



Column Shoe System

Rigid screw connection for columns and beams

PFEIFER

Carefree with the Pfeifer PCC Column Shoe system ...

Are the following aspects important for your project?

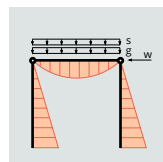
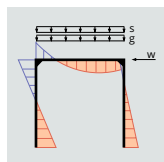
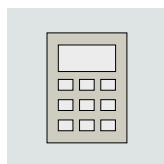
- short construction times?
- efficient transport of precast concrete elements?
- safe and fast assembly?
- maximum assembly flexibility with regard to the weather?
- flat foundations?
- early use of the building?

... 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

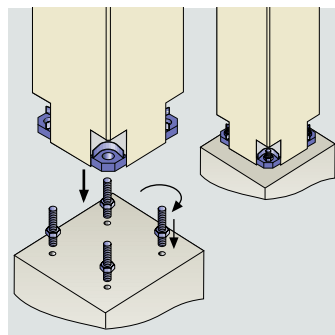
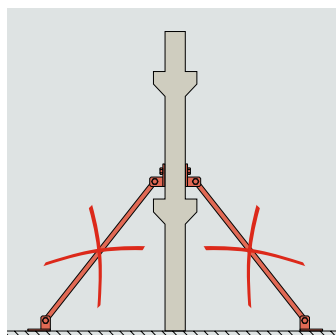
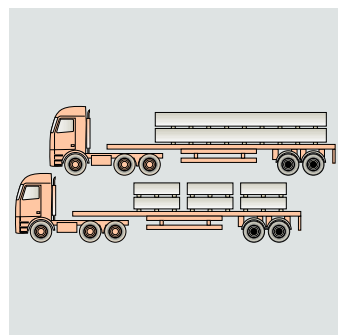
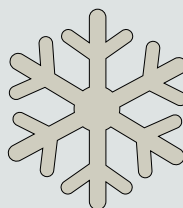


* PCC Column Shoe/
PGS/G1-K Foundation Anchor

OK ✓



OK ✓



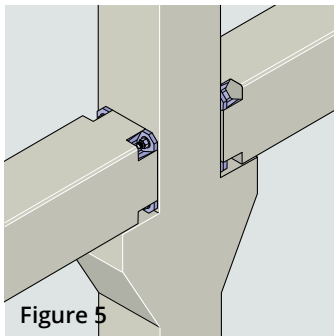
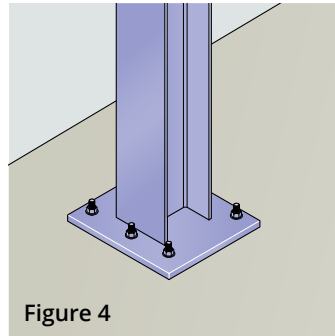
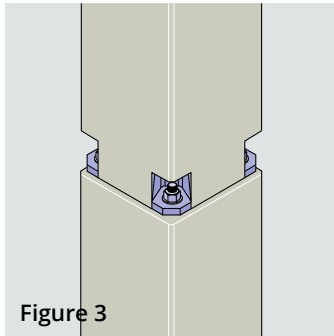
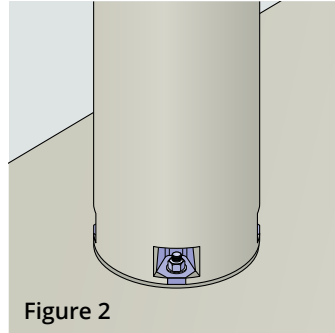
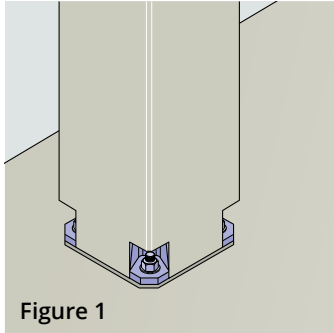
Efficiently simple and simply efficient!



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 screw connection means no grout drying times
- **No complex support**
of the precast element is necessary during assembly, thus there are also advantages due to spacious, free 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 – even with compressive stresses
- **Very simple dimensioning**
Simple design with standard bending dimensioning and free of charge software
- **Clear and simple installation**
in the precast plant and on the building site
- **Formal safety**
through approvals and type-static calculation tests of the load-bearing capacity
- **Practicality**
No reduction of the load-bearing capacity in case of fire due to the use of the column shoes

Areas of application



Rigid connection of:

- columns with columns to foundations (figs. 1 and 2)
- columns with columns to columns (fig. 3)
- steel and timber columns with foundation (fig. 4)
- columns with beams (figs. 5 and 6)

Special column shoe versions:

- rigid beam connection (figs. 7, 8, 10 and 11)
- rigid column connection (fig. 9)



Column shoe



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Connection Systems
Column shoe

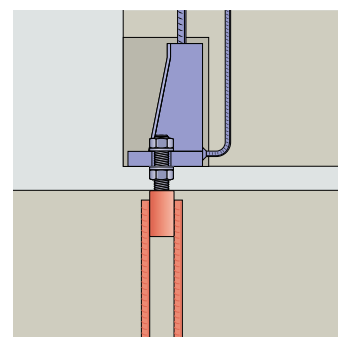
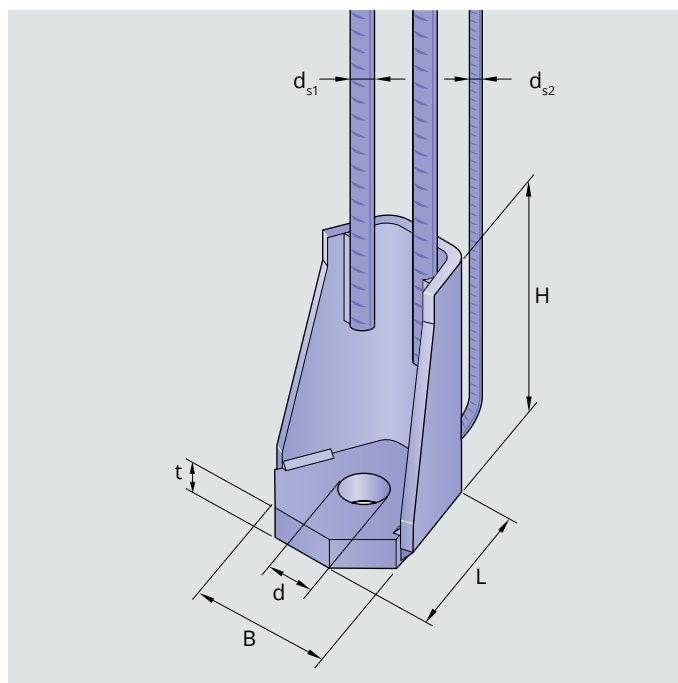
The approved PCC Column Shoes are intended for the rigid connection of precast concrete columns and foundations. They are part of the PFEIFER Column Shoe system and are used in combination with PFEIFER Foundation Anchors.

