

# PHILIPP GROUP

## PHILIPP PB anchor



VB3-BZ-004-en-EU - 04/21

ETA-17/0015

European Technical Assessment

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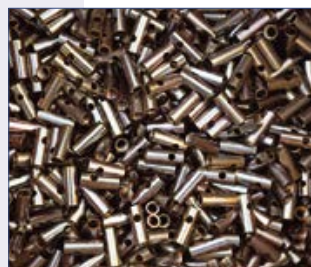
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European Technical Assessment ETA-17/0015



Approval body for construction products and types of construction  
**Bautechnisches Prüfamt**  
 An institution established by the Federal and Laender Governments



**European Technical Assessment** **ETA-17/0015**  
**of 19 April 2021**

English translation prepared by DIBt - Original version in German language

**General Part**

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	PHILIPP PB Anchor System
Product family to which the construction product belongs	Cast-in anchor with internal threaded socket
Manufacturer	PHILIPP GmbH Lilienthalstraße 7-9 63741 Aschaffenburg DEUTSCHLAND
Manufacturing plant	PHILIPP GmbH
This European Technical Assessment contains	16 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330012-01-0601, Edition 02/2021

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**Specific Part**

**1 Technical description of the product**

The PHILIPP PB Anchor System in the size of 12, 16, 20, 24 and 30 is an anchor consisting of an internal threaded socket screwed and pressed on a hexagon bolt. The socket is made of galvanised steel or stainless steel. The anchor is imbedded surface-flush or sunk in the concrete. The anchorage is characterised by mechanical interlock at the head.  
The product description is given in Annex A.

**2 Specification of the intended use in accordance with the applicable European Assessment Document**

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.  
The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

**3 Performance of the product and references to the methods used for its assessment**

**3.1 Mechanical resistance and stability (BWR 1)**

Essential characteristic	Performance
Characteristic values for tension resistance for static and quasi-static loads and displacements	See Annex B3, B4, C1 and C2
Characteristic values for shear resistance for static and quasi-static loads and displacements	See Annex C2
Characteristic values for seismic performance categories C1 and C2 and displacements	No performance assessed

**3.2 Safety in case of fire (BWR 2)**

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

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**4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

In accordance with EAD No. 330012-01-0601, edition 02/2021, the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

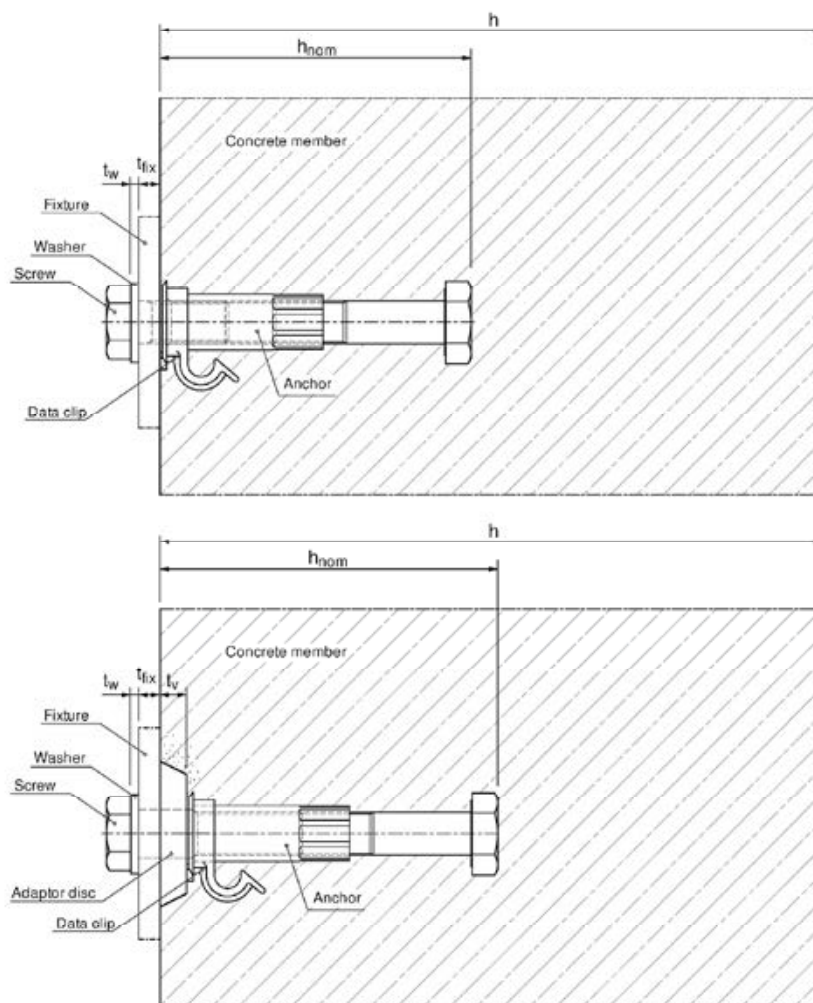
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Dipl.-Ing. Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Aksünger

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**PHILIPP PB Anchor System**



- $h$  = thickness of concrete member
- $h_{nom}$  = embedment depth
- $t_w$  = thickness of washer
- $t_{fix}$  = thickness of fixture
- $t_v$  = thickness of Recess Former / Adaptor Disc

