transmission is possible after the hardening of the infill concrete.

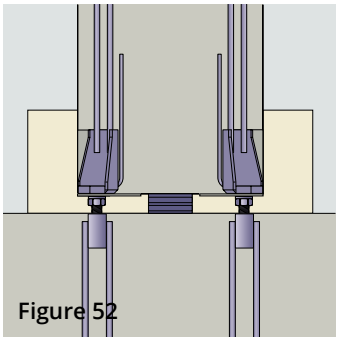


Figure 52

Shear force transmission via subsequently cast-on concrete ring. Increased transversal shear force transmission is possible after the hardening of the infill concrete.

Notes

Installation & assembly

Installation

System description

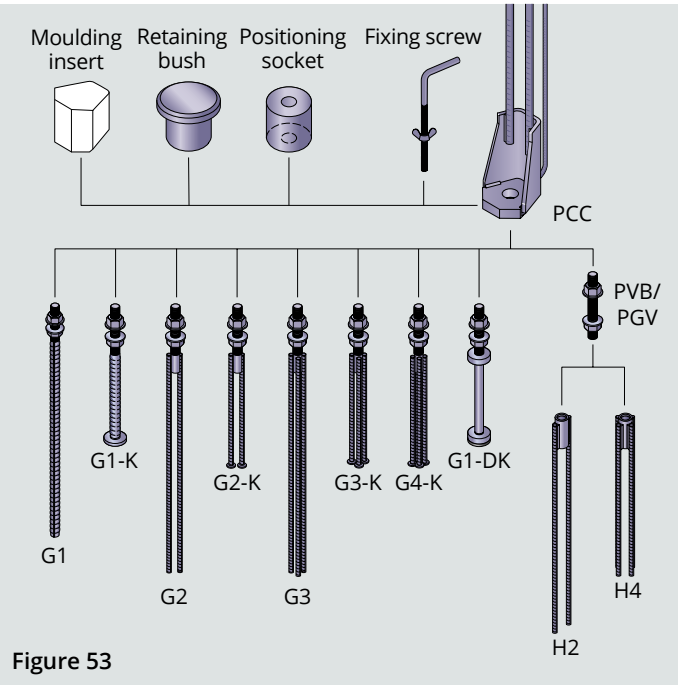


Figure 53

The Column Shoe System is intended for the prop-free assembly and rigid connection of columns to one another, columns to foundations and girders to columns.

This bolted connection produces an immediate rigid connection; additional supports are thus unnecessary.

Table 5: Column Shoe System colour coding

Type designation	Colour
PCC-16	Sulphur yellow
PCC-20	Light blue
PCC-24	Silver grey
PCC-27	Pink
PCC-30-1	Emerald green
PCC-30-2	Pure white
PCC-36	Flame red
PCC-39-1	Water blue
PCC-39-2	Sun yellow

Installation tolerances

Table 6: Installation tolerances

Type	Drilling-Ø [mm]	Bolt-Ø [mm]	Max. eccentricity [mm]
PCC-16	28	16/20	± 6,0/4,0
PCC-20	30	20/24	± 5,0/3,0
PCC-24	35	24	± 5,5
PCC-27	40	27	± 6,5/5,0
PCC-30-1	40	30	± 5,0
PCC-30-2	45	30/36	± 7,5/4,5
PCC-36	53	36/39	± 8,5/7,0
PCC-39-1	55	36/39	± 9,5/8,0
PCC-39-2	55	39/42	± 8,0/6,5

Installation templates

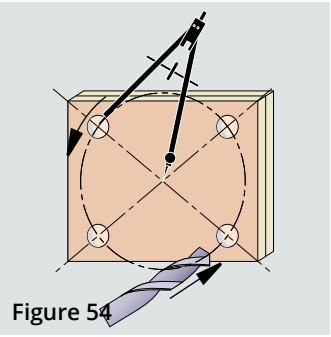


Figure 54

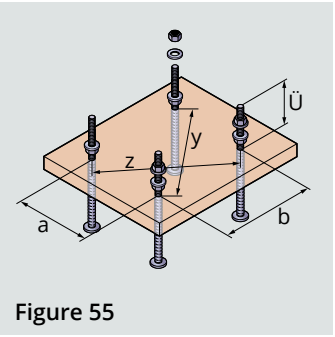


Figure 55

The PCC Column Shoes are ideally installed with the corresponding retaining bushes/positioning sockets and moulding inserts (fig. 53). This ensures that the column shoes, once in place, cannot shift during concreting. The preparation of congruent templates (note the different bore diameters!) on site (fig. 54) for column shoes and foundation anchors increases the implementation safety. Before commencing with the assembly, the reference dimensions specified by the planner and shown in figure 55 must be checked to ensure that they are correct.

