TÜV CERT
DIN EN ISO 9001
Reg.-Nr. 73 100 1561

PHILIPP GROUP

PHILIPP Sandwich Panel Anchor System

Installation Instruction

PHILIPP GROUP
QUALITY MADE IN GERMANY

Permissible values according to DIN 1045-1

PHILIPP GROUP
LGA Würzburg
2005
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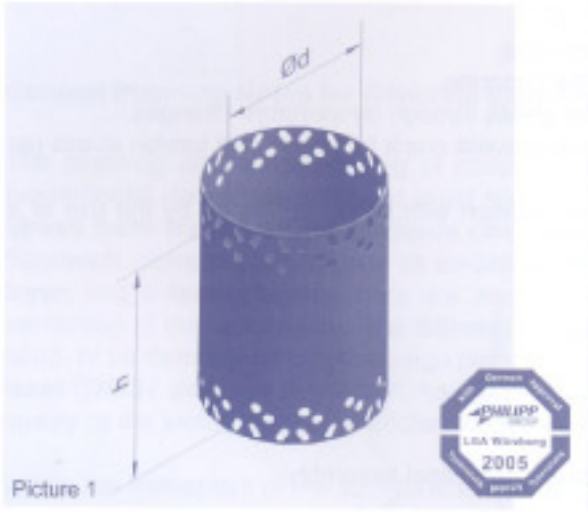
Permissible values according to DIN 1045-1

PHILIPP Sleeve Anchors are part of the **PHILIPP Sandwich Panel Anchor System**. They can be used for three- or four-layer slabs. Their **cylindrical form** insures uniform stress in all load directions and **hence guarantees error-free mounting**. The sleeve anchors can be only used in connection with **PHILIPP Connector Pins** and **PHILIPP Flat Anchors**. In this way, they serve as support anchors and assure safe load division of the facing layer weight. The area around the anchor's edges possesses oval and round holes. The round holes are intended for the introduction of concrete reinforcing bars, while the oval holes created a secure bond with the concrete.

The **PHILIPP Sleeve Anchors** are made of stainless steel and ensure lasting anchorage of loads from the facing layer into the load bearing layer. The sleeve anchors are labelled with diameter and anchor height.

Arrangement of PHILIPP Sleeve Anchors:

- The sleeve anchor should generally be arranged in the element's centre of gravity. To assure proper positioning and to avoid torsion of the element, an additional flat anchor or crossed connector pins must be installed.
- It is possible to install the sleeve anchor outside the element's centre of gravity. In this case it is placed offset from the axis of the centre of gravity in combination with a flat anchor carrying jointly. To avoid symptoms of fatigue in the flat anchor on the basis of thermal expansion of the facing layer, the maximal distance intervals from the sleeve anchors as indicated in table 19 must be observed.



