

PB anchor



Installation Instruction

Our products from the division BUILDING SOLUTIONS

SERVICES

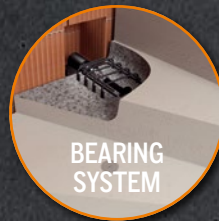
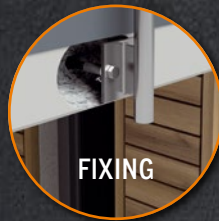
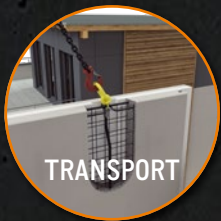
- » On-site tests -> we ensure that your requirements are properly covered by our planning.
- » Test reports -> for your safety and documentation.
- » Trainings -> the knowledge of your employees from planning and production is enhanced by our experts on site, online or via webinar.
- » Planning support -> latest design software, planning documents, CAD data and much more can be downloaded any time from www.philipp-group.de.

HIGH DEMANDS ON PRODUCT SAFETY AND PRACTICALITY

- » Close cooperation with notified bodies and - if necessary - approval of our solutions.

TECHNICAL DEPARTMENT

- » Our expert-team will support you at any time during your planning phase with detailed advice.

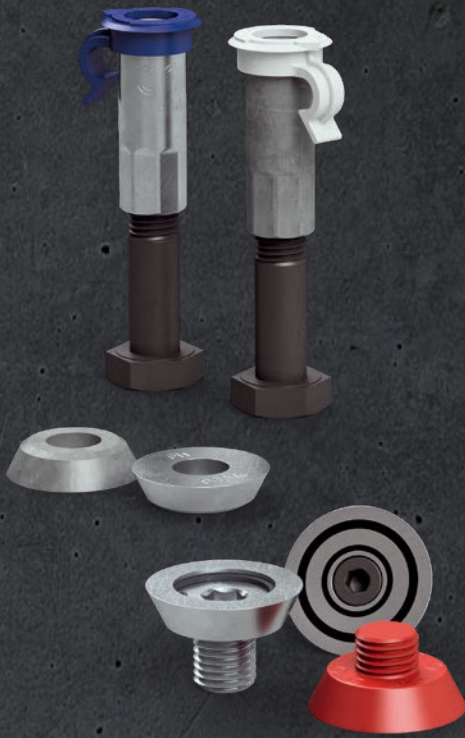


CONTENT

PHILIPP PB SYSTEM	Page	4
Advantages at a glance	Page	4
Scope of supply	Page	5
PB ANCHOR	Page	6
Application	Page	6
Dimensions	Page	6
Materials	Page	6
Sealing	Page	6
Marking	Page	6
PB-MARKING RING WITH CLIP / PB ADAPTER PLATE	Page	7
RECESS FORMERS	Page	8
DESIGN	Page	9
Conditions (environmental conditions)	Page	9
Installation situations (flush to surface / recessed)	Page	9
Element thicknesses, centre and edge distances	Page	10
Concrete	Page	10
Reinforcement	Page	10
Fasteners	Page	10
Thread reach	Page	11
Required screw length	Page	11
Torque specification	Page	11
Required information in design drawings	Page	11
INSTALLATION OF THE PB ANCHOR	Page	12
MOUNTING OF THE ATTACHMENTS	Page	14
DESIGN SOFTWARE	Page	15
CAD	Page	16

PHILIPP PB anchor

PHILIPP PB ANCHOR



ADVANTAGES AT A GLANCE:

- » Certified system (ETA approval)
- » Multi-purpose, permanent fixing of all types of constructions
- » High load-bearing capacities
- » Releasable connection at any time
- » Flexible formwork installation - recessed or surface-flush
- » Easy, software-based design acc. to EN 1992-4:2018

You can find our design software at
www.philipp-group.de

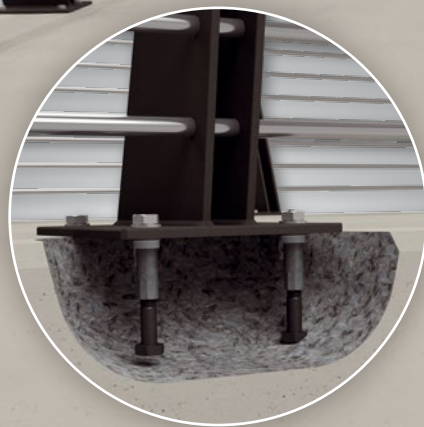


» PHIXATION x NEW SOFTWARE

We provide strength and stability
in an ever-changing world.

PHILIPPGROUP

➔ PLEASE CLICK HERE!



PHILIPP PB ANCHOR

PHILIPP PB anchor consists of the PB anchor itself, the PB marking ring with clip and the optional PB adapter plate for recessed installation.

SCOPE OF SUPPLY PB ANCHOR:

- » **Version: galvanised steel**
 - › PB anchor (galvanised socket)
 - › PB marking ring with clip
- » **optionally**
 - › PB adapter plate (galvanised)
- » **Version: stainless steel**
 - › PB anchor (socket: stainless steel SS316)
 - › PB marking ring with clip
- » **optionally**
 - › PB adapter plate (stainless steel SS316)

AVAILABLE SEPARATELY FROM PHILIPP:

- » **Recess formers**
 - › Plastic (72KHN__)
 - › Steel (72KHN__STK)
 - › Magnetic (72MAXKHN__)