Installation

PCC Column Shoe

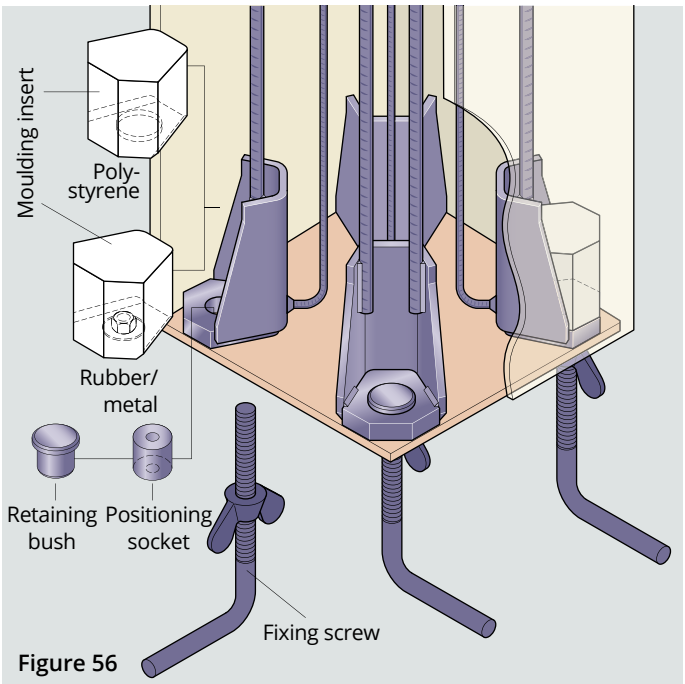


Figure 56

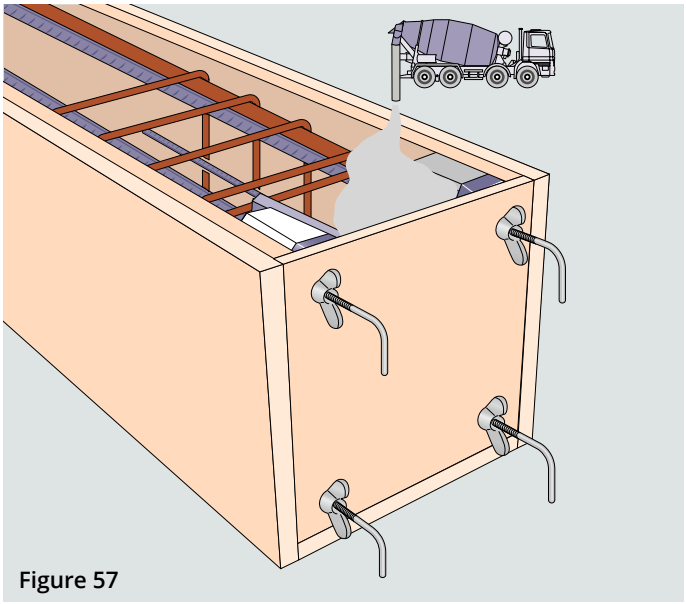


Figure 57

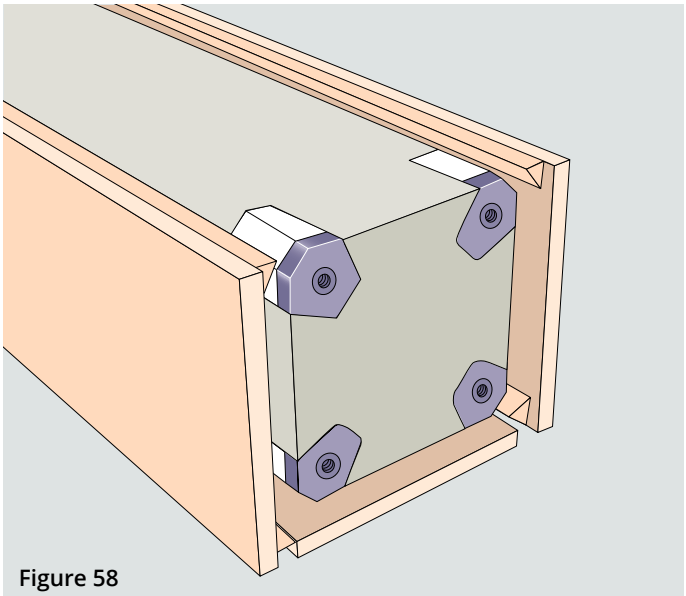


Figure 58

Note:

The PCC Column Shoe is intended for flush installation.
If a concrete cover should be necessary for reasons of fire prevention or corrosion, the column shoe can be indented by the desired amount. All minimum gaps remain valid.