Picture 1

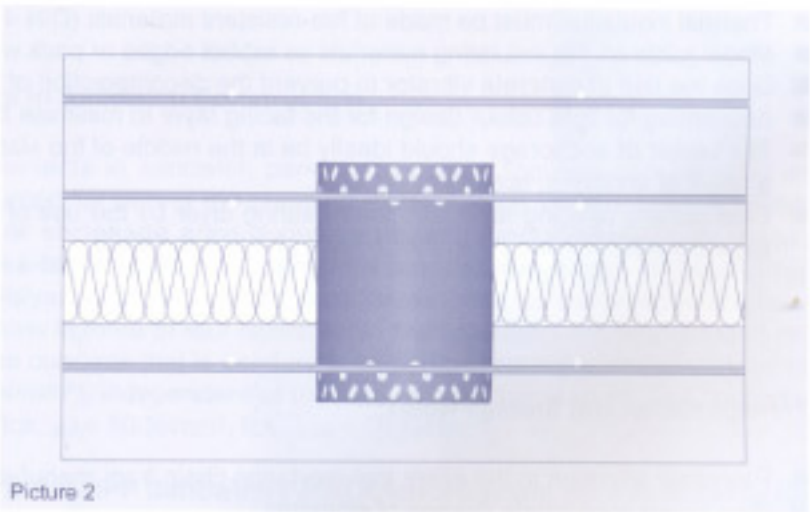

Picture 2

Table 1: Dimensions **PHILIPP Sleeve Anchor**

Art.-No.	Diameter dia.d [mm]	Material Thickness t [mm]	Height h [mm]						Weight per 100 mm Height [kg]
77MA15XXX051	51	1.5	150	175	200	225	260	300	0.11
77MA15XXX076	76	1.5	150	175	200	225	260	300	0.18
77MA15XXX102	102	1.5	150	175	200	225	260	300	0.22
77MA15XXX127	127	1.5	150	175	200	225	260	300	0.28
77MA15XXX153	153	1.5	150	175	200	225	260	300	0.33
77MA15XXX178	178	1.5	150	175	200	225	260	300	0.41
77MA15XXX204	204	1.5	150	175	200	225	260	300	0.46
77MA15XXX229	229	1.5	150	175	200	225	260	300	0.51
77MA15XXX255	255	1.5	150	175	200	225	260	300	0.57
77MA15XXX280	280	1.5	150	175	200	225	260	300	0.65

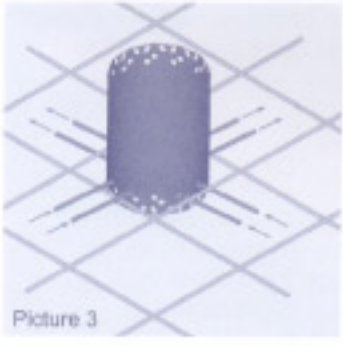
The article number must be supplemented with the desired height h
e.g. sleeve anchor dia.d=204mm, height h=225mm, material thickness t=1,5mm
➔ Article-No.: 77MA15225204

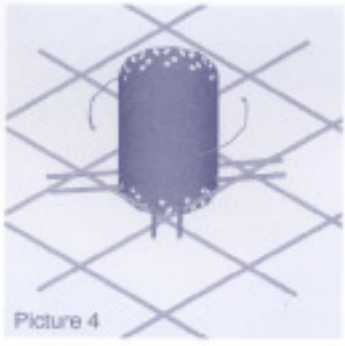
INSTALLATION INSTRUCTIONS
PHILIPP SLEEVE ANCHOR

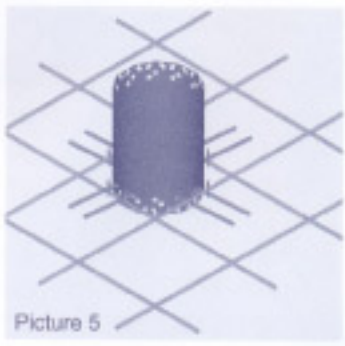
PHILIPP Sleeve Anchors can be installed in two different ways. The user can manufacture them either via positive production (facing layer up) or negative production (facing layer down). The installation of the sleeve anchor described below refers to positive production. The same steps are followed for negative production but in reversed order.

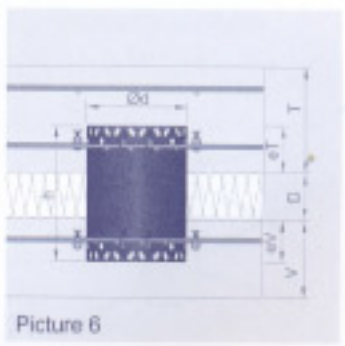
The **PHILIPP Sleeve Anchor** is inserted into the wire mesh reinforcement of the load bearing layer. Concrete reinforcing bars are then run through both of the rows of round holes (Table 3). The bars should lie at right angles to one another (Picture 3). The placement of rows of holes at staggered heights insures that additional bars will be positioned above and/or below the wire mesh reinforcement in the load bearing layer. Once brought into position, the anchor and all additional reinforcement are then turned by 45° (Picture 4). Cut-out surface reinforcement potentially may need to be supplemented with corresponding support rods into the sides of the **PHILIPP Sleeve Anchor**, whereby the overlap lengths should conform to DIN 1045-1 (Table 3). Once the accompanying concrete pouring process is finished, the required insulation can be put into place. In doing so, the anchors can either be stuck through the insulation material, or for large diameters, a spherical pocket must be specially cut. The insulation notch must be laid into the spherical anchor once the insulation has been laid to prevent a cold bridge, as well as a sticking together of the facing layer and the load bearing layer. It is particularly important to mind that installation is performed without leaving hollow spaces, as they would other wise fill up during the concrete pouring. Offset alignment of the cross joints for two-layer insulation material is always preferred, for the stated reasons. Careful installation of the **PHILIPP Sleeve Anchors** ensures a lasting connection accentuated by gravity of the facing layer and the load bearing layer.