Advantages

- Instant load-bearing connection
- Saving of assembly time
- Easy to connect to existing reinforcement (overlapping joint)

Materials:

Reinforcing steel bar B500 A/B
Structural steel



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Dimensions							Overall height [mm]
			d [mm]	L [mm]	B [mm]	t [mm]	H [mm]	d _{s1} [mm]	d _{s2} [mm]	
PCC-16	273703	68	28	90	89	15	145	12	8	725
PCC-20	273704	97	30	95	97	20	170	14	8	880
PCC-24	273705	139	35	100	100	25	190	16	10	1085
PCC-30-1	273706	220	40	112	119	30	230	20	12	1360
PCC-30-2	273707	299	45	121	119	35	250	25	16	1475
PCC-36	273708	436	53	119	132	40	285	28	20	1880
PCC-39-1	438692	383	56	125	136	35	285	28	14	1520
PCC-39-2	438693	521	55	125	132	40	300	32	16	1800
PSF-42	–	on request – project-related, optimised technical and commercial elaboration								
PSF-48	–	on request – project-related, optimised technical and commercial elaboration								
PSF-56	–	on request – project-related, optimised technical and commercial elaboration								

¹⁾ for steel failure



Note: overlap length: concrete quality C30/37, good bond

Foundation anchor with socket



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Connection Systems
Foundation anchors

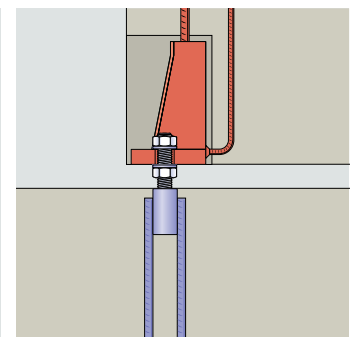
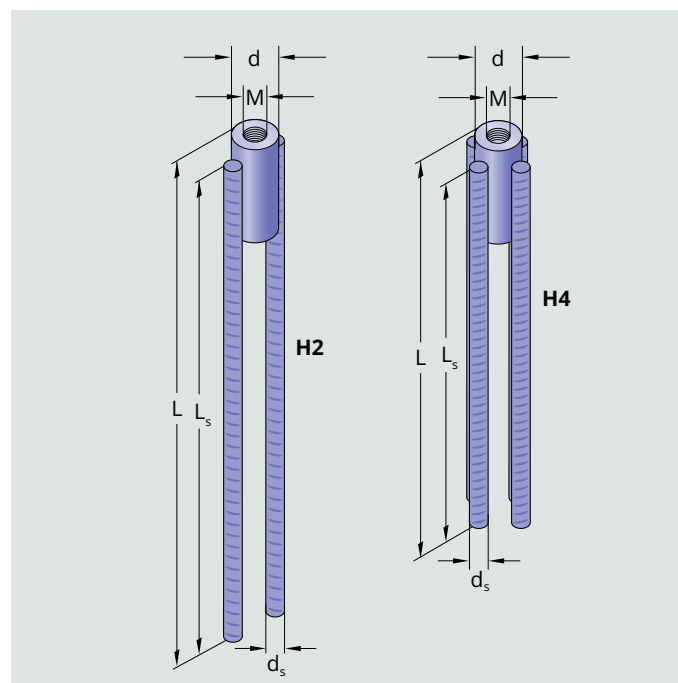
The type-static tested foundation anchor PGS/H2 and H4 are intended for the anchoring of rigid connections between precast concrete columns and foundations. They are also part of the Column Shoe System. Suitable connection bolts are available separately.

Advantages

- No harming protruding connection bolt
- Simple mechanical connection with column shoe by using a bolt

Materials:

Reinforcing steel bar B500 A/B
Structural steel



Notice:

²⁾ Anchorage length:
Concrete quality C20/25,
good bonding. Different
length upon request

Type	Ref. no.	load capacity ¹⁾	Thread size	Dimensions			
		N_{Rd} [kN]		d [mm]	L [mm]	$L_s^{2)}$ [mm]	d_s [mm]
PGS-16/H2	200809	68	M 16	25	510	500	10
PGS-20/H2	200811	97	M 20	30	600	590	12
PGS-24/H2	200812	139	M 24	40	645	635	16
PGS-30/H2	200813	299	M 30	50	880	870	25
PGS-36/H2	200814	436	M 36	60	1135	1125	28
PGS-39/H2	442416	521	M 39	65	1345	1335	28
PGS-42/H2	200815	570	M 42	70	1300	1290	32
PGS-48/H2	200816	778	M 48	80	1540	1530	40
PGS-56/H2	200817	910	M 56	90	1790	1780	40
PGS-20/H4	200818	97	M 20	30	375	365	10
PGS-24/H4	200819	139	M 24	40	445	435	12
PGS-30/H4	200820	299	M 30	50	705	695	16
PGS-36/H4	200821	436	M 36	60	815	805	20
PGS-39/H4	442419	521	M 39	65	960	950	20
PGS-42/H4	200822	570	M 42	70	860	850	25
PGS-48/H4	200823	778	M 48	80	1160	1150	25
PGS-56/H4	200824	910	M 56	90	1205	1195	28