Note:

The exact dimensions of the template must already be defined in the foregoing planning process. It is recommended to check the dimensions of the template and the hole position of the column shoes prior to the assembly.

1. Fasten the column shoes immovably to the template and formwork
2. Fix the column shoe reinforcement to the existing reinforcements on site
3. Install moulding insert - polystyrene combined with retaining bush and fixing screw, rubber/metal combined with positioning socket and fixing screww
4. Pour the concrete carefully and pay attention to the inserted elements
5. Carefully compact the concrete, avoiding direct contact between vibrator and the column shoe
6. Do not move the column shoe by force or damage it
7. Loosen the bolts of the column shoes
8. Demould the component
9. Check the adjacent concrete for honey combs, etc.
10. Remove concrete slurry from column shoes – steel parts must be metallically brigh

Installation

Foundation anchors

Note:

The exact dimensions of the template must already be defined in the foregoing planning process. It is recommended to check the dimensions of the template and the hole position of the foundation anchors prior to the assembly.

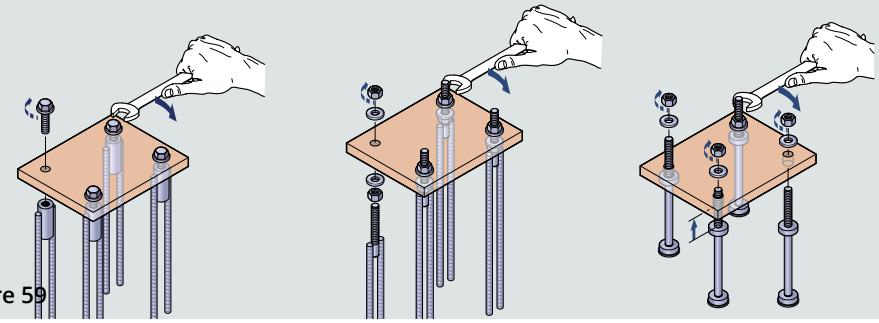


Figure 59

Note:

Inclination of the foundation anchors and distortion of the template must be prevented by suitable fixing of the foundation anchors to the reinforcement.

1. Fasten the foundation anchor immovably to the template

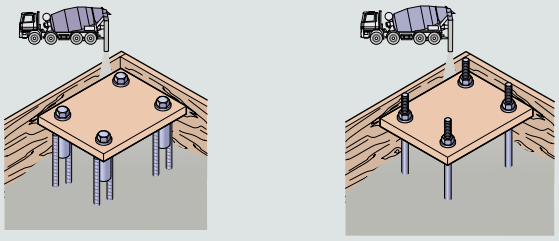


Figure 60

2. Fasten the foundation anchor and the template immovably to the formwork and reinforcement
3. Pour the concrete carefully and pay attention to the inserted elements
4. Compact the concrete carefully

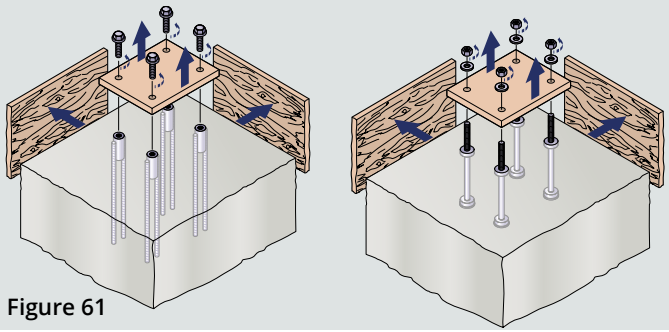


Figure 61

5. Remove formwork elements and bolts at the foundation anchors
6. Avoid getting dirt on the thread
7. If necessary, remove dirt from the thread without damaging the thread

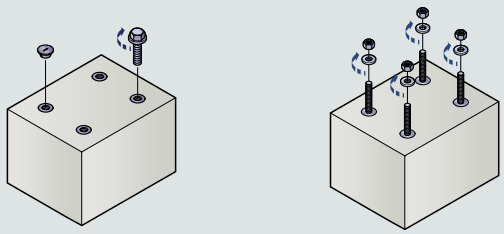


Figure 62

8. If the columns are to be assembled shortly, fasten the connecting bolts and prepare the washers and nuts (only required for types H2 + H4)
9. If the columns are to be assembled later, protect external thread or temporarily seal internal thread with a plug or bolt

Assembly

Column

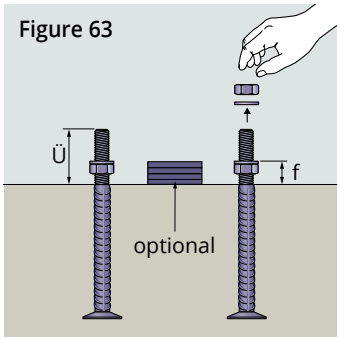


Figure 63

1. Remove the upper nuts and washers
2. Adjust the lower nuts and washers to the target size f (see Table 7)
3. Optional placement of a steel package with dimension f in the middle of the column

Note:

The upper nuts and washers should only be removed from the connecting bolts/foundation anchors shortly before mounting the columns and should be stored in a suitable place nearby.