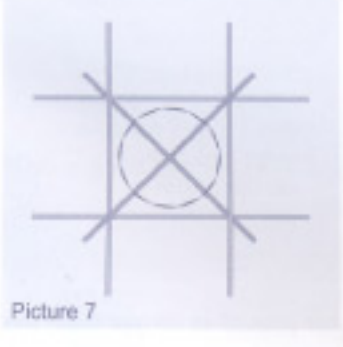
The use of thinner facing layers require a different option. To do so, the anchor is laid onto the reinforcement mesh of the facing layer using pre-installed support rods, and is wired tied (Picture 5).

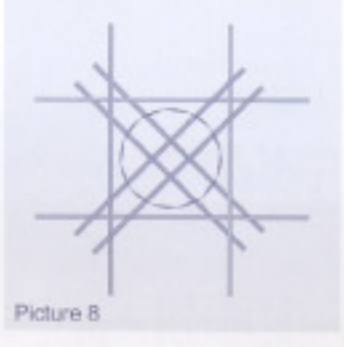

Picture 3


Picture 4


Picture 5


Picture 6


Picture 7


Picture 8

Indices/Legend	
T = thickness of load bearing layer	L_x = grid interval on X axis
D = thickness of insulating layer	L_y = grid interval on Y axis
V = thickness of facing layer	t = material thickness
d = diameter of connector pins	Q_{RD} = rated value of shear
dia. d = diameter sleeve anchors	b = width of connector pin
l = length of flat anchor	e_V = embedded depth facing layer
h = height of anchoring element	e_T = embedded depth load bearing layer
f = distance flat anchor to fulcrum	n = distance connector pin to fulcrum

Embedded Depth

The insulation thickness "D" and the facing layer thickness "V" are the predominant factors for determining the embedded depth "e_V" for the facing layer. The fundamental rule applies that the embedded depth "e_V" in the facing layer must be at least the minimum of the embedded depth "e_T" in the load bearing layer. The calculation of the related anchor lengths is produced from the following formula:

$$h \geq e_T + D + e_V \qquad e_T \geq e_V$$

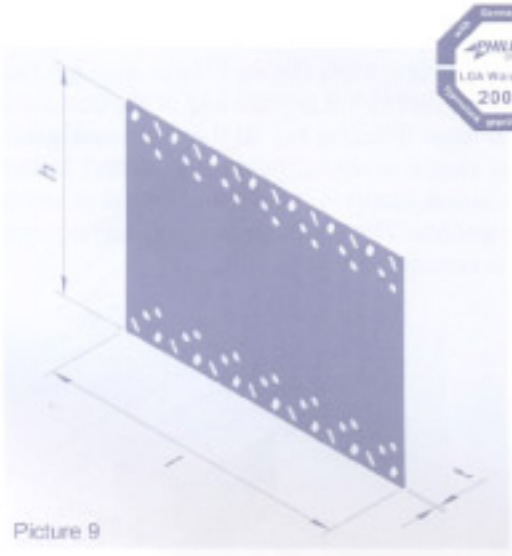
(Tables 2a and 2b on Page 8)