¹⁾ for steel failure



Bended foundation anchors with socket



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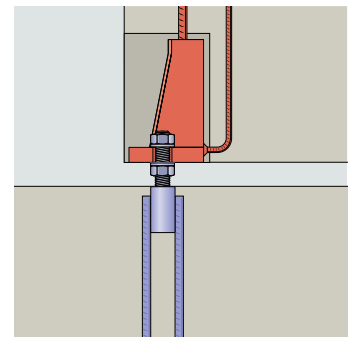
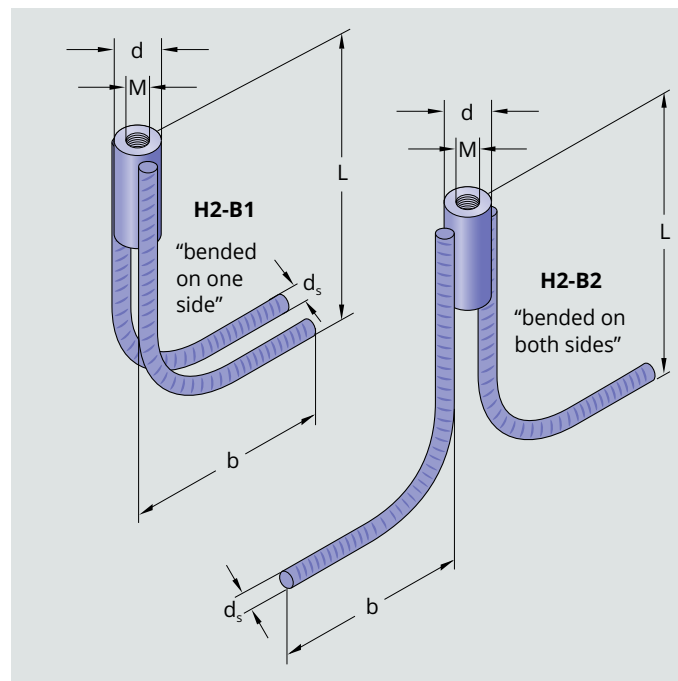
Connection Systems
Foundation anchors

The type-static tested PGS/H2-B bended foundation anchors are intended for anchoring in the rigid connection of precast concrete columns and foundations. They are part of the Column Shoe System. Suitable connecting bolts are available separately.

- Allow thinner foundations permits thinner foundations
- No harming threaded bolts protruding from the structural element
- Simple screw connection with column shoe via bolts

Materials:

Reinforcing steel bar B500 A/B
Structural steel



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Thread size	Dimensions		min L/b [mm]
				d [mm]	d_s [mm]	
PGS-16/H2-B1	020262	68	M 16	25	10	on request
PGS-20/H2-B1	020263	97	M 20	30	12	on request
PGS-24/H2-B1	020264	139	M 24	40	16	on request
PGS-30/H2-B1	020265	299	M 30	50	25	on request
PGS-36/H2-B1	020266	436	M 36	60	28	on request
PGS-39/H2-B1	020444	521	M 39	65	28	on request
PGS-42/H2-B1	020267	570	M 42	70	32	on request
PGS-48/H2-B1	020268	778	M 48	80	40	on request
PGS-56/H2-B1	020269	910	M 56	90	40	on request
PGS-16/H2-B2	020254	68	M 16	25	10	on request
PGS-20/H2-B2	020255	97	M 20	30	12	on request
PGS-24/H2-B2	020256	139	M 24	40	16	on request
PGS-30/H2-B2	020257	299	M 30	50	25	on request
PGS-36/H2-B2	020258	436	M 36	60	28	on request
PGS-39/H2-B2	020443	521	M 39	65	28	on request
PGS-42/H2-B2	020259	570	M 42	70	32	on request
PGS-48/H2-B2	020260	778	M 48	80	40	on request
PGS-56/H2-B2	020261	910	M 56	90	40	on request

¹⁾ for steel failure

Connecting bolts



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Connection Systems

Connecting bolts

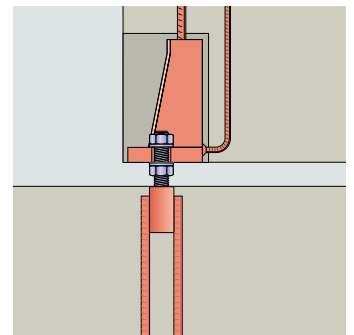
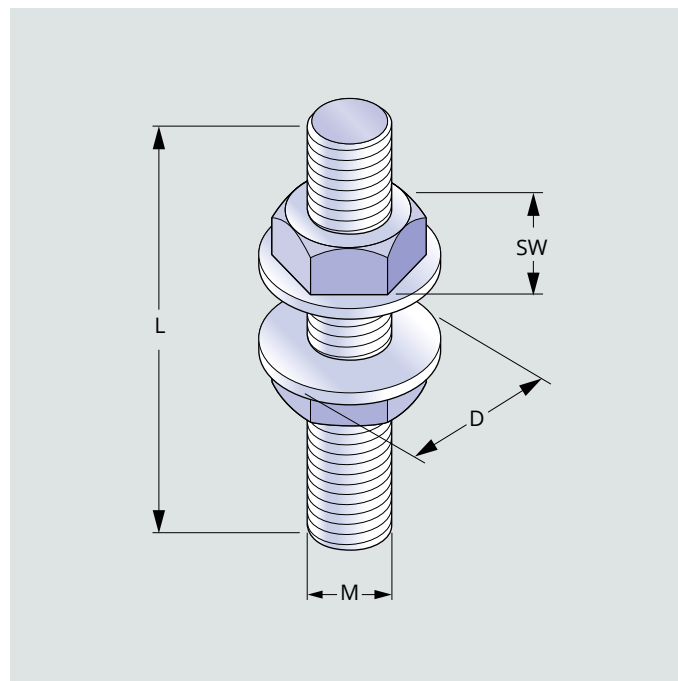
The type-approved PVB/PGV connecting bolts are intended for the rigid connection of precast concrete columns to foundations. They are part of the PFEIFER Column Shoe System and are used in combination with PGS/H2, H4 and H2-B foundation anchors.