Note:

It is recommended to lock the two nuts against each other beforehand to facilitate the screwing-in of the PVB/PGV connecting bolts. Make sure to maintain a thread engagement length of at least 1.5 x thread diameter!

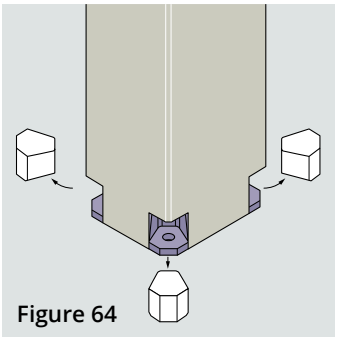


Figure 64

4. Completely remove the moulding inserts from the column (figure 64)
5. Remove all interfering parts and dirt in the region of the bolts

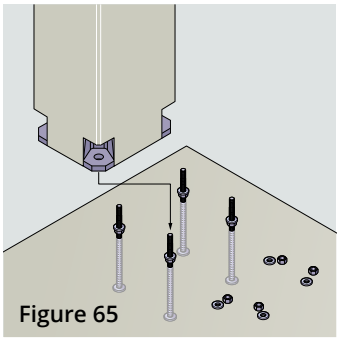


Figure 65

6. Prepare suitable assembly materials
7. Lift the column onto the bolts

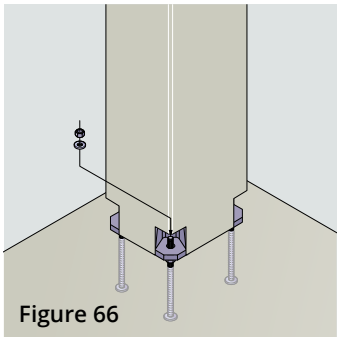


Figure 66

8. Screw the nuts and washers onto the bolts
9. Tighten the nuts hand-tight

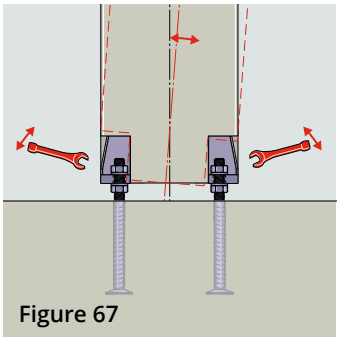


Figure 67

10. Bring the column into the perpendicular position

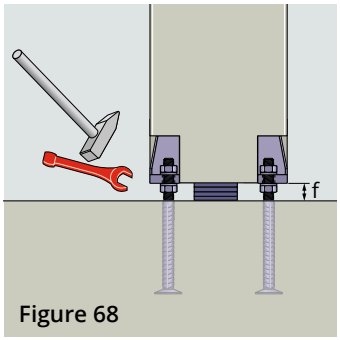


Figure 68

11. Tighten nuts with an impact wrench – **10 blows with a 2 kg hammer**
12. Detach the column from the crane

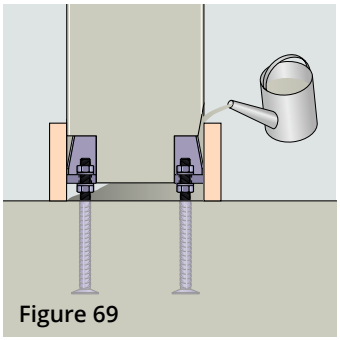


Figure 69

13. Demould the lower area of the column
14. Mix the grouting material according to the manufacturer's specifications and fill the recesses and intermediate space.
    a) Maximum grain 5 mm
    b) Non-flammable A1
    c) Swelling
    d) Minimum strength > column concrete strength grade

Table 7: Limit sizes

Type designation	Possible joint height f [mm]	Minimum protrusion Ü [mm]
PCC-16	25–50	100
PCC-20	30–50	110
PCC-24	35–50	120
PCC-27	35–55	130
PCC-30-1	40–60	140
PCC-30-2	40–60	140
PCC-36	50–70	170
PCC-39-1	50–70	170
PCC-39-2	50–70	170

Notes

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