PHILIPP FLAT ANCHOR

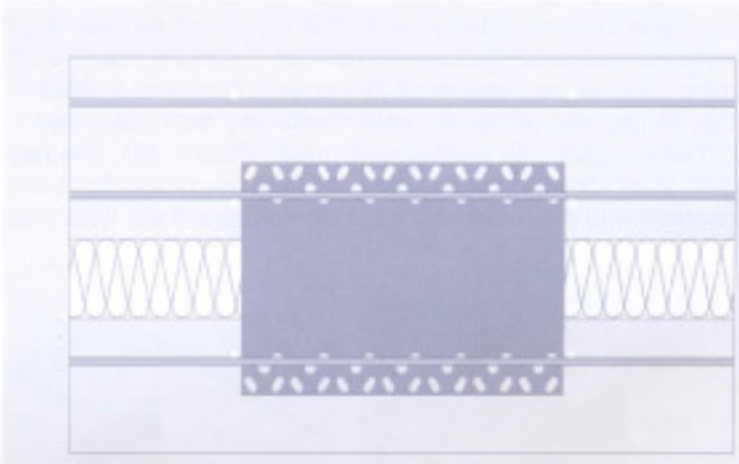
Permissible values according to DIN 1045-1

PHILIPP Flat Anchors are part of the **PHILIPP Sandwich Panel Anchor System.** They can be used for three- or four-layer slabs. They can be applied either in pairs with symmetrical installation in building components as a pure support anchor or as a torsion anchor in combination with the **PHILIPP Sleeve Anchor.** The flat anchor can only be installed in connection with **PHILIPP Connector Pins**. Where serving as a support anchor, the flat anchor provides safe load partitioning of the facing layer weight into the load bearing layer. Both areas around the anchor's edges possess oval and round holes. The round holes are intended for the introduction of concrete reinforcing bars, while the oval holes create a secure bond with the concrete.
The flat anchors are made of stainless steel and ensure lasting anchorage of loads from the facing layer into the load bearing layer. The flat anchors are labelled with anchor width and anchor height.

Arrangement of the PHILIPP Flat Anchors:
Where flat anchors are used alone, at least three flat anchors are required for load transfer. Two of the three anchors transfer the vertical load and should hence be selected for optimal utilisation in such a way that their share of their own dead weight is distributed evenly between the two anchors. A third anchor is installed horizontally and as such forms the fulcrum for the facing layer (Picture 32). The maximum interval between fulcrum (horizontally installed flat anchor or sleeve anchor) and the most external anchor point (flat anchor) are to be drawn from table 19. The rated load limits are laid out in the following tables 13 through 18, depending on the respective facing layer thickness, heat insulation thickness and anchor length. Within the framework of determining the loads on the individual anchors, the eccentricities and potential uneven loading must be taken into account.



Picture 9



Picture 10

Table 10: Dimensions **PHILIPP Flat Anchors**

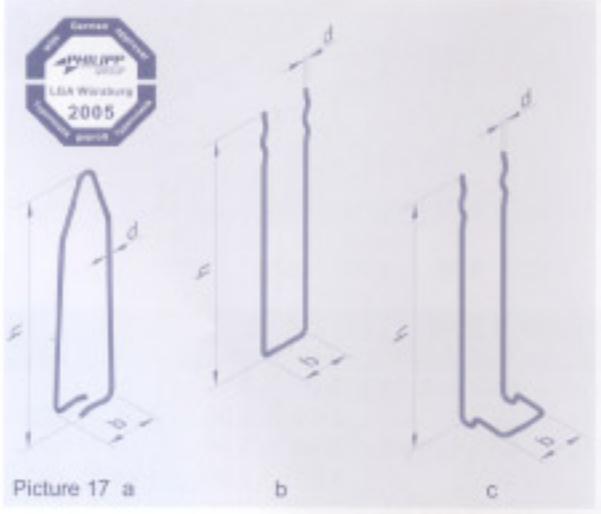
Art.-No.	Length l [mm]	Material Thickness t [mm]	Height h [mm]							Weight per 100 mm Height [kg]
77FA20XXX080	80	2.0	150	175	200	225	260	-	-	0.13
77FA30XXX080		3.0	-	-	-	-	260	280	300	0.19
77FA20XXX120	120	2.0	150	175	200	225	260	-	-	0.21
77FA30XXX120		3.0	-	-	-	-	260	280	300	0.28
77FA20XXX160	160	2.0	150	175	200	225	260	-	-	0.26
77FA30XXX160		3.0	-	-	-	-	260	280	300	0.37
77FA20XXX200	200	2.0	150	175	200	225	260	-	-	0.40
77FA30XXX200		3.0	-	-	-	-	260	280	300	0.47
77FA20XXX240	240	2.0	150	175	200	225	260	-	-	0.38
77FA30XXX240		3.0	-	-	-	-	260	280	300	0.57

