



PHILIPP Connecting Technique

Installation Instruction



07/07 - EN

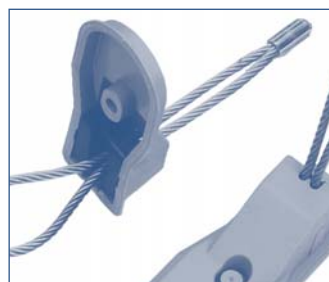
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The connecting technique is used for connections of precast units where no approval is required.



The **PHILIPP Connecting Loop and Rail** is used for structural connections of precast units loaded by primarily static shear forces. The loops transfer shear forces where no approval is required.

The **PHILIPP Connecting Systems** are very flexible and form due to the overlapping of the loops a connection. Therefore it is possible to realize even complicated connections.

The **PHILIPP Connecting Loops and Rails** can be used without additional proofs. The simple installation ensures practical application.

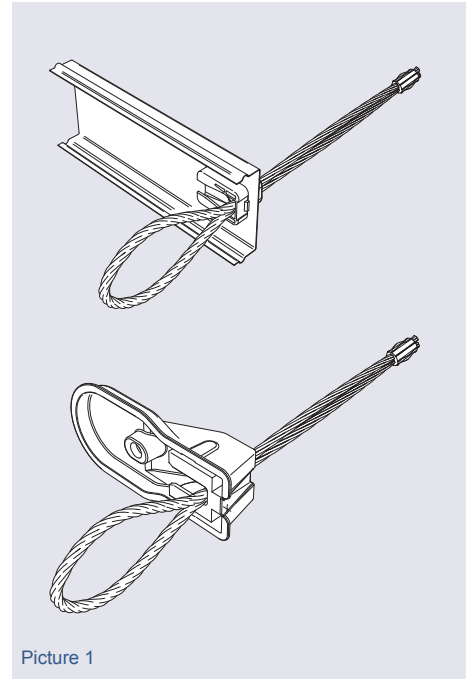
Overview of PHILIPP Connecting Loops

The **PHILIPP Connecting Loop** is a connecting element for the form closed connection of precast units. The flexible loops have the advantage that no "reverse bending" is required and hence the installation of precast units between columns is realizable.

The **PHILIPP Connecting Loop** consists of a plastic body or galvanized steel recess former and is suitable for reinforced concrete and light weight concrete.

Advantages of PHILIPP Connecting Loops

- Flexible connecting element which enables small grouting joints
- No "reverse bending" required
- Simple design, because the reinforcement need not to be changed
- Simple installation due to flexible loops and pre-cut nail holes
- Anchorage also in thin walls possible
- Special version for light weight concrete available
- Weatherproof cover which can be removed easily
- No mix-up due to colour code and direction sign
- Safe grouting with flowable and shrink free mortar



PHILIPP CONNECTING LOOPS

TYPE: PLASTIC

PHILIPP Connecting Loop: Plastic

This construction is a combination between a special steel wire rope and a plastic recess former where the wire rope is installed already.

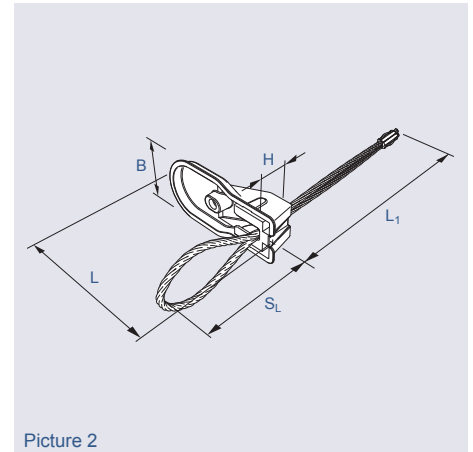


Table 1: Connecting Loop (plastic recess body)

Art.-No.**	L [mm]	L ₁ [mm]	B [mm]	H [mm]	S _L * [mm]	Rope dia. [mm]	Weight [kg/100 pcs.]
54VS080	160	210	78	42	80	6	15.0
54VS100	160	210	78	42	100	6	15.6
54VS120	160	210	78	42	120	6	16.3

* While determining the loop sizes please take into account that the overlapped length is larger than 50mm (Page 9, Picture 13).