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<b>PHILIPP PB Anchor System</b>	<b>Annex A1</b>
<b>Product description</b> Installed conditions	

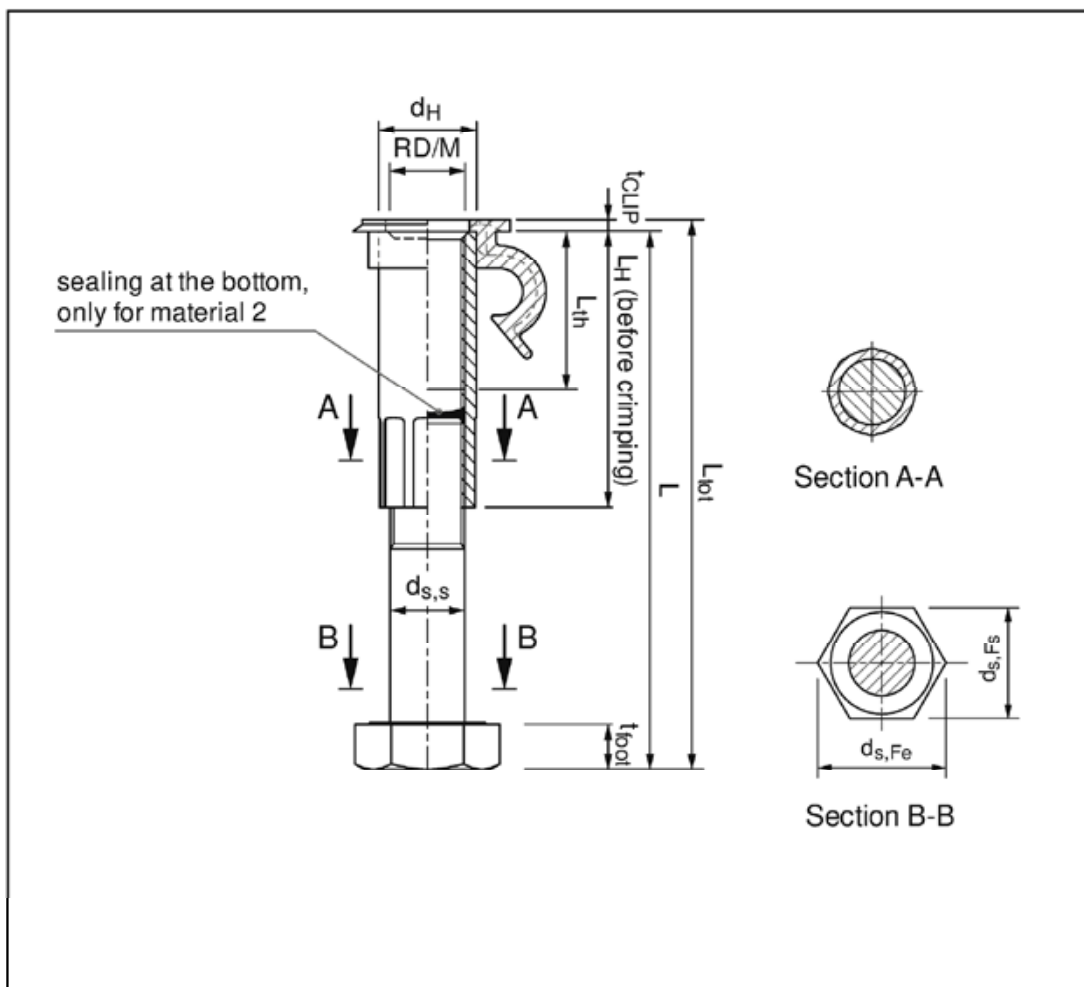


Table A1: Dimensions of PHILIPP PB Anchor and Data Clip

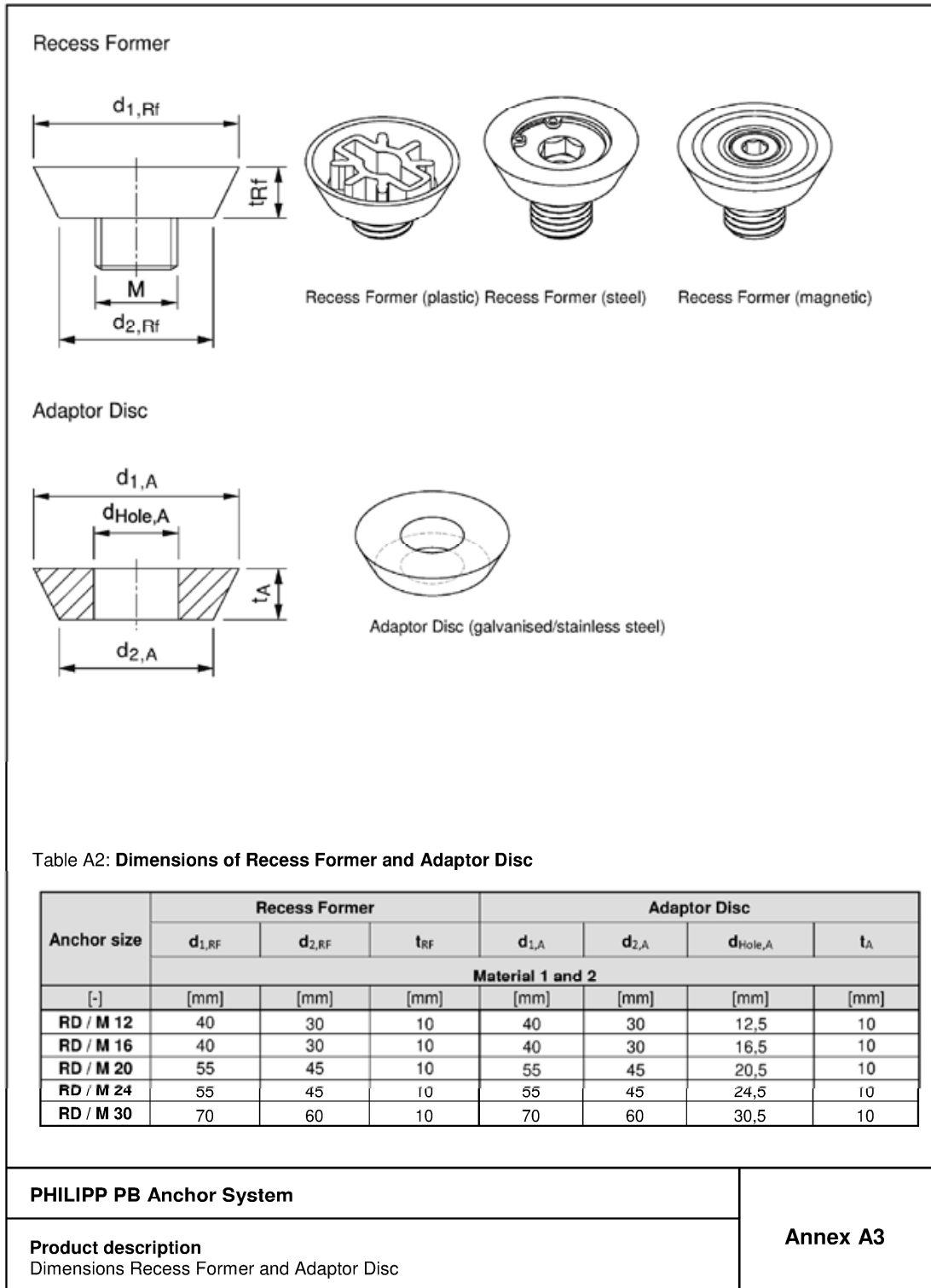
Anchor size	d <sub>H</sub>		L <sub>H</sub>	L <sub>th</sub>	d <sub>s,s</sub>	d <sub>s,Fe</sub>	d <sub>s,Fe</sub>	t <sub>clip</sub>	t <sub>foot</sub>	L	L <sub>tot</sub>
	Material 1	Material 2									
	Material 1 and Material 2										
[ - ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]	[ mm ]