Continued next page

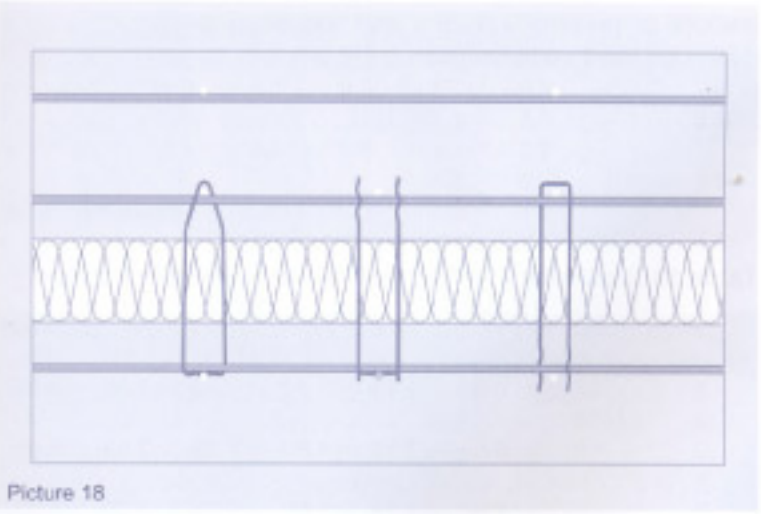
Permissible values according to DIN 1045-1

The **PHILIPP Connector Anchor Pins** are part of the **PHILIPP Sandwich Panel Anchor System**. They can be used for three- or four-layer slabs.
They can be used in pairs as torsion anchors (Picture 30) or individually as a retaining anchor. The connector anchor pins may only be used in connection with **PHILIPP Flat Anchors** or **PHILIPP Sleeve Anchors.** This provides for safe, load lasting distribution.
Connector anchor pins are made of stainless steel. They are available in three different versions (Picture 17) to be used in accordance with the type of production. The most common version is for use as **PHILIPP Connector Pin** (Picture 17b), since it can be used in both positive and negative production. Other versions are the **PHILIPP Clip-On Pin** (Picture 17c) and the **PHILIPP Connector Stirrup** (Picture 17a), which are primarily used with positive production however.
Both the connector pin as well as of the clip-on pin are characterised by a wavy area on their extremities that guarantees a secure bond with the concrete. The U-form of the opposite end is identical for both versions. The clip-on pin features an addition 90° bend, to allow for fastening onto the existing reinforcement mesh. The connector stirrup, by contrast, must be secured by an encompassing anchor around the installed mesh reinforcement. It is placed with its legs offset at 90° onto the reinforcement and then bent around the reinforcement (Pictures 26-29).
The various connector pins are available in diameters of 4.0, 5.0, and 6.0mm for each type.

When using connector anchor pins as a retaining anchor, no further sizing is required, since all testing is provided within the framework of the structural standards. Moreover, wind stresses up to a building height of 100m as well as temperature influences are accounted for.



Picture 17 a b c



Picture 18

Table 20: Dimensions **PHILIPP Connector Anchor Pins**

Art.-No.	Description	Art	d [mm]	b [mm]	h [mm]							
77VB40XXX	Connector stirrup	VB-4.0-h	4	60	160	200	250	280	-	320	-	-
77VB50XXX	(Picture 17a)	VB-5.0-h	5	60								
77VN40XXX	Connector pin	VN-4.0-h	4	34	160	180	200	220	240	260	-	-
77VN50XXX	(Picture 17b)	VN-5.0-h	5	35	240	260	280	300	320	340	360	380
77VN60XXX		VN-6.0-h	6	46	320	340	360	380	400	-	-	-
77AN40XXX	Clip-on pin	AN-4.0-h	4	34	160	200	250	280	-	320	-	-
77AN50XXX	(Picture 17c)	AN-5.0-h	5	38								

The article number must be supplemented with the desired height h.
e.g. connector pin height h=280mm, diameter dia.d=5.0mm
→ Article-No.: 77VN50280