** The article no. for light weight concrete gets the additional ending "LB".

Order suggestion

PHILIPP Connecting Loop

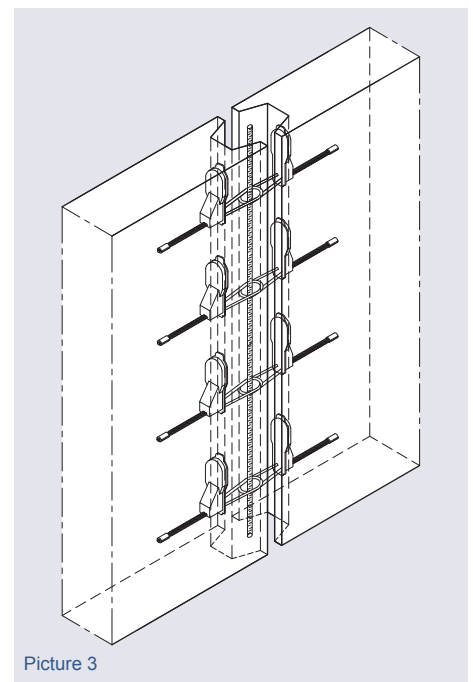
(Type: plastic/ loop size: 100mm)

→ Art. No.: 54VS100

for light weight concrete:

(Type: plastic/ loop size: 100mm)

→ Art. No.: 54VS100LB



PHILIPP Connecting Loop: Metal

This construction is a combination between a special steel wire rope and a metal recess body where the wire rope is installed already.

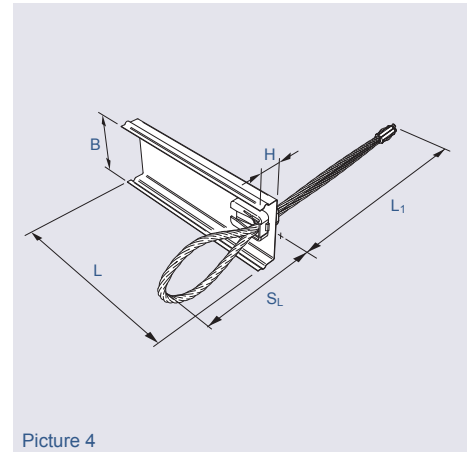


Table 1: Connecting Loop (metallic recess body)

Art.-No.**	L [mm]	L ₁ [mm]	B [mm]	H [mm]	SL* [mm]	Rope dia. [mm]	Weight [kg/100 pcs.]
54VSM080	160	190	50	20	80	6	13,0
54VSM100	160	190	50	20	100	6	14,0
54VSM120	160	190	50	20	120	6	15,0
54VSM140	190	190	50	20	140	6	18,0

* While determining the loop sizes please take into account that the overlapped length is larger than 50mm (Page 9, Picture 13).

** The article no. for light weight concrete get the additional ending "LB".

Colour code and marking of the PHILIPP Connecting Loop (material metal):

The recess body has a sign at its back side for the explicit identification of the right installation direction and loop size. Please take into account that at installation the arrow faces upwards.

yellow = SL 80
white = SL 100
red = SL 120
blue = SL 140

Order suggestion

e.g. **PHILIPP Connecting Loop**

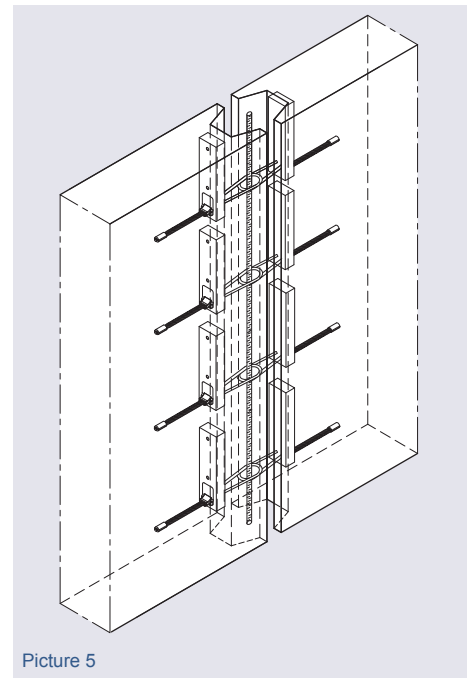
(Type metal/ loop size: 100mm)