Advantages

- Subsequent adjustment under load possible with the aid of nuts
- No harming threaded bolts protruding from the structural element
- Simple screw connection with column shoe via bolts

Materials:

High-strength threaded bolt, uncoated
High-strength nuts, uncoated
Washers, uncoated



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Thread size	Dimensions		
				SW [mm]	D [mm]	L [mm]
PVB-16	203111	68	M 16	24	45	130
PVB-20	203112	97	M 20	30	45	145
PVB-24	203113	139	M 24	36	55	160
PVB-30	203114	299	M 30	46	65	195
PVB-36	203115	436	M 36	55	75	230
PGV-42	159040	546	M 42	65	78	240
PGV-48	159041	672	M 48	75	92	270
PGV-56	159042	910	M 56	85	105	300

¹⁾ for steel failure



Foundation anchor with bolt



PGS/G1-K



PGS/G1



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Connection Systems
Foundation anchors

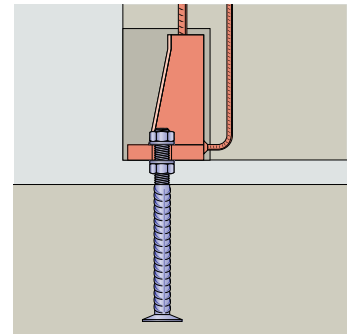
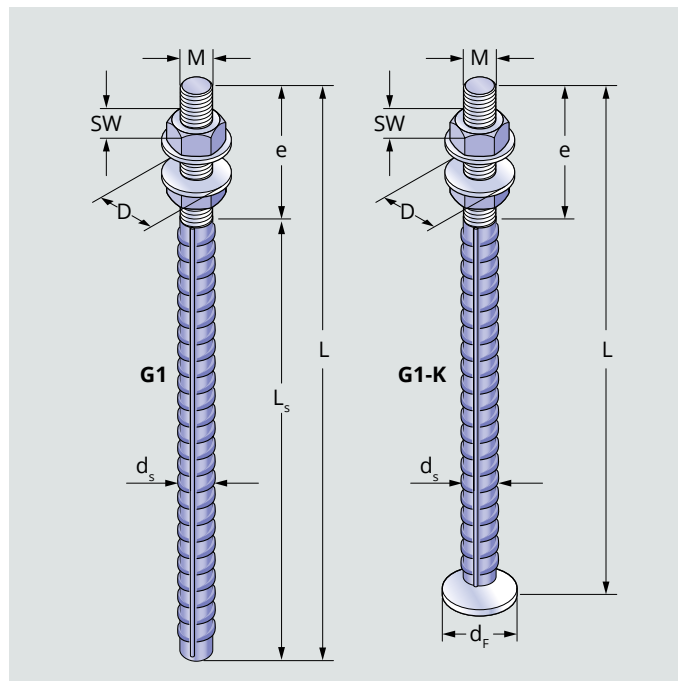
The approved PGS/G1 and G1-K foundation anchors are intended for the rigid connection of precast concrete columns to foundations. They are part of the Column Shoe System.

Advantages

- No additional connecting bolts required
- Subsequent adjustment under load possible with the aid of nuts
- Simple screw connection with column shoe via integrated bolt

Materials:

Reinforcing steel bar B500 A/B
High-strength nuts, uncoated
Washers, uncoated



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Thread size	Dimensions						
				e [mm]	SW [mm]	D [mm]	L [mm]	L_s [mm]	d_s [mm]	d_F [mm]
PGS-16/G1	281811/282359	61,7	M 16	100	24	45	790/1270	690 ²⁾ /1170 ³⁾	16	-
PGS-20/G1	281813/282360	96,2	M 20	110	30	45	970/1570	860 ²⁾ /1460 ³⁾	20	-
PGS-24/G1	281814/282361	138,7	M 24	120	36	55	1110/1810	990 ²⁾ /1690 ³⁾	25	-
PGS-30/G1	281815/282362	220,5	M 30	140	46	65	1360/2230	1220 ²⁾ /2090 ³⁾	32 ²⁾	-
PGS-36/G1	281816/282363	320,9	M 36	170	55	75	1590/2820	1420 ²⁾ /2650 ³⁾	40	-
PGS-39/G1	375783/375785	383,4	M 39	170	60	75	1710/2760	1540 ²⁾ /2590 ³⁾	40	-
PGS-16/G1-K	281337	61,7	M 16	100	24	45	280	-	16	38
PGS-20/G1-K	281338	96,2	M 20	110	30	45	350	-	20	46
PGS-24/G1-K	281339	138,7	M 24	120	36	55	430	-	25	55
PGS-30/G1-K	281340	220,5	M 30	140	46	65	550	-	32	70
PGS-36/G1-K	281341	320,9	M 36	170	55	75	700	-	40	80
PGS-39/G1-K	289222	383,4	M 39	170	60	75	750	-	40	80

¹⁾ for steel failure

PGS/G1-K



Notice:

²⁾ Overlap length: Concrete quality C25/30, good bond (EN 1992-1-1:2004)

³⁾ Overlap length: Concrete quality C30/37, poor bond (EN 1992-1-1/NA:2013/14). Different lengths available on request.