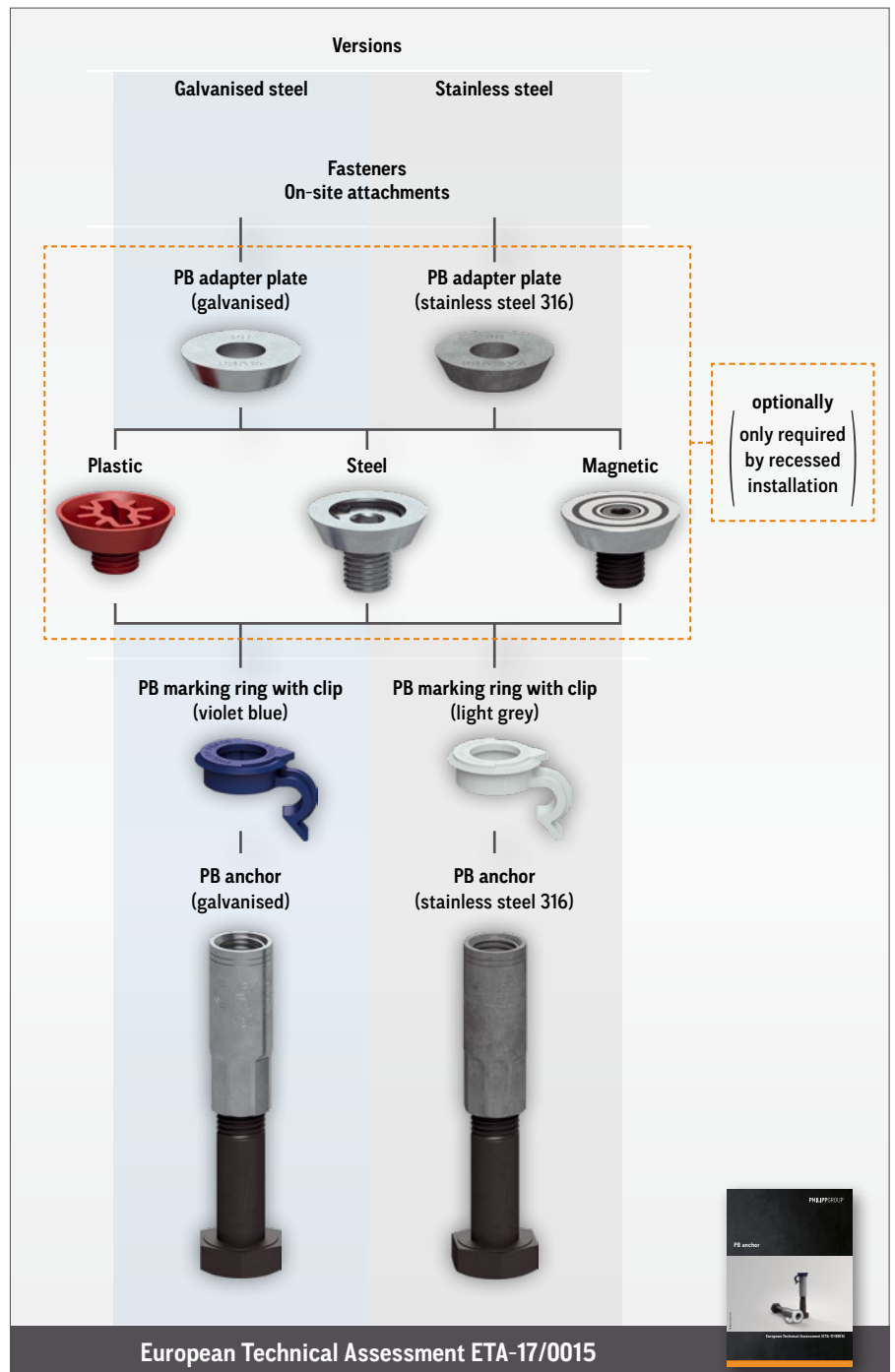


NOTE:

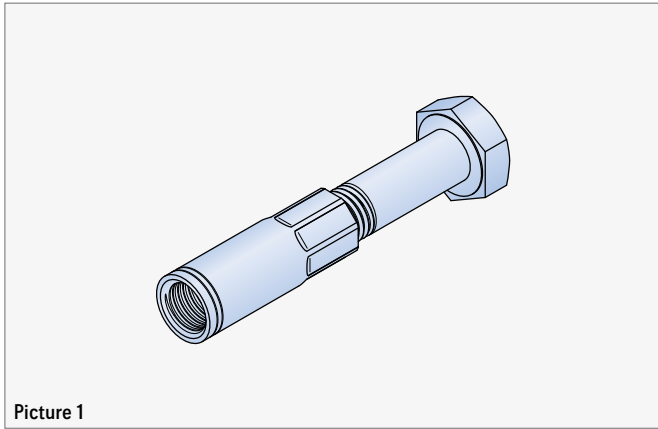
The Application Instruction for the KHN system has to be noted!



The fasteners (screws and washers) are not part of the PB anchor and have to be ordered separately. These have to be in accordance with the requested data of the static design or the design drawings. The fasteners are not available from PHILIPP.



PB ANCHOR



Picture 1

The PB anchor is designed for fixations in un/cracked normal concrete with a minimum compressive strength of C20/25 under predominantly static or quasi-static load. It is certified and approved via the European Technical Assessment (ETA-17/0015) by the Deutsches Institut für Bautechnik (DIBt), Berlin, Germany.

APPLICATION

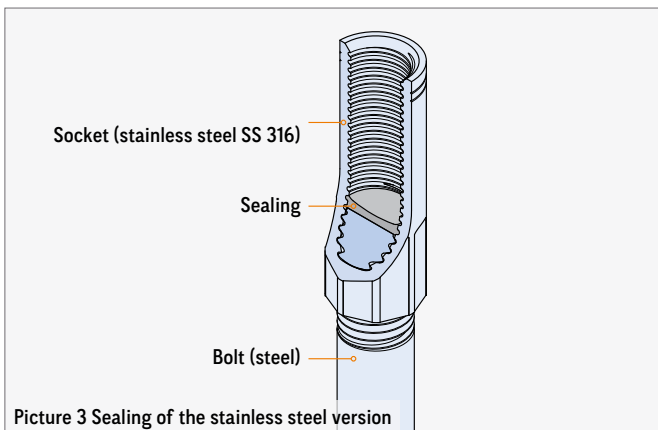
The PB anchor is used exclusively for permanent fixations. An attachment of lifting devices for the transport of concrete elements is not permitted as well as the use as attachment points for load protection.

MATERIALS

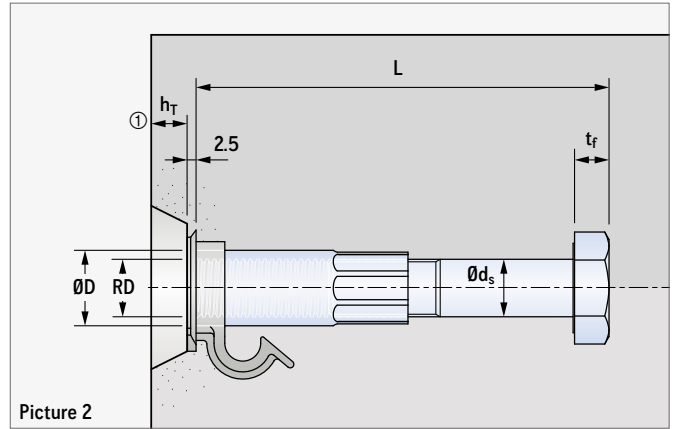
The PB anchor consists of a bright steel hexagonal bolt in strength class 8.8 with a screwed and crimped-on socket (RD thread with metric pitch). Depending on the anchor type, the socket is made of high-quality bright zinc galvanized steel or stainless steel SS316.

SEALING

The PB anchor in stainless steel is sealed on the bottom of the socket resp. on top of the bolt against corrosion. This sealing against corrosion is in accordance with EN 1992-4:2018 and ETA-17/0015 for a life cycle of 50 years.



Picture 3 Sealing of the stainless steel version



Picture 2

TABLE 1: DIMENSIONS OF THE PB ANCHOR

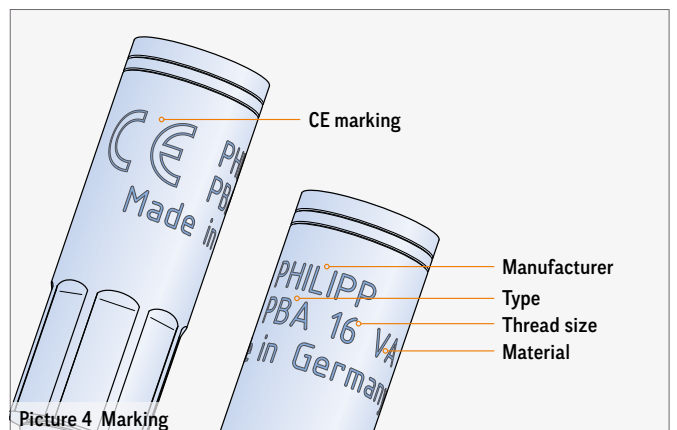
Ref. no.	Type	Dimensions					
		RD	ØD (mm)	L (mm)	h _T (mm)	Ød _s (mm)	t _f (mm)
Version: galvanised steel							
70PBA12	PBA 12	12	15.0	76.5	10.0	12.0	7.5
70PBA16	PBA 16	16	21.0	114.5	10.0	16.0	10.5
70PBA20	PBA 20	20	27.0	155.0	10.0	20.0	12.5
70PBA24	PBA 24	24	31.0	201.0	10.0	24.0	15.0
70PBA30	PBA 30	30	39.5	250.0	10.0	30.0	18.7
Version: stainless steel							
70PBA12VA	PBA 12	12	15.0	76.5	10.0	12.0	7.5
70PBA16VA	PBA 16	16	21.0	114.5	10.0	16.0	10.5
70PBA20VA	PBA 20	20	27.0	155.0	10.0	20.0	12.5
70PBA24VA	PBA 24	24	31.0	201.0	10.0	24.0	15.0
70PBA30VA	PBA 30	30	39.5	250.0	10.0	30.0	18.7

① If the PB anchor is installed recessed, the height of the adapter plate must be considered (picture 2).