RD / M 12	15,0	15,0	43,0	24	12	23,9	22,0	2,5	7,5	76,5	79,0
RD / M 16	21,0	21,0	59,0	35	16	29,6	27,0	2,5	10,0	114,5	117,0
RD / M 20	27,0	26,7	71,0	42	20	35,0	32,0	2,5	12,5	155,0	157,5
RD / M 24	31,0	31,0	85,0	50	24	45,2	41,0	2,5	15,0	201,0	203,5
RD / M 30	39,5	38,0	102,0	59	30	55,4	50,0	2,5	18,7	250,0	252,5

**PHILIPP PB Anchor System**

**Product description**  
Dimensions anchor and Data Clip

**Annex A2**





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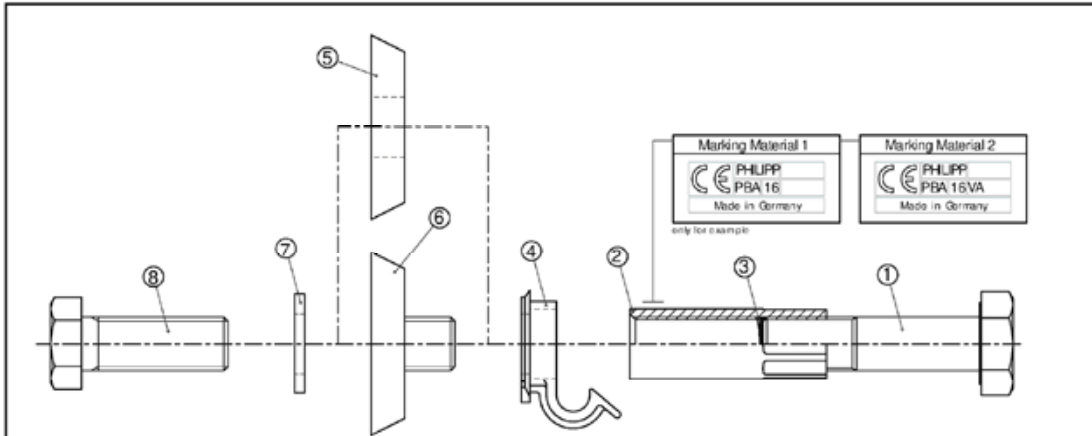
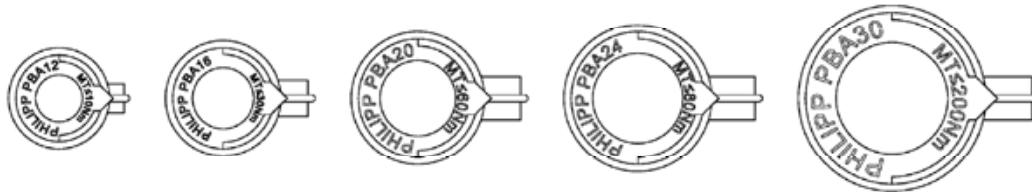