Foundation anchor with bolt



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Connection Systems
Foundation anchors

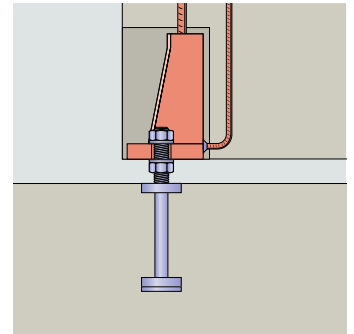
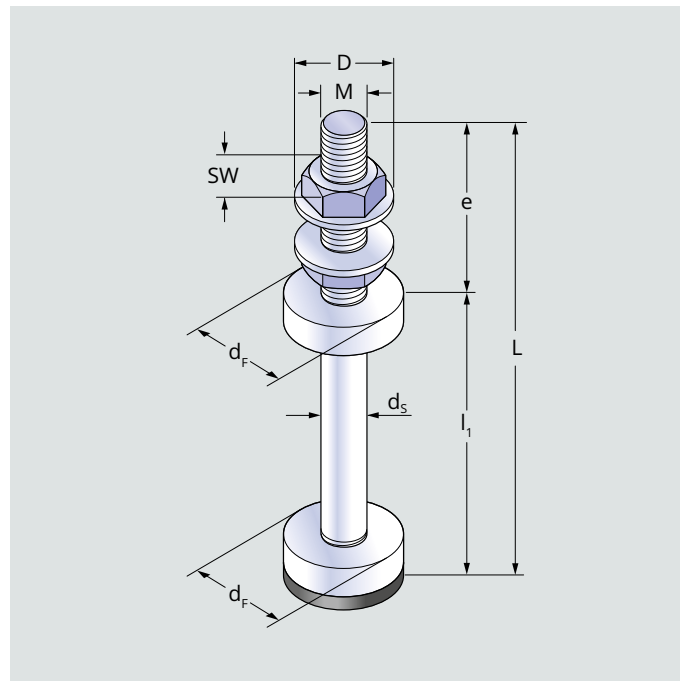
The PGS/ G1-DK foundation anchors with building authority approval are intended for the rigid connection of precast concrete columns to foundations. They are part of the Column Shoe System. These anchors are particularly suitable for installation in very thin foundations and slabs.

Advantages

- Highest resistances for tensile and compressive forces due to two pressure plates
- No additional connecting bolts required
- Subsequent adjustment under load possible with the aid of nuts
- Simple screw connection with column shoe via integrated bolt

Materials:

High-strength round material, uncoated
High-strength nuts, uncoated
Washers, uncoated



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Thread size	Dimensions						
				e [mm]	SW [mm]	D [mm]	L [mm]	l_1 [mm]	d_s [mm]	d_F [mm]
PGS-16/G1-DK	222891	83,3	M 16	110	24	45	291	180	16	40
PGS-20/G1-DK	222892	130,7	M 20	120	30	45	361	240	20	50
PGS-24/G1-DK	222894	188,0	M 24	130	36	55	433	300	24	60
PGS-30/G1-DK	222895	299,3	M 30	150	46	65	642	490	30	85
PGS-36/G1-DK	222896	435,3	M 36	160	55	75	753	590	36	100
PGS-42/G1-DK	222897	598,0	M 42	170	65	78	884	715	42	115
PGS-48/G1-DK	222898	786,0	M 48	190	75	92	1015	825	48	130
PGS-56/G1-DK	222899	1082,7	M 56	210	85	105	1215	1005	56	150

¹⁾ for steel failure

Foundation anchor with bolt



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Connection Systems
Foundation anchors

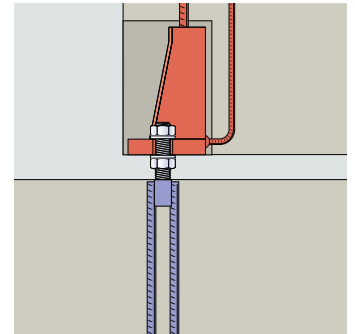
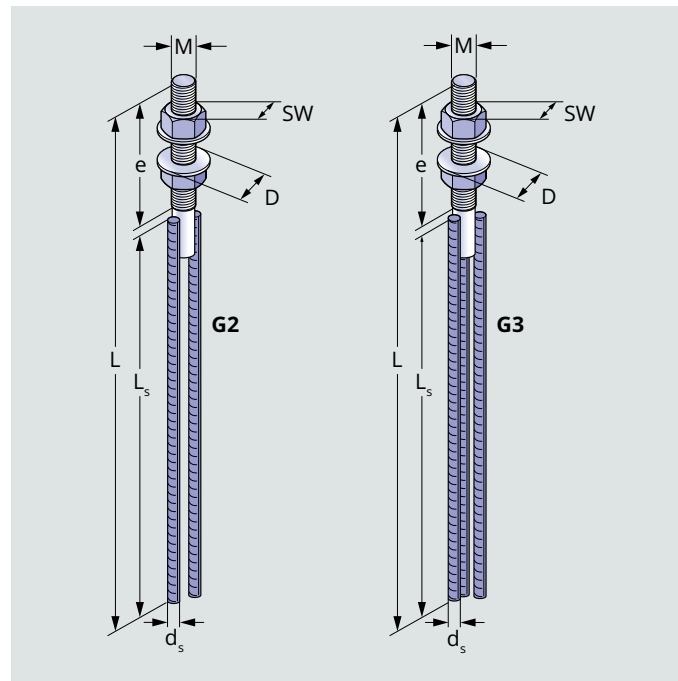
The PGS/ G2 and G3 foundation anchors with building authority approval are intended for the rigid connection of precast concrete columns to foundations. They are part of the Column Shoe System.