→ Art. No.: 54VSM100

for light weight concrete:

(Type metal/ loop size: 100mm)

→ Art. No.: 54VSM100LB

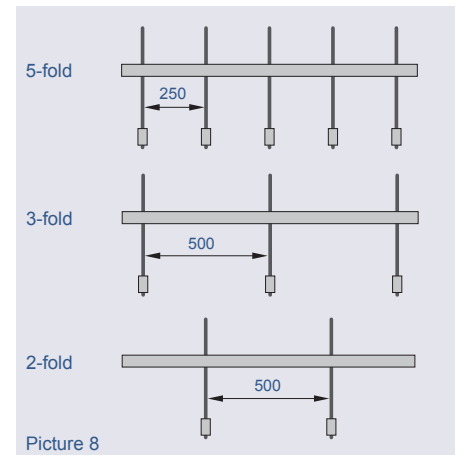
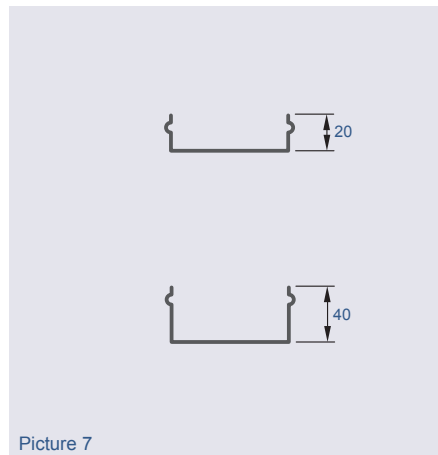
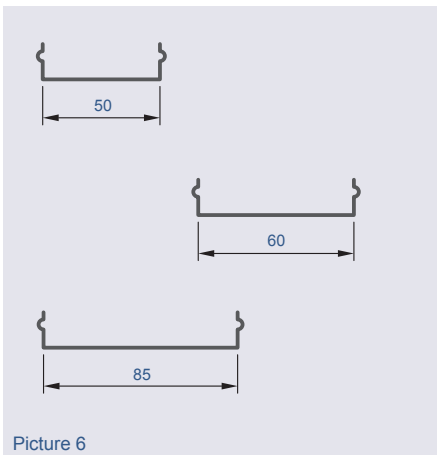


Overview of PHILIPP Connecting Rail

The **PHILIPP Connecting Rail** is used for the connection of precast concrete units where no approval is required. This connection is a combination between a special wire rope and a metal recess body where the wire rope is installed already.

The **PHILIPP Connecting Rail** is available in breadths 50, 60 and 85mm as well as the height of 20 and 40mm. For a rail length of 1.25m the number of loops can be chosen between 2, 3 and 5 (Picture 8).

Other rail dimensions are available (also without loops).



Advantages of PHILIPP Connecting Rails

- Flexible connecting element which enables small grouting joints.
- No “reverse bending” required.
- Simple planning because the main reinforcement need not to be changed.
- Anchorage also in thin walls possible.
- Special design for light weight concrete available.
- Stable cover also suitable for hot-gluing.
- Structured surface ensures adhesion with the concrete.
- Weatherproof cover which can be removed easily.
- No mix-up due to colour code and direction sign.
- Safe grouting with flowable and shrink free mortar.

Table 3: Connecting Rail

Art.-No.**	Numbers of Loops [pcs.]	S _L * [mm]	H [mm]	L [mm]	B [mm]			L ₁ [mm]
84VS200802	2	80	20	1250	50	60	85	190
84VS200803	3	80	20	1250	50	60	85	190
84VS200805	5	80	20	1250	50	60	85	190
84VS201002	2	100	20	1250	50	60	85	190
84VS201003	3	100	20	1250	50	60	85	190
84VS201005	5	100	20	1250	50	60	85	190
84VS201202	2	120	20	1250	50	60	85	190
84VS201203	3	120	20	1250	50	60	85	190
84VS201205	5	120	20	1250	50	60	85	190
84VS400802	2	80	40	1250	50	60	85	190
84VS400803	3	80	40	1250	50	60	85	190
84VS400805	5	80	40	1250	50	60	85	190
84VS401002	2	100	40	1250	50	60	85	190
84VS401003	3	100	40	1250	50	60	85	190
84VS401005	5	100	40	1250	50	60	85	190
84VS401202	2	120	40	1250	50	60	85	190
84VS401203	3	120	40	1250	50	60	85	190
84VS401205	5	120	40	1250	50	60	85	190

* While determining the loop sizes please take into account that the length the lapped joint is larger than 50mm (Page 9, Picture 13)..