Table A3: Specification and material of the anchor and appropriate components

Item	Component	Delivery content	Material 1 galvanised steel	Material 2 stainless steel
1	Hexagon Bolt	yes	acc. to DIN EN 14399-3:2015, bright, strength class 8.8	
2	Socket	yes	E 355 + N (1.0580) acc. to EN 10025:2004 galvanised <sup>1)</sup>	Stainless steel 1.4401/1.4404/1.4571 acc. to EN 10088:2009; CRC III
3	Sealing inside the socket	yes	not required	2-component resin <sup>2)</sup>
4	Data Clip	yes	HD-PE (RAL 5000) / violet blue	HD-PE (RAL 7035) / light grey
5	Adaptor Disc	selectable	S235 JR (1.0037) acc. to EN 10025:2004	Stainless steel 1.4401/1.4404/1.4571 acc. to EN 10088-4/5:2009; CRC III
6	Recess Former	selectable	HD-PE (plastic version) or S235 JR (1.0037) acc. to EN 10025:2004 (steel and magnetic version)	
7	Washer	no	Steel acc. to EN ISO 7089:2000 / 7090:2000, galvanised, $\geq 200\text{HV}$	Stainless steel 1.4401 / 1.4404 / 1.4571 acc. to EN ISO 7089:2000 / 7090:2000, $\geq 200\text{HV}$ ; CRC III
8	Screw	no	Steel acc. to EN ISO 898-1:2013, galvanised, strength class 8.8	Stainless steel acc. to EN ISO 3506-1:2009, strength class A4-70; CRC III

<sup>1)</sup> Galvanisation with a plate thickness  $\geq 5 \mu\text{m}$  incl. electroplated zinc coating (blue) acc. to EN ISO 4042:2018

<sup>2)</sup> Front side of hexagonal screw covered/protected against corrosion



Top view of Data Clip.

<b>PHILIPP PB Anchor System</b>	<b>Annex A4</b>
<b>Product description</b> Marking and materials	

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<p><b><u>Specifications of intended use</u></b></p> <p><b>Anchorage subject to</b></p> <ul style="list-style-type: none"> <li>• static and quasi static loads</li> <li>• for transmission of tensile loads, shear loads or a combination of both</li> <li>• surface-flush or sunk in the concrete member</li> <li>• in temperature range -40° C to +80° C</li> </ul> <p><b>Base materials</b></p> <ul style="list-style-type: none"> <li>• reinforced or unreinforced normal weight concrete according to EN 206:2013 + A1:2016</li> <li>• strength classes of C20/25 to C50/60</li> <li>• cracked or uncracked concrete</li> </ul> <p><b>Condition of use (Environmental conditions)</b></p> <ul style="list-style-type: none"> <li>• Cast-in anchors intended for use in structures subject to dry, internal conditions (Material 1 acc. Annex A4 only if the inner area of the socket is protected against water during installation)</li> <li>• Cast-in anchors made of stainless steel according to EN 1993-1-4:2006 + A1:2015, Annex A, Table A.3 according to the Corrosion Resistance Class (CRC) (see Annex A4 Material 2)</li> </ul> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work</li> <li>• Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, orientating the Data Clip)</li> <li>• Anchorages under static or quasi-static actions are designed in accordance with:             <ul style="list-style-type: none"> <li>- EN 1992-4:2018</li> </ul> </li> <li>• Requirements for the screw:             <ul style="list-style-type: none"> <li>- Material and strength class in accordance with Annex A4</li> <li>- Length in accordance with Annex B3 and required thickness of the fixture.</li> </ul> </li> <li>• Shear loads acting on fastenings may be assumed to act without a lever arm if the adapter disc according to Annex A 3 is used.</li> </ul>	
<p><b>PHILIPP PB Anchor System</b></p>	
<p><b>Intended use Specifications</b></p>	<p><b>Annex B1</b></p>

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### Installation

- Installation of anchors is carried out by trained and appropriately qualified workers under supervision of the person responsible for technical matters on site
- Usage of anchors only as supplied by the manufacturer without any manipulation or exchanging of components
- Installation of anchors in accordance with manufacturer's specifications given in Annex B5 and B6
- Anchors have to be fixed to the formwork so that no movement of the anchors will occur during the time of laying the reinforcement and of placing and compacting the concrete
- Concrete around anchors has to be compacted properly
- Inner area of socket has to be protected against penetration of concrete
- Inner area of socket made of galvanised steel is to be protected against water
- Inner area of socket made of stainless steel is to be protected against oil
- Maximum setting torques and the minimum and maximum screw-in depth given in Annex B3 must not be exceeded
- Anchors may only be loaded in the direction shown by the Data Clip (arrow) if a supplementary reinforcement is used
- The fixture is assembled to the cast-in anchor with a fastening screw and washer or a threaded rod, a washer and a nut. They are not provided by the manufacturer (see Annexes A4, table A3).