MARKING

The PB anchor is marked as follows:

- » CE marking
- » Manufacturer (PHILIPP)
- » Typ (PBA)
- » Thread size (e.g. 16)
- » Material (only for versions in SS316)



Picture 4 Marking

PB MARKING RING WITH CLIP / PB ADAPTER PLATE

PB MARKING RING WITH CLIP

The PB marking ring with clip is used in order to identify the anchor in installed position, to fix the additional reinforcement in the right position (if necessary) and to show the load direction.

TABLE 2: PB MARKING RING WITH CLIP (PLASTIC)

Ref. no.	Type	ØD (mm)	Ød (mm)	H (mm)	h ₁ (mm)
Version: galvanised steel					
74KR12PBA	PBA 12	28	13	10.5	2.5
74KR16PBA	PBA 16	32	17	10.5	2.5
74KR20PBA	PBA 20	37	21	10.5	2.5
74KR24PBA	PBA 24	41	25	10.5	2.5
74KR30PBA	PBA 30	52	31	10.5	2.5
Version: stainless steel					
74KR12PBAVA	PBA 12	28	13	10.5	2.5
74KR16PBAVA	PBA 16	32	17	10.5	2.5
74KR20PBAVA	PBA 20	37	21	10.5	2.5
74KR24PBAVA	PBA 24	41	25	10.5	2.5
74KR30PBAVA	PBA 30	52	31	10.5	2.5

MARKING WHEN INSTALLED

Following data are visible after installation:

- » Colour code
- » Manufacturer (PHILIPP)
- » Type (PBA)
- » Thread size (e. g. 16)
- » Load direction (arrow)
- » Torque specification



INSTALLATION

The PB anchor must always be installed in combination with the PB marking ring with clip.

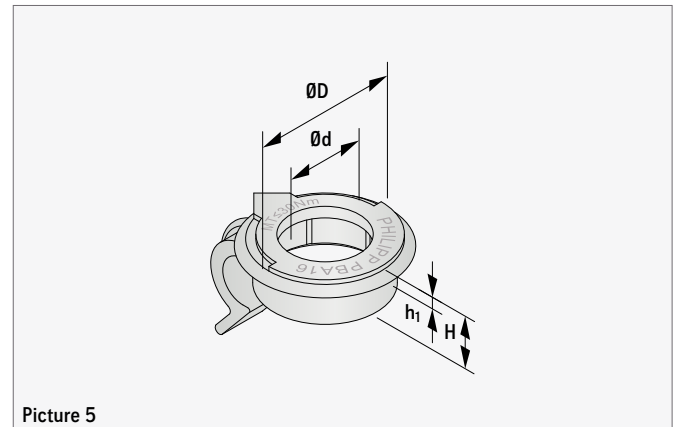
PB ADAPTER PLATE

If the PB anchor is installed recessed by using a recess former, the PB adapter plate can be placed into the recess during mounting procedure. Otherwise, it shall be ensured that this load case has already been included in the planning.

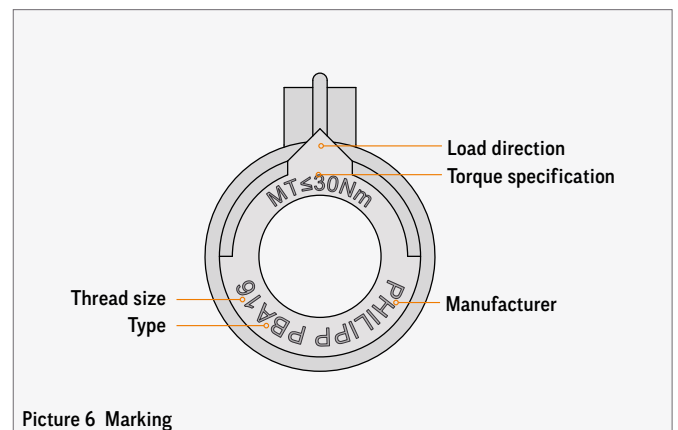
TABLE 3: PB ADAPTER PLATE

Ref. no.	Type	ØD (mm)	Ød (mm)	h (mm)
Version: galvanised steel				
72AS12PBA	PBA 12	40.0	12.5	10.0
72AS16PBA	PBA 16	40.0	16.5	10.0
72AS20PBA	PBA 20	55.0	20.5	10.0
72AS24PBA	PBA 24	55.0	24.5	10.0
72AS30PBA	PBA 30	70.0	30.5	10.0
Version: stainless steel				
72AS12PBAVA	PBA 12	40.0	12.5	10.0
72AS16PBAVA	PBA 16	40.0	16.5	10.0
72AS20PBAVA	PBA 20	55.0	20.5	10.0
72AS24PBAVA	PBA 24	55.0	24.5	10.0
72AS30PBAVA	PBA 30	70.0	30.5	10.0

The plastic marking ring is put over the PB anchor socket during the installation of the anchor. Afterwards the PB anchor is fixed to the formwork (picture 2).



Picture 5

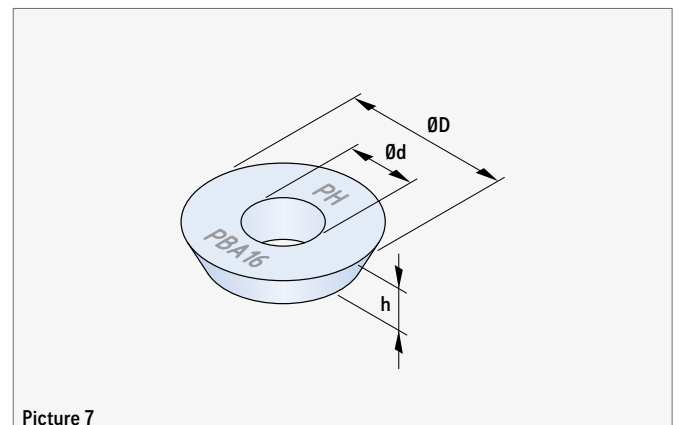


Picture 6 Marking



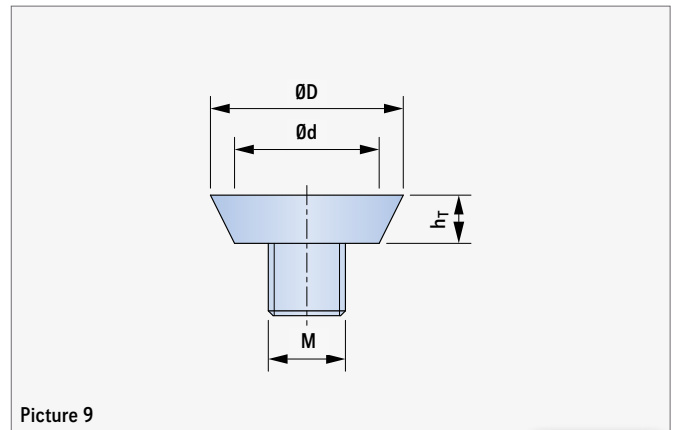
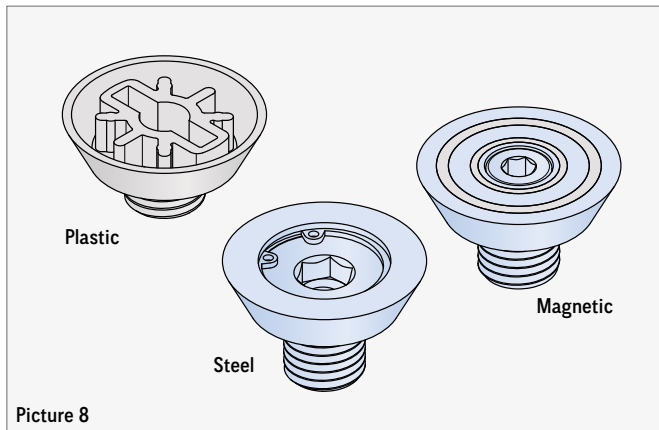
RECESSED INSTALLATION

If the PB anchor is installed recessed without an adapter plate, this shall be taken into account in the design beforehand if necessary (shear forces with lever arm).