** This article-no. is only valid for a rail breadth of 50mm. For the breadths 60 or 85mm the ending 60 or 85 must be added. For lightweight concrete "LB" must be added to the article no. If you have any further questions please contact us: +49 (0) 6021/ 40 27-300

Order suggestion

e.g. **PHILIPP Connecting Rail**

(Height: 20mm/ loop size: 120mm

number of loops: 2 / breath: 60mm)

➔ Art. No.: 84VS20120260

for light weight concrete

(Height: 20mm/ loop size: 120mm

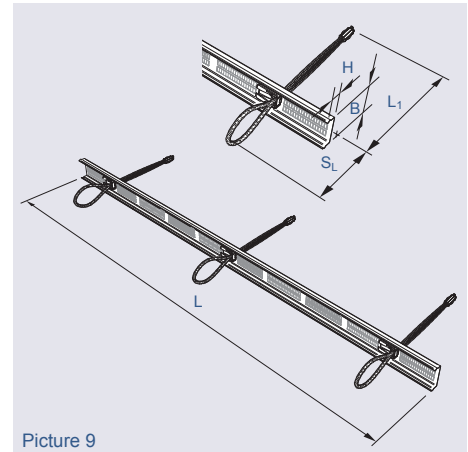
number of loops: 2 / breath: 60mm)

➔ Art. No.: 84VS20120260LB

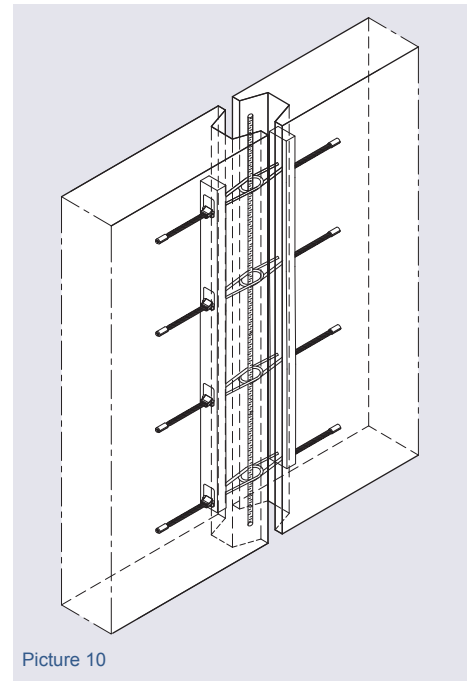
Colour Code and Marking of PHILIPP Connecting Rail:

The connecting rail has a sign at its back side for the explicit identification of the right installation direction. Please take into account that during installation the arrow points to the top of the wall.

- yellow = SL 80
- white = SL 100
- red = SL 120



Picture 9

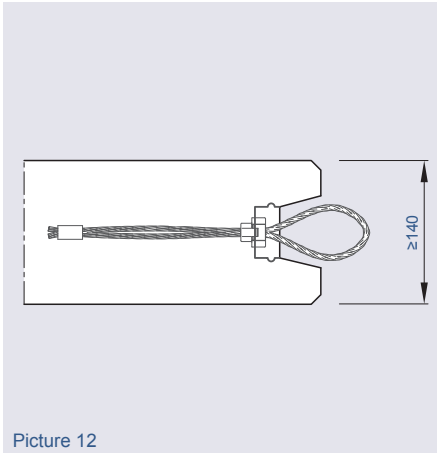


Picture 10



Picture 11

Joint Geometry/ Edge Distance and Reinforcement

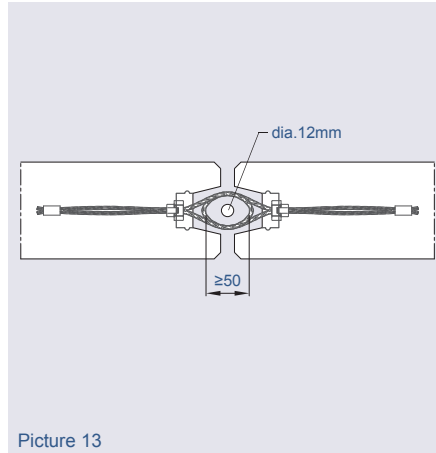


Picture 12

The **PHILIPP Connecting Loops and Rails** are appropriate for a unit thickness of 140mm. In outdoor units a concrete cover according to DIN 1045 must be taken into account.