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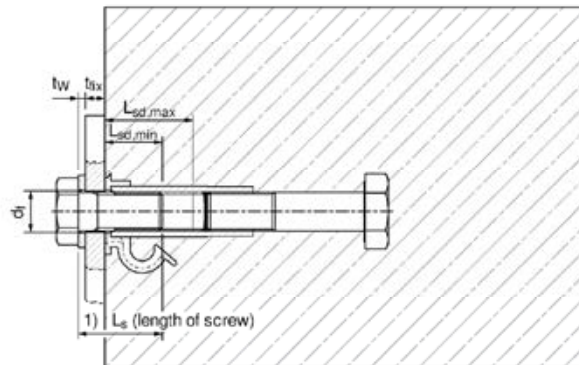
<b>PHILIPP PB Anchor System</b>		<b>Annex B2</b>
<b>Intended use Specifications</b>		

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**Application of anchor flush to the surface**

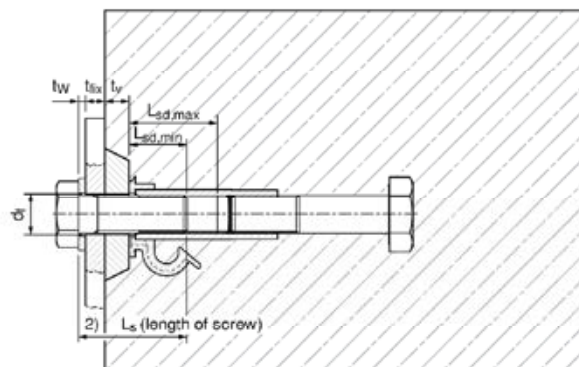
The fixture is braced directly to the concrete while the anchor is braced flush to the surface.



$$1) t_w + t_{fix} + L_{sd,min} \leq L_s \leq t_w + t_{fix} + L_{sd,max}$$

**Application of anchor in recessed position**

The fixture is braced directly to the concrete while the anchor is installed in recessed position using the recess former acc. to Annex A3. In this case the Adaptor Disc acc. to Annex A3 can be put into the recess.

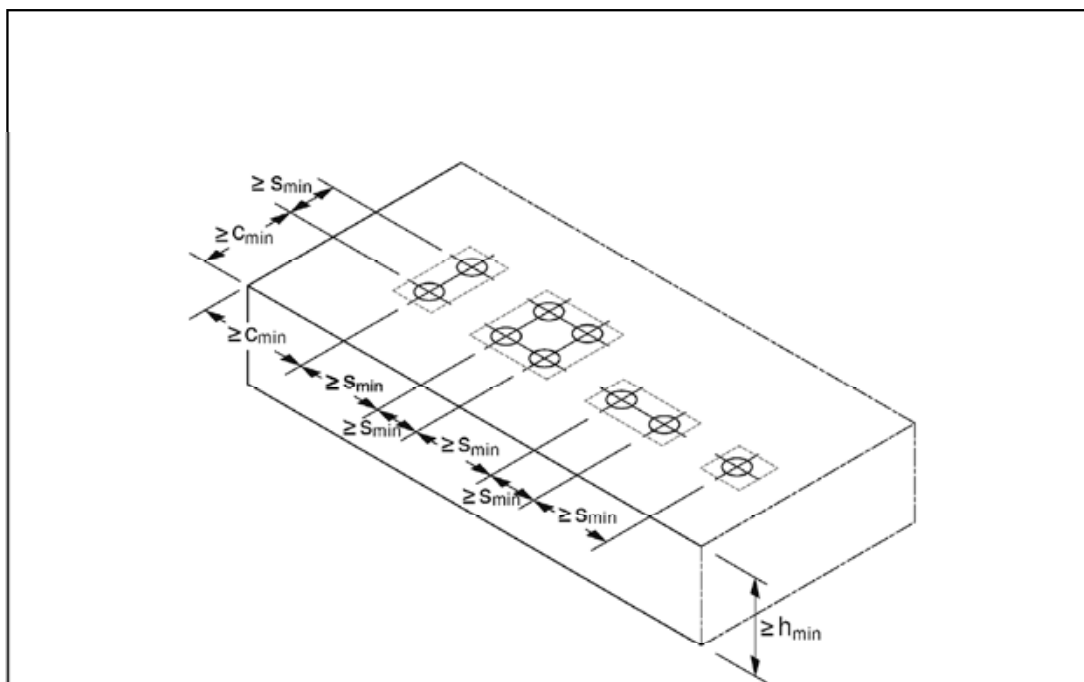


$$2) t_w + t_{fix} + t_v + L_{sd,min} \leq L_s \leq t_w + t_{fix} + t_v + L_{sd,max}$$

Table B1: Installation parameters

PB Anchor		RD / M 12	RD / M 16	RD / M 20	RD / M 24	RD / M 30
Appropriate size of screw	[mm]	M12	M16	M20	M24	M30
Maximum setting torque	$T_{inst}$ [Nm]	≤ 10	≤ 30	≤ 60	≤ 80	≤ 200
Minimum screw-in depth	$L_{sd,min}$ [mm]	16,9	21,7	26,5	31,3	38,5
Maximum screw-in depth	$L_{sd,max}$ [mm]	26,5	37,5	44,5	52,5	61,5
Thickness of the Recess Former	$t_v$ [mm]	10	10	10	10	10
Diameter of clearance hole in the fixture	$d_f$ [mm]	14	18	22	26	33

<b>PHILIPP PB Anchor System</b>	<b>Annex B3</b>
<b>Intended use</b> Installation parameters	



Spacing, edge distance and minimum thickness of concrete member apply also for anchors in front-side installation.