Picture 7

RECESS FORMERS



Use recess formers KHN for the recessed installation of the PB anchor. These are available as plastic, steel or magnetic version.



PLEASE NOTE

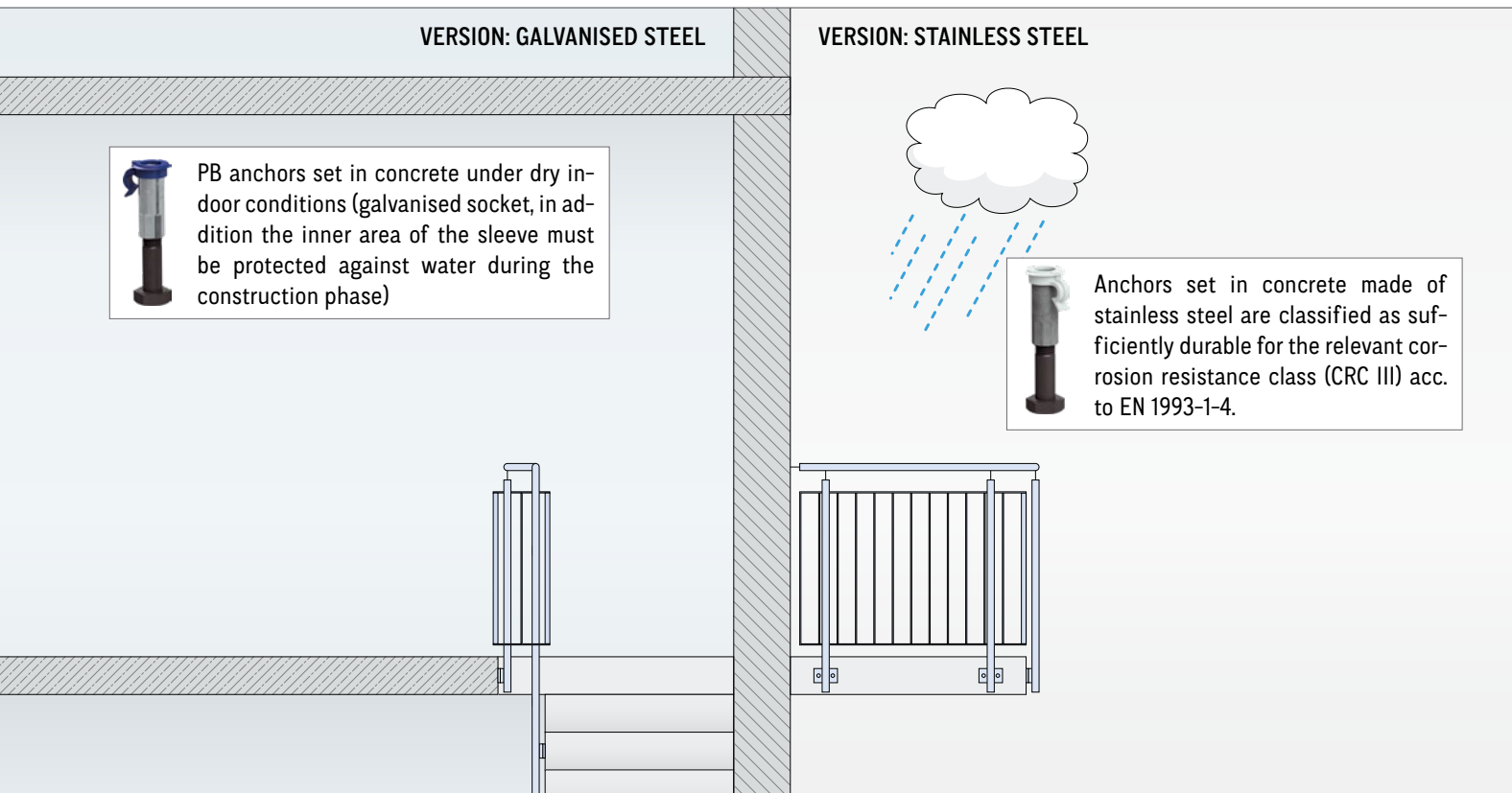
The Application Instruction for the KHN system is to be considered!



TABLE 4: RECESS FORMERS (TYPE KHN)

Ref. no.			Thread (M)	Dimensions		
Plastic	Steel	Magnetic		ØD (mm)	Ød (mm)	h _T (mm)
72KHN12	72KHN12STK	72MAXKHN12	M12	40	30	10
72KHN16	72KHN16STK	72MAXKHN16	M16	40	30	10
72KHN20	72KHN20STK	72MAXKHN20	M20	55	45	10
72KHN24	72KHN24STK	72MAXKHN24	M24	55	45	10
72KHN30	72KHN30STK	72MAXKHN30	M30	70	60	10

PLANNING

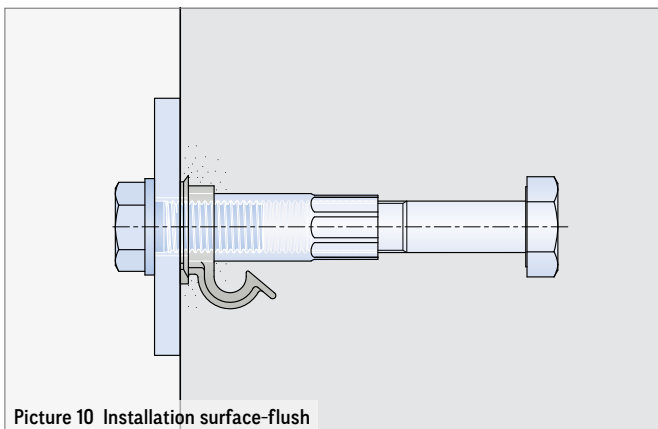


DESIGN

The design of the fixation under predominantly static or quasi-static load has to be done in accordance with EN 1992-4:2018 and under the responsibility of an engineer experienced in the field of anchorages and concrete construction. Verifiable technical drawings and calculations have to be prepared considering the final loads to be anchored.

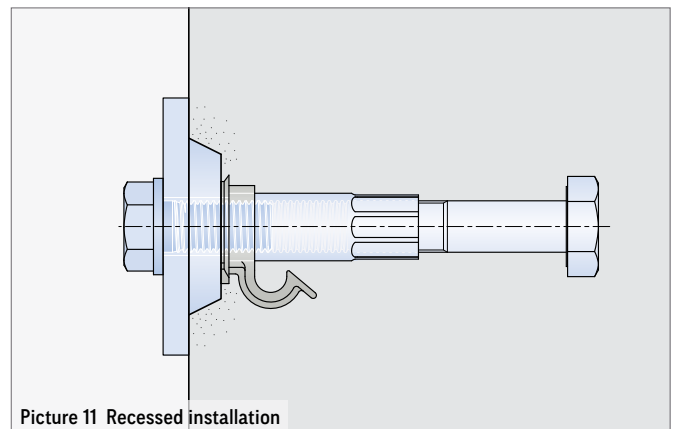
INSTALLATION FLUSH TO CONCRETE SURFACE

If the PB anchor is installed flush to the concrete surface the attachment has direct contact to the anchor socket as well as the concrete surface.