Advantages

- No additional connecting bolts required
- Subsequent adjustment under load possible with the aid of nuts
- Simple screw connection with column shoe via integrated bolt

Materials:

Reinforcing steel bar B500 A/B
High-strength threaded bolt, uncoated
High-strength nut, uncoated
Washer, uncoated



Type	Ref. no.	load capacity ¹⁾ N _{Rd} [kN]	Thread size	Dimensions					
				e [mm]	SW [mm]	D [mm]	L [mm]	L _s ²⁾ [mm]	d _s [mm]
PGS-24/G2	176066	139	M 24	120	36	55	770	635	16
PGS-30/G2	176067	299	M 30	140	46	65	1025	870	25
PGS-36/G2	176068	436	M 36	170	55	75	1310	1125	28
PGS-42/G2	176069	546	M 42	180	65	78	1485	1290	32
PGS-48/G2	176070	672	M 48	190	75	92	1735	1530	40
PGS-56/G2	176071	910	M 56	210	85	105	2005	1780	40
PGS-24/G3	176060	139	M 24	120	36	55	700	565	12
PGS-30/G3	176061	299	M 30	140	46	65	890	735	20
PGS-36/G3	176062	436	M 36	170	55	75	1040	855	25
PGS-42/G3	176063	546	M 42	180	65	78	1150	955	28
PGS-48/G3	176064	672	M 48	190	75	92	1245	1040	32
PGS-56/G3	176065	910	M 56	210	85	105	1605	1380	32
PGS-39/G2	448465	521	M 39	170	60	75	1520	1335	28
PGS-39/G3	448569	521	M 39	170	60	75	1195	1010	25

¹⁾ for steel failure



Notice: ²⁾ Overlapping length: Concrete quality C20/25, good bond. Different lengths available on request.

Bended foundation anchors with bolt



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Connection Systems
Foundation anchors

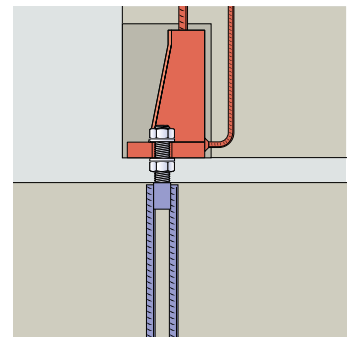
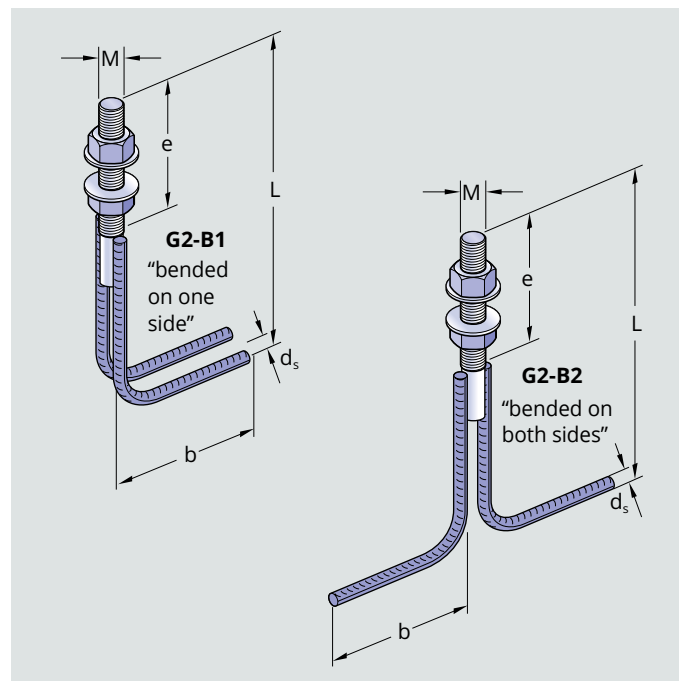
The PGS/G2-B bended foundation anchors with building authority approval are intended for the rigid connection of precast concrete columns to foundations. They are part of the Column Shoe System.

Advantages

- Allows thinner foundations
- No additional connecting bolts required
- Subsequent adjustment under load possible with the aid of nuts
- Simple screw connection with column shoe via integrated bolt

Materials:

Reinforcing steel bar B500 A/B
High-strength threaded bolt, uncoated
High-strength nut, uncoated
Washer, uncoated



Type	Ref. no.	load capacity ¹⁾ N_{Rd} [kN]	Thread size	Dimensions		min L/b [mm]
				e [mm]	d_s [mm]	
PGS-24/G2-B1	020302	139	M 24	120	16	on request
PGS-30/G2-B1	020303	299	M 30	140	25	on request
PGS-36/G2-B1	020304	436	M 36	170	28	on request
PGS-42/G2-B1	020305	546	M 42	180	32	on request
PGS-48/G2-B1	020306	672	M 48	190	40	on request
PGS-56/G2-B1	020307	910	M 56	210	40	on request
PGS-24/G2-B2	020216	139	M 24	120	16	on request
PGS-30/G2-B2	020217	299	M 30	140	25	on request
PGS-36/G2-B2	020218	436	M 36	170	28	on request
PGS-42/G2-B2	020219	546	M 42	180	32	on request
PGS-48/G2-B2	020220	672	M 48	190	40	on request
PGS-56/G2-B2	020221	910	M 56	210	40	on request

¹⁾ for steel failure

Straight female bar



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Reinforcement Systems

Female bar

The approved PH-MU female bars are intended for anchoring tensile and compressive forces. In the context of the Column Shoe System they are used in particular for column to column connections because of the low space requirement. It is easy to use them in the reinforcement system of the lower column and then the upper column can be easily placed and bolted

with the help of the column shoes. Installation is done with a rigid template. High-strength PVB/PGV connecting bolts are only screwed in when the columns are assembled.