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**Table B2: Minimum spacings and edge distances, minimum thickness of concrete member**

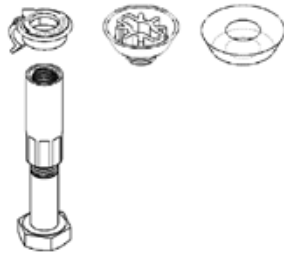
PB Anchor		RD / M 12	RD / M 16	RD / M 20	RD / M 24	RD / M 30
Minimum spacing	$S_{min}$ [mm]	110	140	180	220	270
Minimum edge distance	$C_{min}$ [mm]	55	70	90	110	135
Minimum thickness of concrete member <sup>1)</sup>	$h_{min}$ [mm]	100	140	180	225	275

<sup>1)</sup>  $h \geq h_{nom} + C_{nom}$   $C_{nom}$  acc. to EN 1992-1-1:2004

<b>PHILIPP PB Anchor System</b>	<b>Annex B4</b>
<b>Intended use</b> Minimum spacings and edge distances, minimum thickness of concrete member	

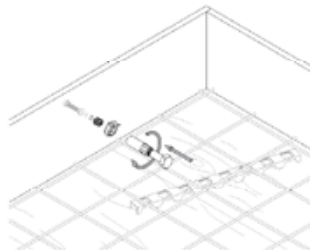
**Installation instructions**

1. Components



1. PHILIPP PB Anchor with socket made of galvanised steel or stainless steel
2. PHILIPP Data Clip
3. PHILIPP Recess Former (selectable (plastic, steel or magnetic))
4. PHILIPP Adaptor Disc (selectable)

2. Fixing the anchor to the formwork



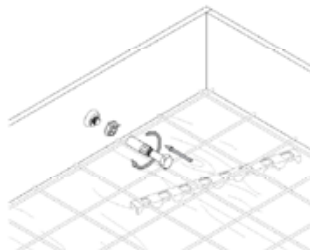
1. Put Data Clip onto the socket

2 a. Fix anchor to the formwork by using PHILIPP accessories for shuttering or alternatively by means of a suitable screw.

- Keep the correct adjustment of the PB Anchor!
- Avoid concrete penetration into the socket!

2 b. Fix anchor to the formwork by using PHILIPP Recess Former, possibly in combination with PHILIPP Adaptor Disc within the recess.

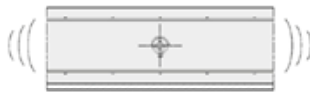
- Use appropriate components acc. to Annex A4!



3. If required, fix supplementary reinforcement to the socket by using PHILIPP Data Clip.

- Supplementary reinforcement must be fixed with contact to the socket!
- Supplementary reinforcement must point to the correct direction according to the direction of the force!

3. Pouring and compacting of concrete



1. Fill in concrete carefully, mind the fixed anchors!

2. Compact concrete properly, avoid contact between vibrating device and PB Anchor resp. supplementary reinforcement.

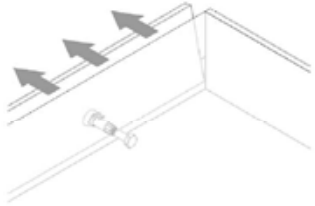
- Anchor must not be moved or damaged!

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<b>PHILIPP PB Anchor System</b>		<b>Annex B5</b>
Intended use Installation instructions		

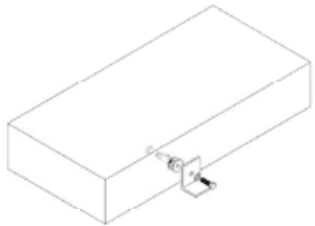
**Installation instructions**

4. Removal of shuttering



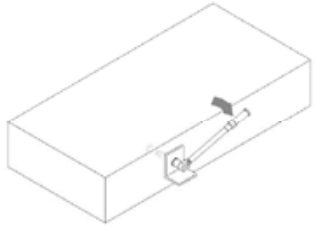
1. Remove accessories for shuttering.
2. Remove shuttering.
3. Check internal thread of PB Anchor. Clean the thread of the socket properly if concrete has been penetrated into.

5. Assembly of the fixture



1. Ensure, that the concrete has reached its designated strength.
2. Ensure, that the length of the screw is correct.  
→ Maximum respectively minimum screw in depth see Annex B3!
3. Assemble the fixture.  
→ Use appropriate components acc. to Annex A4, Table A3!  
→ Keep the maximum setting torque given below!  
→ Note all additional information regarding the fixture!