RECESSED INSTALLATION

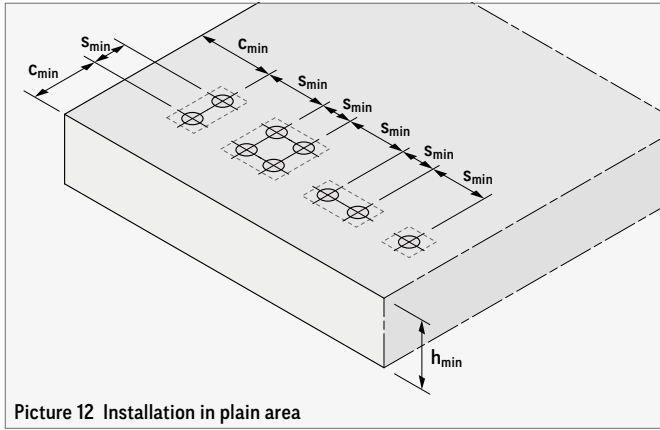
If the anchor is installed recessed, the attachment has direct contact to the concrete surface but not to the anchor socket. Here, the PB adapter plate can be used as an option (see also page 7).



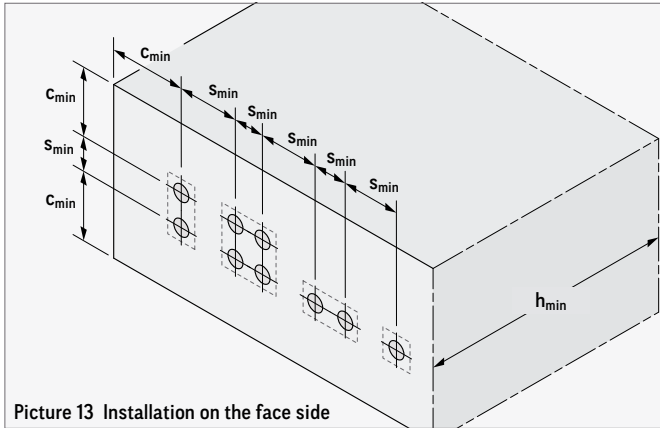
PLANNING

MIN. ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

For a safe load transfer the installation and positioning of PB anchors in precast concrete elements requires minimum thicknesses as well as centre and edge distances.



Picture 12 Installation in plain area



Picture 13 Installation on the face side

TABLE 5: MINIMUM ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

Ref. no.	Min. element thickness ① h_{min} (mm)	Min. centre distance S_{min} (mm)	Min. edge distance C_{min} (mm)
PBA 12	100	110	55
PBA 16	140	140	70
PBA 20	180	180	90
PBA 24	225	220	110
PBA 30	275	270	135

① $h \geq h_{nom} + C_{nom}$ (C_{nom} acc. to EN 1992-1-1:2011-01)

CONCRETE

Reinforced and unreinforced concrete in accordance with EN 206:2013+A2:2021 of concrete strength classes C20/25 to C50/60 can be used. In general, an anchoring in cracked and uncracked concrete is possible.

REINFORCEMENT

Any reinforcement required shall be chosen in accordance with EN 1992-4:2018. If additional reinforcement is chosen for lateral tension in form of stirrups or U-bent reinf. (with contact to the PB anchor), it may be necessary to use stainless steel for this additional reinforcement in accordance with the concrete cover requirements.

FASTENERS

For the fasteners, the minimum requirements according to table 6 must be met.

TABLE 6: FASTENERS

Screw	Washer
Version: galvanised steel	
EN ISO 898-1:2013, bright zinc plated, class 8.8	EN ISO 7089:2000 / 7090:2000, bright zinc galvanised, $\geq 200HV$
Version: stainless steel	
EN ISO 3506-1:2020, strength class A4-70, CRC III	1.4401 / 1.4404 / 1.4571 EN ISO 7089:2000 / 7090:2000 $\geq 200HV$, CRC III

PLANNING

THREAD REACH

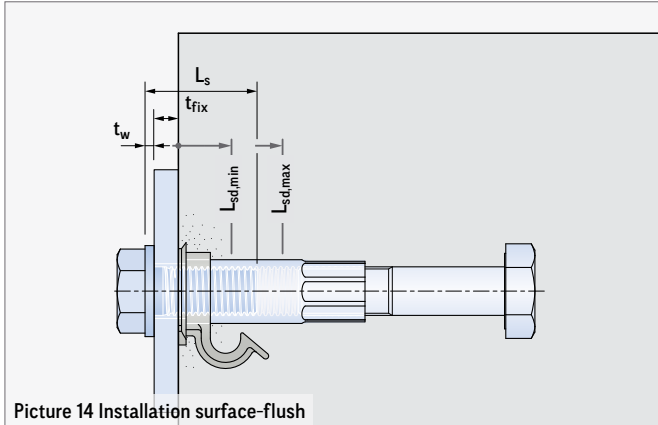
For a correct mounting of the attachments to the PB anchor the minimum and maximum thread reach has to be considered. These can be found in table 7.



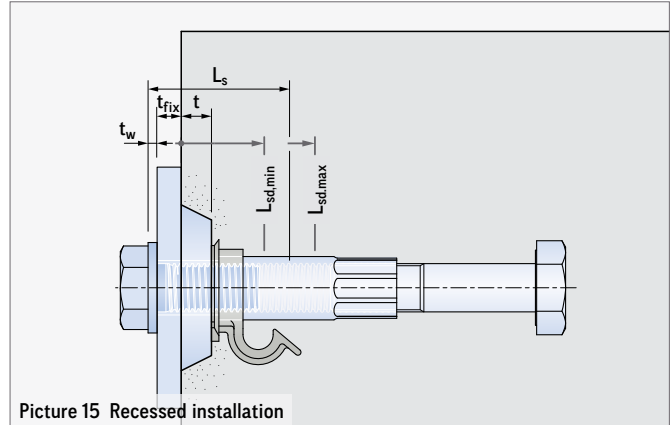
FASTENERS

All required fasteners are not included in our scope of delivery.

L_s	Length of the screw
$L_{sd,min}$	Minimum thread reach
$L_{sd,max}$	Maximum thread reach
t_w	Thickness of the washer
t_{fix}	Thickness of the attachment
t_v	Depth of the recess



Picture 14 Installation surface-flush



Picture 15 Recessed installation

TABLE 7: THREAD REACH

Type	Thread reach	
	$L_{sd,min}$ (mm)	$L_{sd,max}$ (mm)
PBA 12	16.9	26.5
PBA 16	21.7	37.5
PBA 20	26.5	44.5
PBA 24	31.3	52.5
PBA 30	38.5	61.5

TORQUE SPECIFICATION

The attachment to be fixed is screwed into the PB anchor set in concrete using a screw with metric ISO thread and a suitable washer. Here, the given torque specification in table 8 has to be considered.