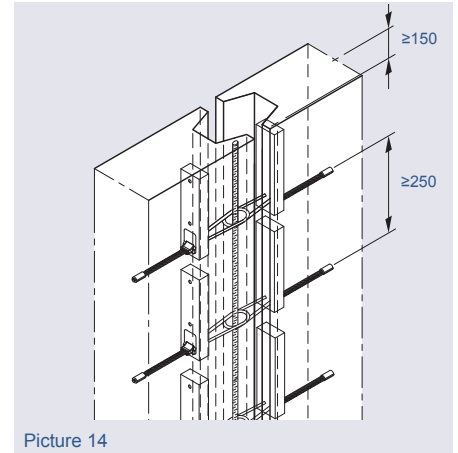


The joint construction fulfils with the respective precast concrete walls a fire resistance class of "F90" (according certificate of TU Braunschweig).



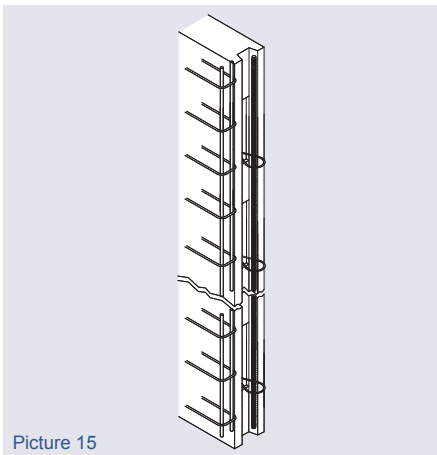
Picture 13

The **PHILIPP Connecting Loops and Rails** work as a lapped joint and are installed in a sunk position. The joint geometry is determined by the loop size. The loops must lay above another and overlap. For the installation of the reinforcement bar (dia. 12mm) a minimum lapped joint of $L_s \geq 50$ mm must be ensured.



Picture 14

Edge distances, intermediate distances of **PHILIPP Connecting Loops and Rails** must be taken into account. The minimum edge distance must be 150mm and the minimum axial distance must be 250mm..

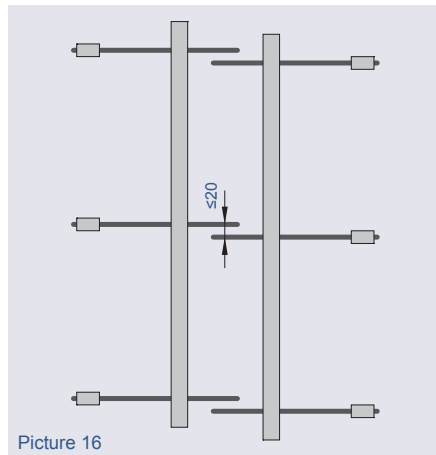


Picture 15

As minimum reinforcement mesh reinforcement (Q 188) in connection with stirrups at the joint side must be installed.

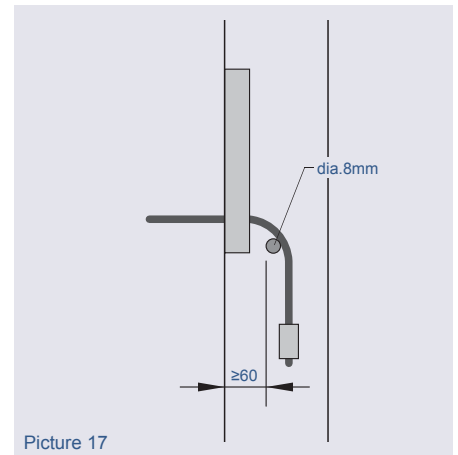


Alternatively mesh caps can be used. Already existing or constructive reinforcement can be taken into account.



Picture 16

So that the lapped joint can work the vertical distances must not exceed a tolerance of 20mm.