6. Maximum setting torques



Maximum setting torques max.  $T_{first}$  for PB Anchor

RD / M 12	RD / M 16	RD / M 20	RD / M 24	RD / M 30
≤ 10 Nm	≤ 30 Nm	≤ 60 Nm	≤ 80 Nm	≤ 200 Nm

<b>PHILIPP PB Anchor System</b>		<b>Annex B6</b>
<b>Intended use</b> Installation instructions		

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**Table C1: Characteristic resistances under tension load**

		RD 12 / M 12	RD 16 / M 16	RD 20 / M 20	RD 24 / M 24	RD 30 / M 30
<b>Steel failure with galvanised sockets and screws (strength class 8.8)</b>						
Characteristic resistance	$N_{Rk,s}$ [kN]	35,0	77,3	136,1	161,6	240,9
Partial factor	$\gamma_{Ms}^{1)}$ [-]	1,66				
<b>Steel failure with sockets and screws made of stainless steel (strength class A4-70)</b>						
Characteristic resistance	$N_{Rk,s}$ [kN]	34,6	75,1	132,5	142,4	233,9
Partial factor	$\gamma_{Ms}^{1)}$ [-]	2,93				
<b>Pull-out failure</b>						
Characteristic resistance in cracked concrete	C20/25 $N_{Rk,p}$ [kN]	40,1	55,7	73,5	130,2	188,5
Characteristic resistance in uncracked concrete	C20/25 $N_{Rk,p}$ [kN]	56,1	78,0	102,9	182,3	263,9
Increasing factor for $N_{Rk,p} = N_{Rk,p}(C20/25) \cdot \psi_c$ in cracked or uncracked concrete	C25/30 $\psi_c$ [-]	1,25				
	C30/37 $\psi_c$ [-]	1,50				
	C35/45 $\psi_c$ [-]	1,75				
	C40/50 $\psi_c$ [-]	2,00				
	C45/55 $\psi_c$ [-]	2,25				
	C50/60 $\psi_c$ [-]	2,50				
Partial factor	$\gamma_{Mp}^{1)}$ [-]	1,50				
<b>Concrete cone failure</b>						
Effective anchorage depth <sup>2)</sup>	$h_{ef}$ [mm]	71,5	107	145	188,5	233,8
Factor to take into account the influence of the load transfer mechanism	$k_{cr}$ [-]	8,9				
	$k_{ucr}$ [-]	12,7				
Characteristic spacing	$s_{cr,N}$ [mm]	$3,0 \cdot h_{ef}$				
Characteristic edge distance	$c_{cr,N}$ [mm]	$1,5 \cdot h_{ef}$				
Partial factor	$\gamma_{Mc}^{1)}$ [-]	1,50				
<b>Splitting</b>						
Characteristic resistance in cracked concrete	C20/25 $N^0_{Rk,sp}$ [kN]	24,1	44,1	69,5	103,0	142,3
Characteristic resistance in uncracked concrete	C20/25 $N^0_{Rk,sp}$ [kN]	34,3	62,9	99,2	147,0	203,0
Effective anchorage depth <sup>2)</sup>	$h_{ef}$ [mm]	71,5	107	145	188,5	233,8
Characteristic spacing	$s_{cr,sp}$ [mm]	$3,0 \cdot h_{ef}$				
Characteristic edge distance	$c_{cr,sp}$ [mm]	$1,5 \cdot h_{ef}$				
Partial factor	$\gamma_{MSp}^{1)}$ [-]	1,50				

<sup>1)</sup> In the absence of other national regulations

<sup>2)</sup> If the anchors are installed with the PHILIPP Recess Former acc. Annex A3,  $h_{ef}$  has to be increased by 10 mm

**PHILIPP PB Anchor System**

**Performances**

Characteristic resistances under tension load

**Annex C1**

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**Table C2: Displacements**

		RD / M 12	RD / M 16	RD / M 20	RD / M 24	RD / M 30
<b>Displacements under tension load (Material 1 or Material 2)</b>						
Displacement to $\delta_{N0} = 0,7$ mm in cracked concrete under tension loads <sup>1)</sup>	N [kN]	21	28	35	56	77
<b>Displacements under shear load (Material 1 or Material 2)</b>						
$\delta_{V0}$ and $\delta_{V\infty}$		No performance assessed				

1) The indicated displacements are valid for short term loading. The displacements can be increased under long term loading to  $\delta_{N\infty} = 1,8$  mm

**Table C3: Characteristic resistances under shear load**

		RD / M 12	RD / M 16	RD / M 20	RD / M 24	RD / M 30
<b>Shear load without lever arm</b>						
Group factor (EN 1992-4, 7.2.2.3.1)	$k_7$ [-]	0,8				
<b>Steel failure with galvanised sockets and screws (strength class 8.8)</b>						
Characteristic resistance	$V_{Rk,s}$ [kN]	21,1	46,4	81,7	97,1	164,4
Partial factor	$\gamma_{Ms}^{1)}$ [-]	1,38				
<b>Steel failure with sockets and screws made of stainless steel (strength class A4-70)</b>						
Characteristic resistance	$V_{Rk,s}$ [kN]	21,5	47,3	79,5	99,1	140,4
Partial factor	$\gamma_{Ms}^{1)}$ [-]	2,44				
<b>Shear load with lever arm</b>						
<b>Steel failure with galvanised sockets and screws (strength class 8.8)</b>						
Characteristic resistance of the screw	$M_{Rk,s}^0$ [Nm]	104,7	265,5	518,6	896,1	1797,1
Partial factor	$\gamma_{Ms}^{1)}$ [-]	1,25				
<b>Steel failure with sockets and screws made of stainless steel (strength class A4-70)</b>						
Characteristic resistance of the screw	$M_{Rk,s}^0$ [Nm]	128,4	232,3	453,7	1199,6	1572,5
Partial factor	$\gamma_{Ms}^{1)}$ [-]	2,44	1,56	2,44		
<b>Concrete edge failure with supplementary reinforcement</b>						
Characteristic resistance	$V_{Rk,c,re}$ [kN]	No performance assessed				
<b>Concrete pry-out failure</b>						
Factor	$k_{sp}$ [-]	2				
Partial factor	$\gamma_{Mcp}^{1)}$ [-]	1,50				
<b>Concrete edge failure (without supplementary reinforcement)<sup>2)</sup></b>						
Outer diameter of the socket	$d_{nom}$ [mm]	15	21	25	25	25
Effective length of anchor	$l_i$ [mm]	43	59	71	85	102
Minimum edge distance	$c_{min}$ [mm]	55	70	90	110	135
Partial factor	$\gamma_{Mto}^{1)}$ [-]	1,50				