REQUIRED INFORMATION IN DESIGN DRAWINGS

Following data shall be provided on the design drawings:

- » Selected PB anchor (ref. no.)
- » Position of the anchor (centre and edge distances)
- » Direction of the marking ring (direction of arrow)
- » Minimum reinforcement
- » Minimum concrete strength according to static calculation
- » Position and direction of the required additional reinforcement
- » Requirements for the fasteners (material and strength class)
- » Length of the fasteners and thickness of the attachment
- » Details of the recess former (if the anchor is installed recessed)

CALCULATION OF THE REQUIRED SCREW LENGTH

For installation flush to the surface:

$$t_w + t_{fix} + L_{sd,min} \leq L_s \leq t_w + t_{fix} + L_{sd,max}$$

For recessed installation:

$$t_w + t_{fix} + t_v + L_{sd,min} \leq L_s \leq t_w + t_{fix} + t_v + L_{sd,max}$$

Example acc. to picture 14 (PBA 16):

$$3 \text{ mm} + 12 \text{ mm} + 21.7 \text{ mm} \leq L_s \leq 3 \text{ mm} + 12 \text{ mm} + 37.5 \text{ mm}$$

$$36.7 \text{ mm} \leq L_s \leq 52.5 \text{ mm}$$

Possible screws: M16 × 40 / M16 × 45 / M16 × 50

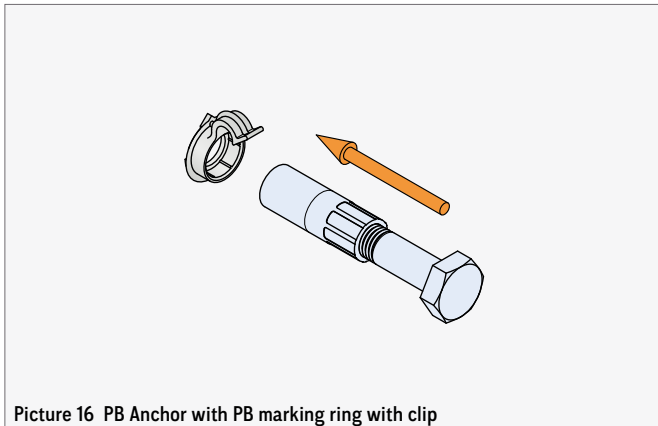
TABLE 8: TORQUE SPECIFICATIONS M_T

Type	M_T (Nm)
PBA 12	≤ 10
PBA 16	≤ 30
PBA 20	≤ 60
PBA 24	≤ 80
PBA 30	≤ 200

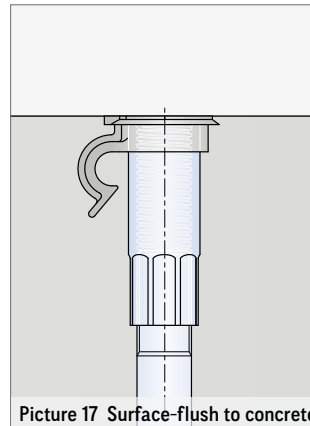
INSTALLATION OF THE PB ANCHOR

REQUIREMENTS FOR THE INSTALLATION

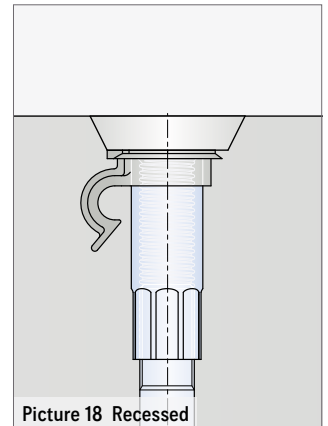
- » Modifications or change of any individual component are not permitted.
- » The PB anchor has to be fixed to the formwork so that its position won't be changed by the installation of the reinforcement, casting or compacting of the concrete.
- » Proper compacting of the concrete in the anchor area.
- » The interior area of the bright zinc galvanised socket must be protected against water penetration.
- » The interior area of the stainless steel socket must be protected against oil penetration.



Picture 16 PB Anchor with PB marking ring with clip



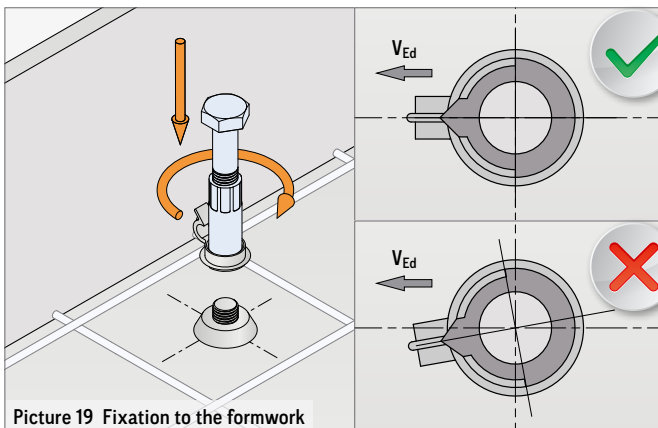
Picture 17 Surface-flush to concrete



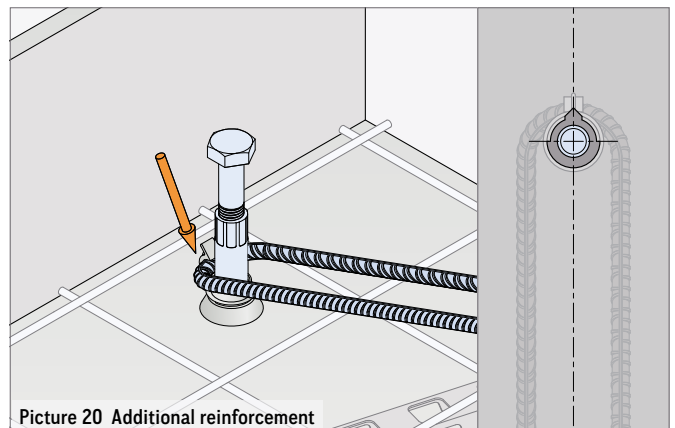
Picture 18 Recessed

Before installation of the PB anchor the PB marking ring with clip shall be fixed on the socket.

Then, the PB anchor is fixed to the formwork either with PHILIPP Threaded adapter flush to the concrete surface or using the PHILIPP Recess former KHN.



Picture 19 Fixation to the formwork

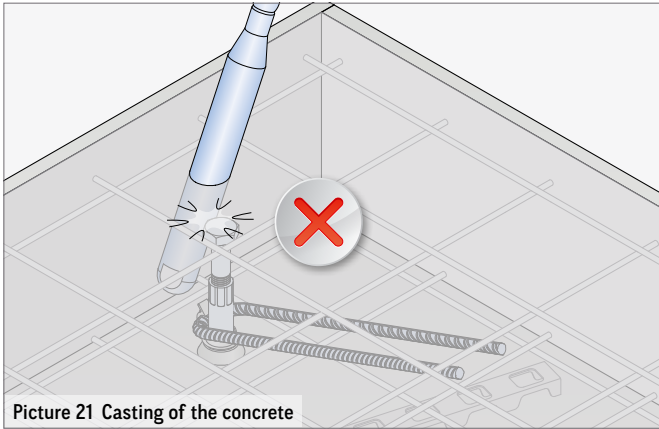


Picture 20 Additional reinforcement

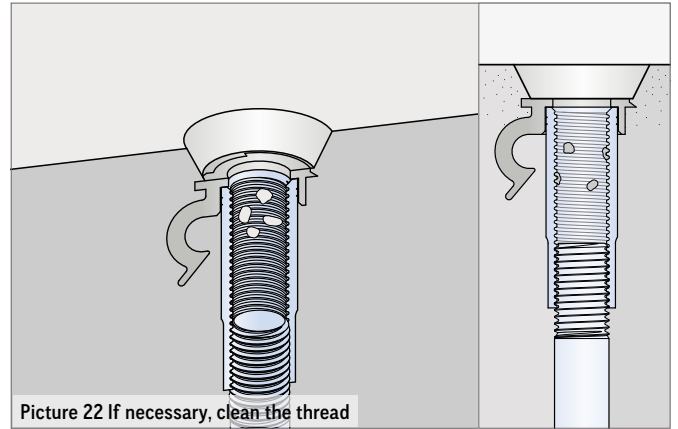
Pay attention that the PB marking ring with clip is placed in the correct direction (arrow direction (on clip) = load direction).