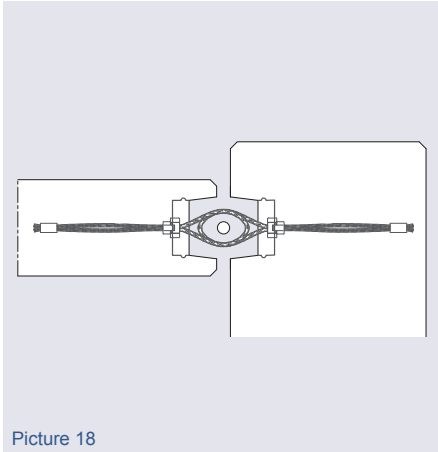
Picture 17

For thin units it is possible to bend the end of the loop under consideration of the bending radius. To simplify the bending of the wire rope a rebar (dia. 8mm) must be placed in.

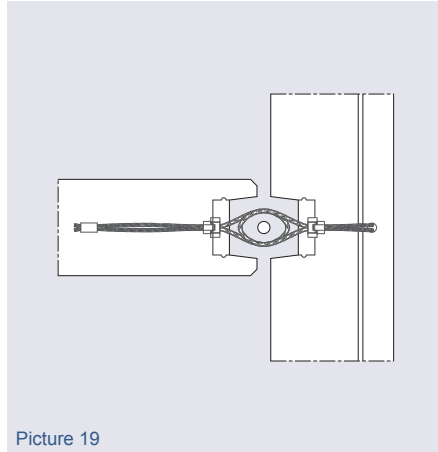
By using a less reinforcement bar diameter than 12mm or installing in a thinner wall than 140mm please contact your technical department.

Examples for Application:

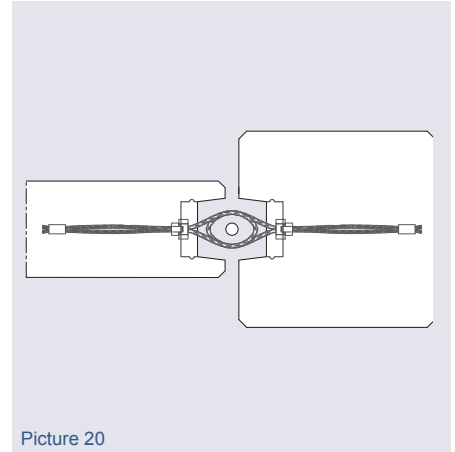
Due to its flexibility the **PHILIPP Connecting Loops and Rails** can be used in many situations, like edge-connections, T-connections or connections of walls with columns.



Picture 18



Picture 19




Picture 20

Bearing Capacity

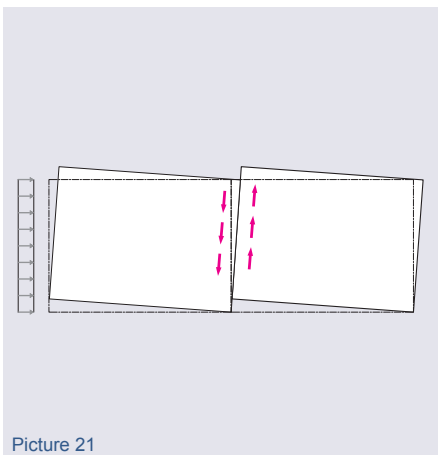
The maximum allowable bearing capacity for each pair of loops can be calculated as follows. Here, the wire rope is considered as failure criteria and is multiplied with a global safety factor of 3,0 (F_{min} of rope = 21,2 kN).

$$\text{max. allow. } Z = \frac{F_{min} \times 2}{\geq} = \frac{21,2\text{kN} \times 2}{3,0} = 14\text{kN}$$

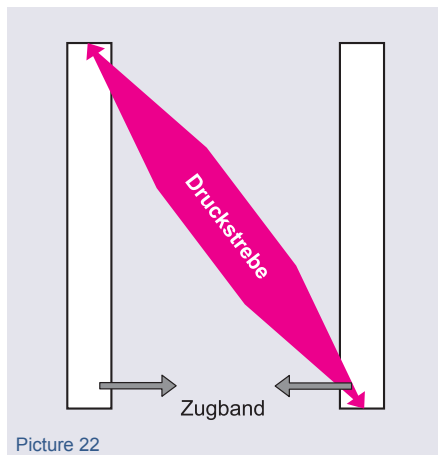
 The serviceability state (cracks and strains) is not considered in the aforementioned equation and the design models (Picture 22 and 23).