Advantages

- Low space requirement
- Simple screw connection with column shoe via bolts

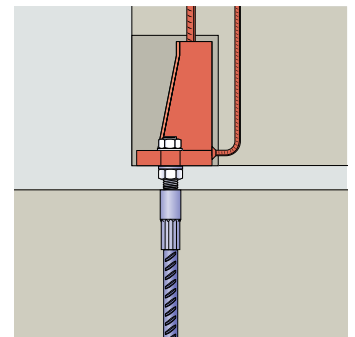
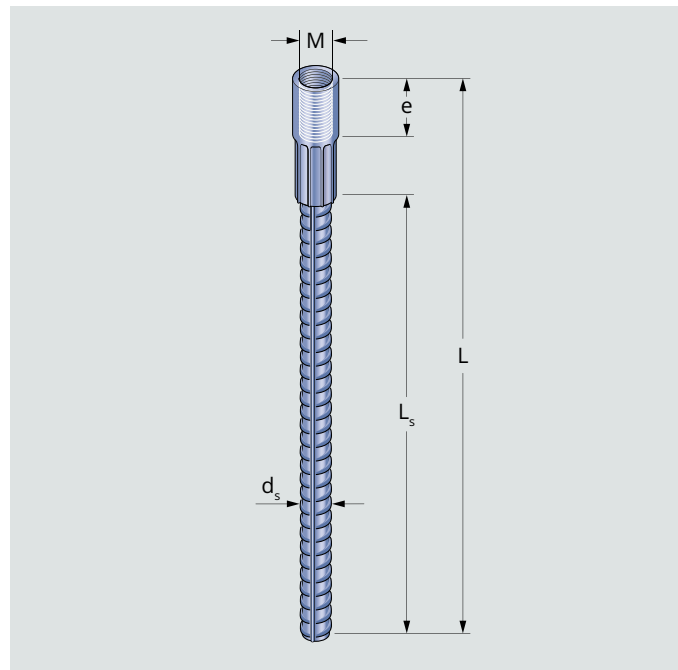
Materials:

High grade precision steel tube
Special quality
Reinforcing steel bar B500 A/B



Notice:

Reduced design resistances must be taken into account. The full design resistance of the column shoes cannot be used.



Type	Ref. no.	load capacity ¹⁾	Thread size	Dimensions			
		N_{Rd} [kN]		$L^{2)}$ [mm]	L_s [mm]	d_s [mm]	e [mm]
PH-MU-12	119057	49,5	M 16	570	520	12	20
PH-MU-12	119058	49,5	M 16	800	750	12	20
PH-MU-12	119059	49,5	M 16	1500	1450	12	20
PH-MU-16	119067	87,4	M 20	1020	955	16	24
PH-MU-16	119069	87,4	M 20	1440	1375	16	24
PH-MU-16	119070	87,4	M 20	2000	1935	16	24
PH-MU-20	119073	136,6	M 24	1280	1195	20	32
PH-MU-20	119075	136,6	M 24	1800	1715	20	32
PH-MU-20	119076	136,6	M 24	3000	2915	20	32
PH-MU-25	119081	213,4	M 30	1600	1497	25	40
PH-MU-25	119082	213,4	M 30	2260	2157	25	40
PH-MU-25	119083	213,4	M 30	3600	3497	25	40
PH-MU-28	119088	267,7	M 36	1790	1666	28	42
PH-MU-28	119089	267,7	M 36	2530	2406	28	42
PH-MU-28	119090	267,7	M 36	3600	3476	28	42

¹⁾ for steel failure

²⁾ different lengths available on request

Moulding insert



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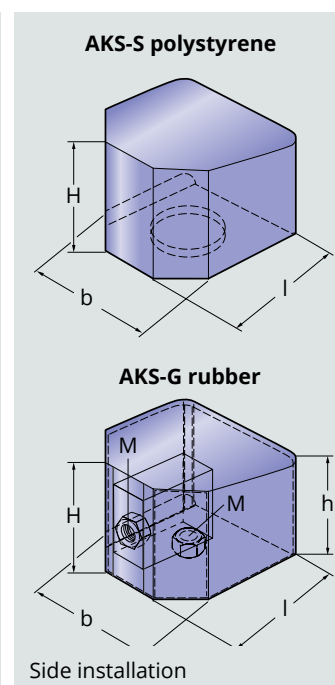
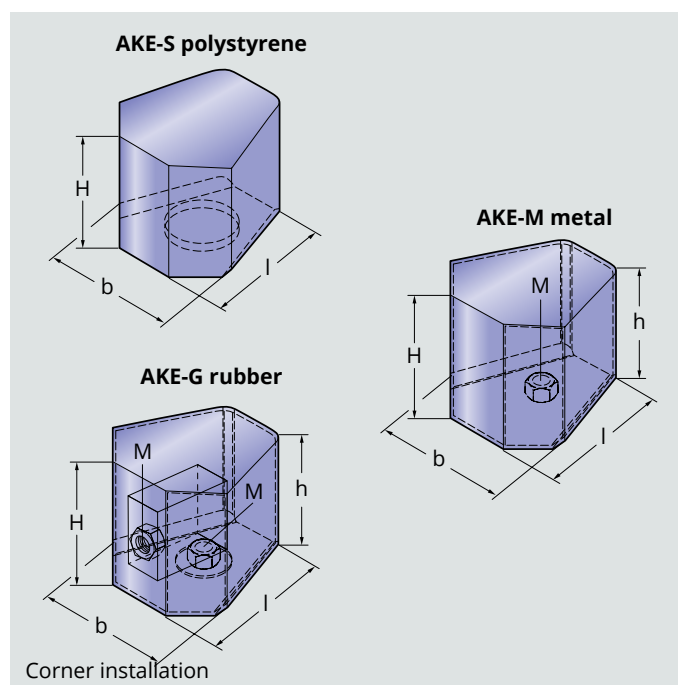
Connection Systems

Moulding insert

For a suitable fixing of the column shoes to the formwork, the user has a choice of both disposable and reusable recessing variants.