In case of additional reinforcement, this can be fixed fast and easily by the PB marking ring with clip. This additional reinforcement has to be placed opposite to the load direction (arrow direction of the PB marking ring with clip) and with contact to the socket. Here, the required concrete cover has to be ensured. If necessary, the additional reinforcement has to be placed in inclined position or the version in stainless steel is required. Alternatively, the reinforcement can be installed according to EN 1992-4:2018.

INSTALLATION OF THE PB ANCHOR



The PB anchor has to be fixed to the formwork so that its position won't be changed by the installation of the reinforcement, casting or compacting of the concrete. During compacting of the concrete any contact between the vibrator and the PB anchor shall be avoided.



If the thread is dirty, it must be cleaned before using. This can be done easily by using the PHILIPP Chaser screw.



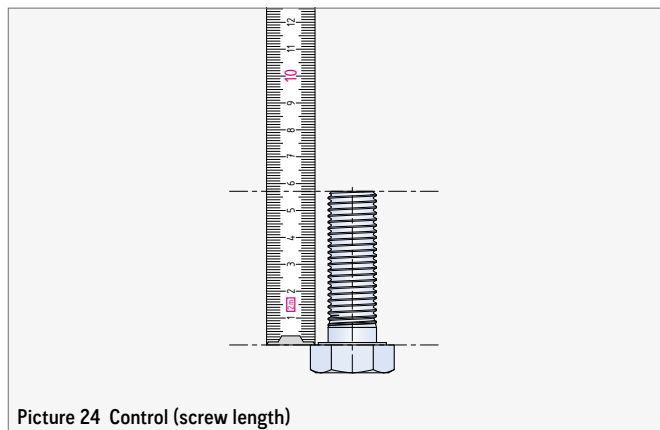
NOTE

In order to avoid any penetration of water, oil or mud it is recommended to seal the PB anchor during storage and transport processes.

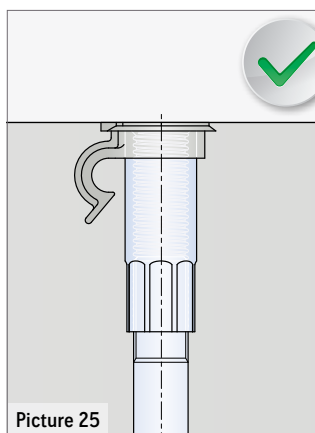
MOUNTING OF THE ATTACHMENTS

The required concrete strength needs to be ensured before mounting of the attachments. Furthermore, check if the length of the screws is suitable to fulfil the required minimum and maximum length of the screws (table 7).

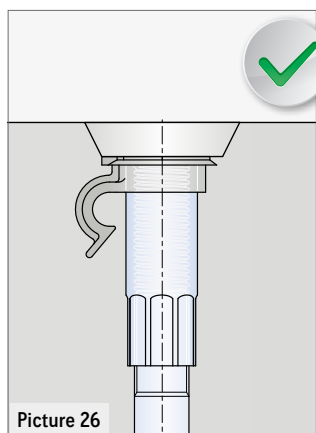
The installation of the PB anchor shall be controlled visually (picture 25 - 28). An installation to incorrectly installed PB anchors can cause damage to the anchors themselves or to the concrete.



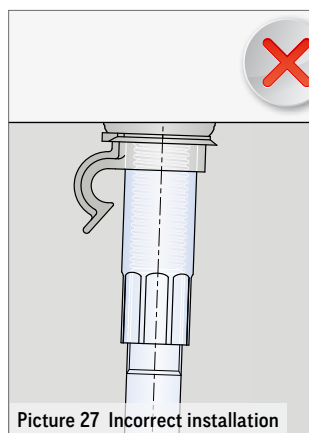
Picture 24 Control (screw length)



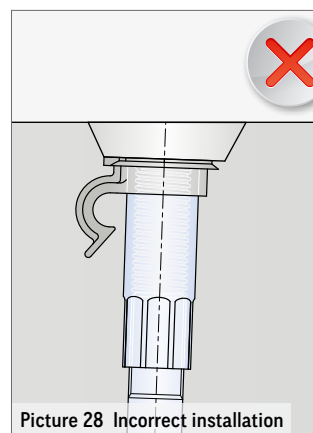
Picture 25



Picture 26

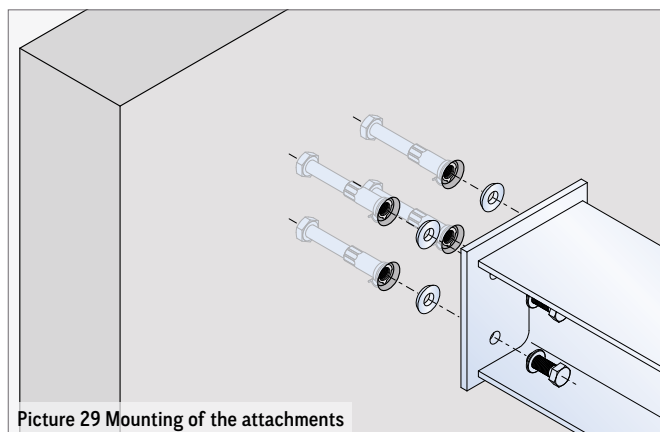


Picture 27 Incorrect installation



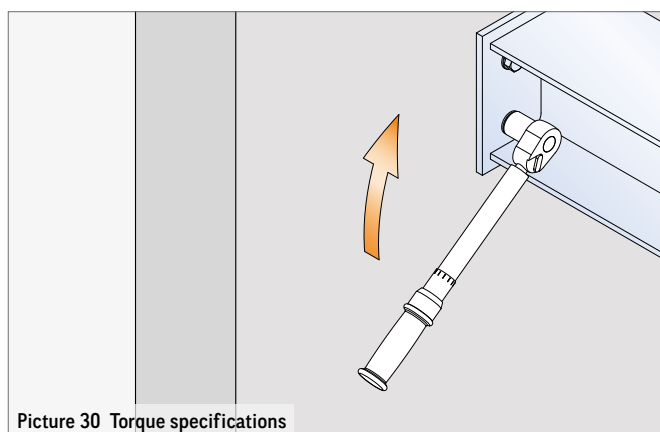
Picture 28 Incorrect installation

For the mounting of the attachments please use the specified fasteners (screws, washers) and, if necessary, the PB adapter plate for a recessed installation.



Picture 29 Mounting of the attachments

The screws must be screwed in with the specified torque. Here, the additional notes of the attachment parts shall be followed. The maximum fastening torques M_T are given in table 8 as well as on the PB marking ring with clip.



Picture 30 Torque specifications



TORQUE SPECIFICATIONS

An installation with incorrect fastening torque may result in damage to the concrete or the PB anchor.