The **PHILIPP Connecting Rails** are self contained systems which transfer shear forces. Shear forces parallel to the joint are transferred by a system consisting of compression strut and tension tie (Picture 22). The **PHILIPP Connecting Rail** has a structured surface which can transfer the shear forces from the joint into the wall.

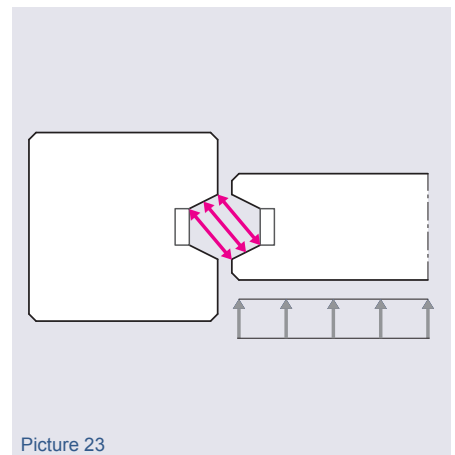
Shear forces at right angles with the wall are transferred through the mortar to the flanges (Picture 23).



Picture 21



Picture 22



Picture 23

Mounting

On installation of **PHILIPP Connecting Loops and Rails** please pay attention to the direction of the arrow and the colour code for the loop size. Fastening at the mould can be made by nailing or hot-gluing. An angle of 90° between the end of the wire rope and the precast unit has to be ensured. It could be helpful to connect the end of the wire rope to the existing reinforcement before concreting vertically.

The cover of the **PHILIPP Connecting Loop** (plastic) can be opened easily due to its ultrasonic welding. The opening of **PHILIPP Connecting Loop** (metal) and **PHILIPP Connecting Rail** is ensured by a robust, recyclable plastic cover.

Both, the **PHILIPP Connecting Rail** and the **PHILIPP Connecting Loop** can be opened quickly and the loops can be folded out very easily. The loops should have an angle of 90° to the wall. Please pay attention during mounting that the length of lapped joint is larger than 50mm (Picture 13). Please consider possible dimensional tolerances.

A rebar (dia. 12mm) must be put the loops prior setting a stop end. On use of joint tape please take care that the grouting joint is not reduced. The grouting mortar should be filled in layers. The use of a hose or hopper simplifies the process.

Processing Instructions and Properties of PHILIPP Grouting Mortar

PHILIPP Grouting Mortar is a ready-to-use dry mixture on a cement basis for grouting of precast concrete units. It is free of shrinkage and has a high strength and good flow ability.

Properties

PHILIPP Grouting Mortar is free of chlorides. It has a good bond with steel and concrete and shows no separation of the components. Furthermore it has a good pump ability and a good frost and de-icing salt resistance. **PHILIPP Grouting Mortar** is produced in reliably consistent quality and is easy to process. Due to its flowing consistency, the mortar is self-levelling and fills out all accessible, venting hollow spaces.

Preparation

The subsurface must be free of dirt such as oils, greases, etc. Cement slurry leavings on the surface shall be removed. A seal formwork should be used. To improve grip, the joint surface should be pre-wetted thoroughly.

Mixing

Approximately 2/3 of the mixing water is put into the mixer; the **PHILIPP Grouting Mortar** is then completely stirred in. Afterwards the remaining water can be used to adjust the consistency. Mixing lasts 4 – 6 minutes depending on the type of mixing.

Note

During grouting, air must be able to escape. Careful compactions can prevent trapped air. The processing time is about 60 minutes at 20° C.

Processing temperature

DIN 1045-2 and DIN EN 206-1 must be taken into account when working with **PHILIPP Grouting Mortar**. These standards give a processing temperature of at least +5° C.

Post-treatment

It should be prevented that **PHILIPP Grouting Mortar** dries up too fast for at least three days after application. Appropriate procedure includes covering with plastic sheets, wet tissues or irrigation.

Consumption

25 kg dry mortar results in 13 - 14 litres **PHILIPP Grouting Mortar**.

Delivery form

25 kg paper/PE bags