Materials:

Polystyrene
Painted steel
Rubber



	Type	Ref. no. Polystyrene	Type	Ref. no. Rubber	Type	Ref. no. Metal	For PCC size	Thread size	Dimensions approx.			
									H [mm]	h [mm]	l [mm]	b [mm]
Corner installation	AKE-S-16	278934	AKE-G-16	337908	AKE-M-16	325859	PCC-16	M 16	75	65	88	89
	AKE-S-20	278935	AKE-G-20	337909	AKE-M-20	325860	PCC-20	M 16	85	75	93	97
	AKE-S-24	278936	AKE-G-24	337910	AKE-M-24	325861	PCC-24	M 16	96	86	98	100
	AKE-S-30-1	278937	AKE-G-30-1	337911	AKE-M-30-1	325862	PCC-30-1	M 16	106	96	111	119
	AKE-S-30-2	278938	AKE-G-30-2	337912	AKE-M-30-2	325863	PCC-30-2	M 16	106	96	119	119
	AKE-S-36	278939	AKE-G-36	337913	AKE-M-36	325864	PCC-36	M 16	126	116	117	132
	AKE-S-39-1	442816	AKE-G-39-1	442822	AKE-M-39-1	442818	PCC-39-1	M 16	130	120	123	136
	AKE-S-39-2	442817	AKE-G-39-2	442823	AKE-M-39-2	442819	PCC-39-2	M 16	135	125	122	132
Side installation	AKS-S-16	278982	AKS-G-16	432551	-	-	PCC-16	M 16	75	67	90	106
	AKS-S-20	278983	AKS-G-20	432553	-	-	PCC-20	M 16	85	77	95	116
	AKS-S-24	278984	AKS-G-24	432554	-	-	PCC-24	M 16	96	87	100	120
	AKS-S-30-1	278985	AKS-G-30-1	432555	-	-	PCC-30-1	M 16	106	96	110	146
	AKS-S-30-2	278986	AKS-G-30-2	432556	-	-	PCC-30-2	M 16	106	96	119	146
	AKS-S-36	278987	AKS-G-36	432557	-	-	PCC-36	M 16	126	116	117	160
	AKS-S-39-1	442831	AKS-G-39-1	442824	-	-	PCC-39-1	M 16	130	120	123	163
	AKS-S-39-2	442832	AKS-G-39-2	442825	-	-	PCC-39-2	M 16	125	115	122	161

Assembly accessories



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Connection Systems

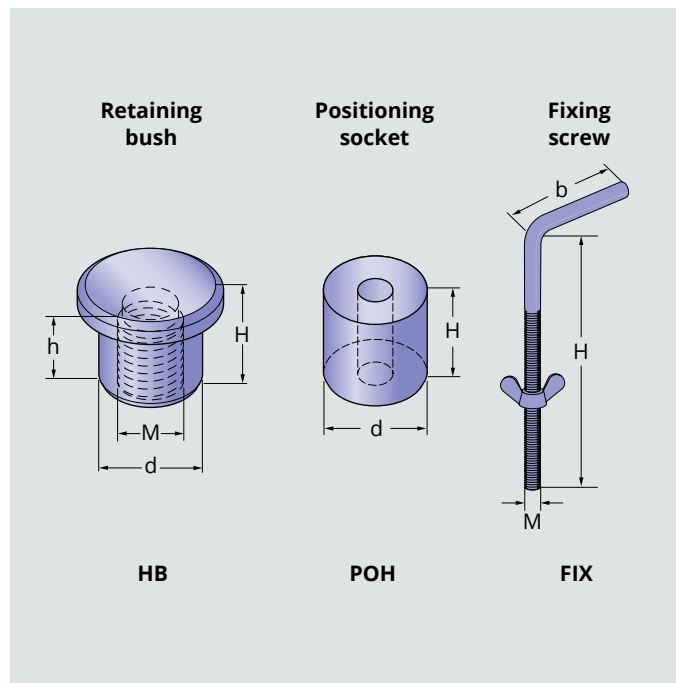
Moulding insert

The assembly accessories, combined with the moulding inserts, ensure an accurately positioned fastening of the PCC Column Shoes to the formwork. Positioning sockets are used in combination with

moulding inserts made of rubber and metal, retaining bushes with moulding inserts made of polystyrene. The fixing screw is used for screwing to the formwork.

Material:

Steel, galvanized



Assignment of assembly accessories:

Moulding insert	HB	POH	FIX
AKE-S	✓	-	M 10 (PCC-16 to 24) M 16 (PCC-30-1 to 39-2)
AKE-G	-	✓	M 16
AKE-M	-	✓	M 16
AKS-S	✓	-	M 10 (PCC-16 to 24) M 16 (PCC-30-1 to 39-2)
AKS-S	-	✓	M 16

Type	Ref. no.	For PCC size	Thread size	Dimensions			
				d [mm]	H [mm]	h [mm]	b [mm]
HB-16	275657	PCC-16	M 10	27	20	14	-
HB-20	275658	PCC-20	M 10	29	25	19	-
HB-24	275659	PCC-24	M 10	34	30	24	-
HB-30-1	275660	PCC-30-1	M 16	39	35	29	-
HB-30-2	275661	PCC-30-2	M 16	44	40	34	-
HB-36	275662	PCC-36	M 16	52	45	39	-
HB-39-1	443004	PCC-39-1	M 16	53	42	34	-
HB-39-2	443005	PCC-39-2	M 16	53	47	39	-
POH-16	279424	PCC-16	-	27	14	-	-
POH-20	279425	PCC-20	-	29	19	-	-
POH-24	279426	PCC-24	-	34	24	-	-
POH-30-1	279427	PCC-30-1	-	39	39	-	-
POH-30-2	279428	PCC-30-2	-	44	34	-	-
POH-36	279429	PCC-36	-	52	39	-	-
POH-39-1	443016	PCC-39-1	-	53	34	-	-
POH-39-2	443017	PCC-39-2	-	53	39	-	-
FIX-10	118544	PCC-16 - PCC-24 (with HB)	M 10	-	150	-	60
FIX-16	118547	PCC-16 - PCC-39-2	M 16	-	180	-	60

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