DESIGN SOFTWARE

PHILIPP provides a free software for the design of PB anchors. Here are some of the advantages of the software available on the PHILIPP website www.philipp-group.de

» Simple and easy-to-understand user interface
 » Geometry and load entries directly in a 3D model
 » Direct support during application through mouse-over help texts
 » Detailed and comprehensible results of the design

» Results of the calculations are shown immediately when geometry or load entries are changed, without pressing a "design button"
 » Multiple calculation of all anchor types is possible

Anchor	Type	Size	hef	Tension load	Shear load	Tension and shear load
Anchor Family: PBA						
PBA	A4	RD / M 12	71,5 mm	127,02 %	34,05 %	172,94 %
PBA	GV	RD / M 12	71,5 mm	93,50 %	19,62 %	85,71 %
PBA	A4	RD / M 16	107 mm	60,27 %	15,48 %	48,27 %
PBA	GV	RD / M 16	107 mm	60,27 %	8,8 %	48,27 %
PBA	A4	RD / M 20	145 mm	49,30 %	9,7 %	35,71 %
PBA	GV	RD / M 20	145 mm	49,30 %	8,7 %	26,12 %
PBA	A4	RD / M 24	188,5 mm	40,03 %	7,1 %	26,12 %
PBA	GV	RD / M 24	188,5 mm	40,03 %	5,3 %	19,54 %
PBA	A4	RD / M 30	233,8 mm	32,98 %	5,3 %	19,54 %
PBA	GV	RD / M 30	233,8 mm	32,98 %	5,3 %	19,54 %

Results
PBA, GV, RD / M 12
Tension load
 Steel failure: 11,9 %
 Pull-out: 9,4 %
 Concrete cone failure: 25,6 %
Shear load
 Steel failure: 16,4 %
 Concrete pry-out failure: 12,8 %
Tension and shear load
 Interaction steel: 4,1 %
 Interaction concrete: 17,6 %

» Project management for the creation of multiple designs within one project file
 » Hint window, which indicates boundary conditions that lead to conflicts in the design



DESIGN RESULTS

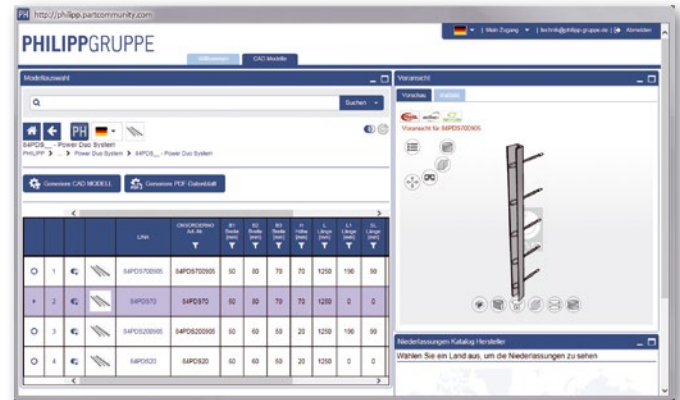
All results from the PHILIPP design software are only valid in combination with PHILIPP products to ensure the local load transfer into the concrete element. The planner is responsible for the further load transfer into the concrete element.

CAD

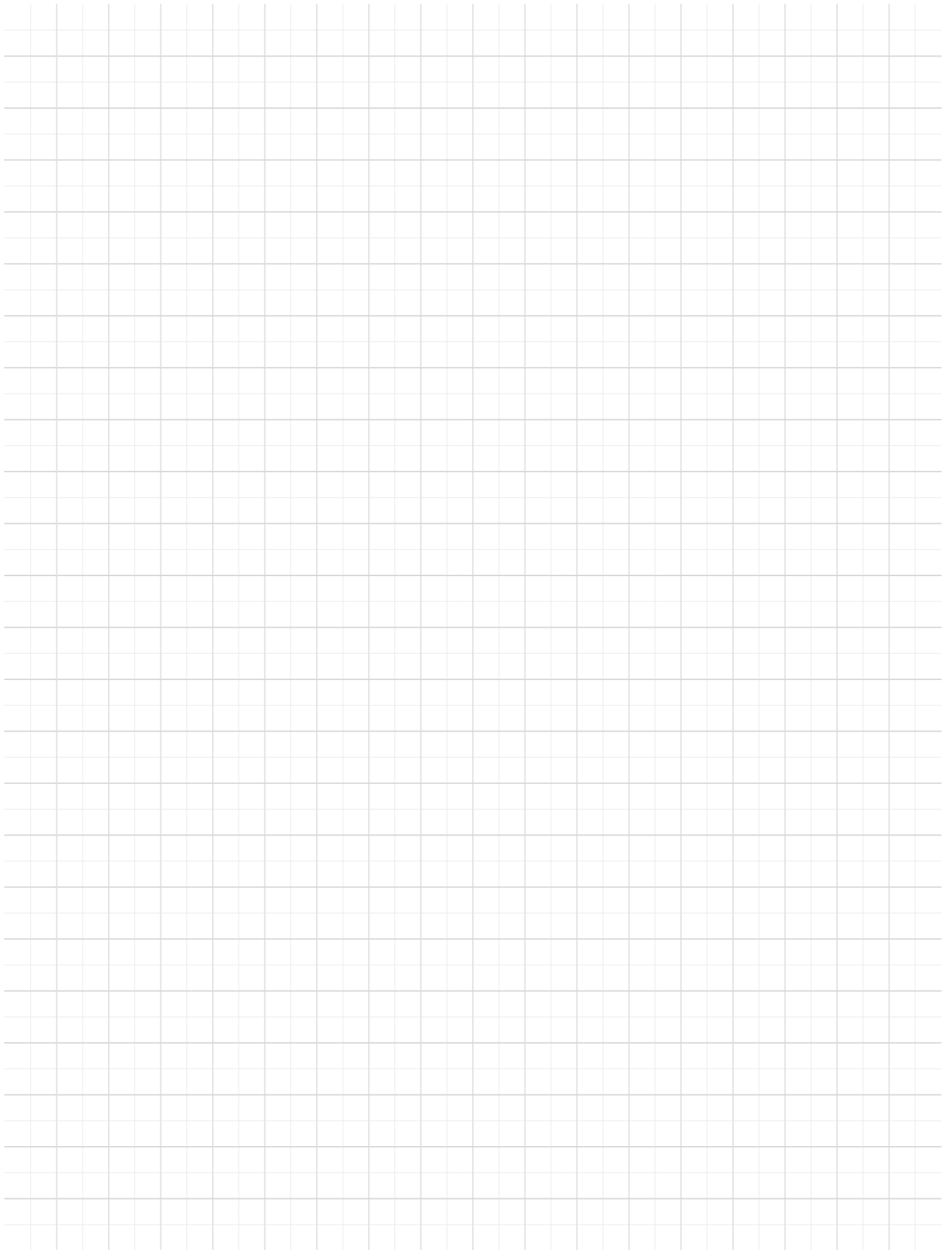
3D MOUNTING PARTS

Time-saving during the planning process and support for the Building Information Modelling (BIM) method are becoming more and more important. This is the reason why the universal PHILIPP CAD library helps to work efficiently on these matters.

- » More than 1,200 PHILIPP products are available as 3D model
- » Universal CAD library with many export formats compatible for all CAD systems (e.g. IFC, DWG)
- » Free offer for all people involved in precast building
- » Time-saving in the design process thanks to the readymade models and views
- » Simply structured catalogue
- » More product details are provided
 - › Standard PartCommunity:
philipp.partcommunity.com
 - › BIM specific PartCommunity:
bimcatalogs.partcommunity.com



NOTES





**PHILIPP GmbH
Headquarters**

Lilienthalstrasse 7-9
63741 Aschaffenburg

+ 49 6021 40 27-0

info@philipp-gruppe.de

**PHILIPP GmbH
Production and logistics**

Hauptstrasse 204
63814 Mainaschaff

+ 49 6021 40 27-0

info@philipp-gruppe.de

**PHILIPP GmbH
Office Coswig**

Roßlauer Strasse 70
06869 Coswig/Anhalt

+ 49 34903 6 94-0

info@philipp-gruppe.de

**PHILIPP GmbH
Office Neuss**

Sperberweg 37
41468 Neuss

+ 49 2131 3 59 18-0

info@philipp-gruppe.de



PHILIPP Vertriebs GmbH

Leogangerstraße 21
5760 Saalfelden / Salzburg

+ 43 6582 7 04 01

info@philipp-gruppe.at



Visit us!

www.philipp-group.de