<sup>1)</sup> In the absence of other national regulations

<sup>2)</sup> In accordance with EN 1992-4: 2018, Equation (7.41)

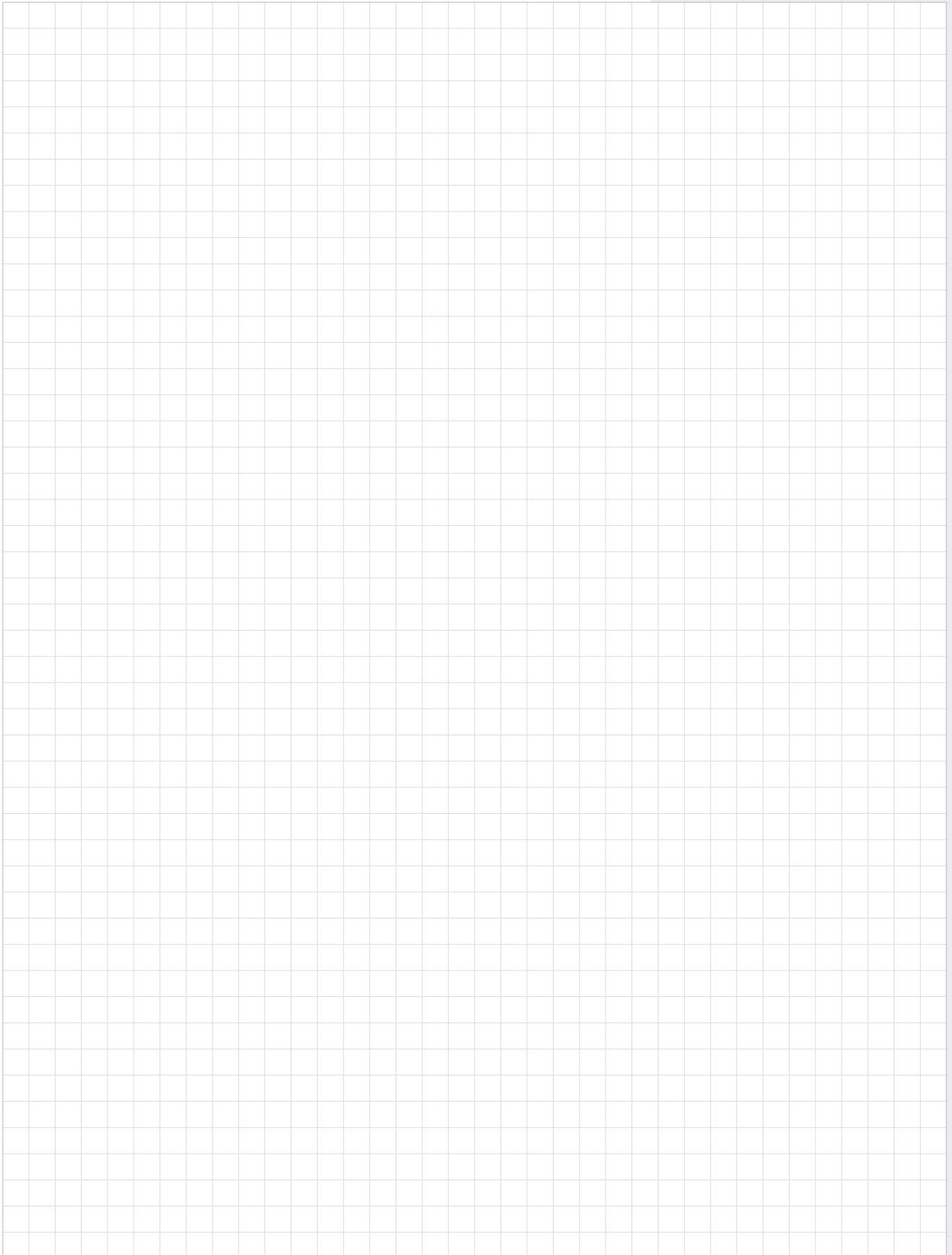
**PHILIPP PB Anchor System**

**Performances**

Displacements under tension load and shear load  
Characteristic resistance under shear load

**Annex C2**

## Notes



Our customers trust us to deliver. We do everything in our power to reward their faith and we start each day intending to do better than the last. We provide strength and stability in an ever-changing world.

## Welcome to the PHILIPP Group

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