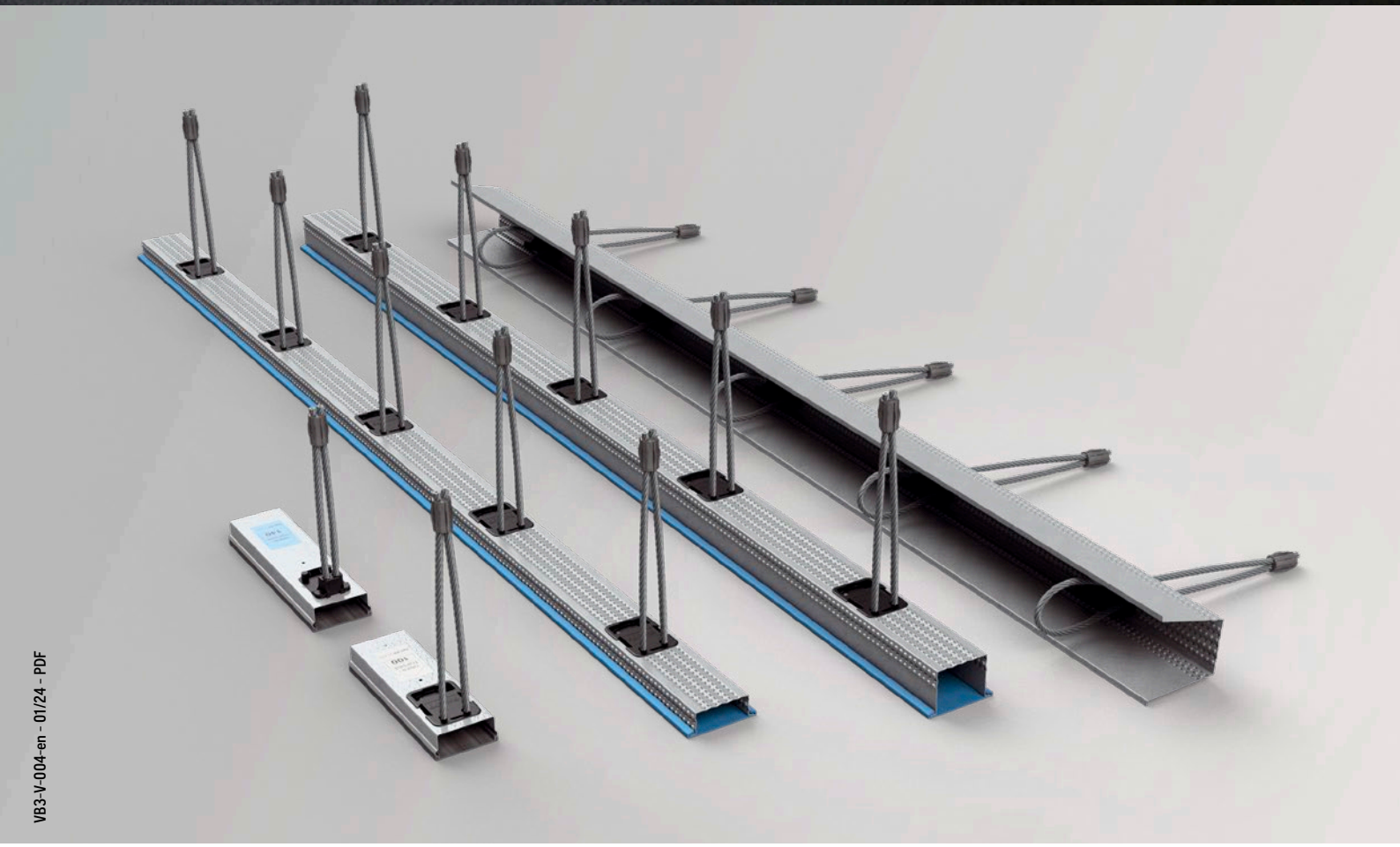
PHILIPPGROUP

Connecting rails and loops



VB3-V-004-en - 01/24 - PDF

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.

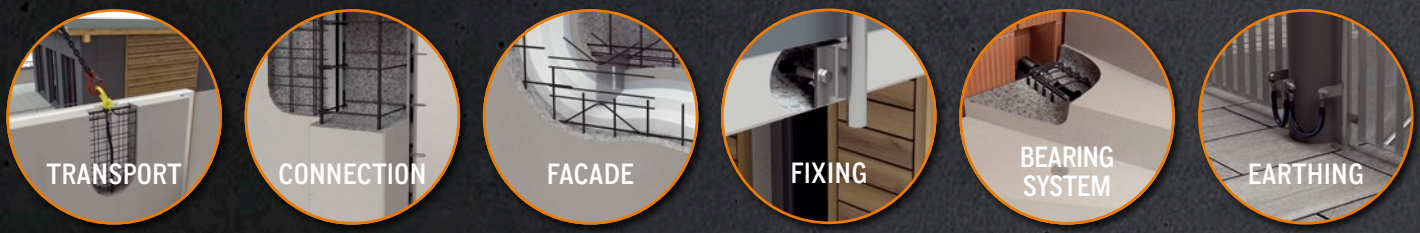
» Planning support -> latest design software, planning documents, CAD data and much more can be downloaded any time from www.philipp-group.de.

HIGH DEMANDS ON PRODUCT SAFETY AND PRACTICALITY

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

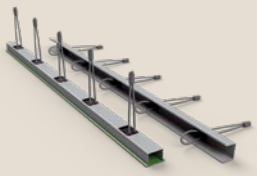
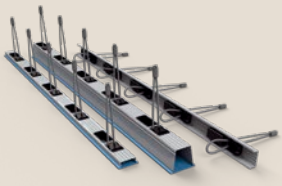
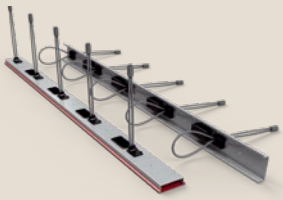
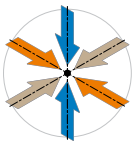
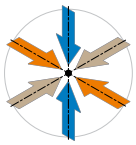
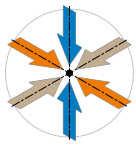
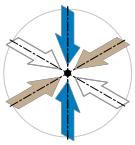
TECHNICAL DEPARTMENT

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

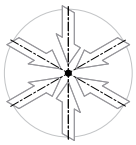
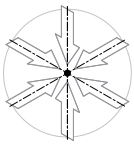


CONTENT

PRODUCT CHARACTERISTICS - OVERVIEW

	Approved (German approval)			
	Power One System	Power Duo System	Power OS rails	Power Box System
				
LOAD DIRECTIONS / MAX. DESIGN RESISTANCES				
				
$v_{Rd,II}$ (kN/m)	60.0	90.0	80.0	105.0
$v_{Rd,\perp}$ (kN/m)	37.5	37.5	35.7	28.6
Z_{Rd} (kN/loop)	10.0	10.0	10.0	-
AREA OF APPLICATION (RECOMMENDED)				
Precast building	✓	✓	✓	✓
In-situ concrete constructions	-	-	✓	-
Wall / wall	✓	✓	✓	✓
Wall / wall (T-connection)	-	✓	✓	✓
Wall / column	-	✓	✓	-
Minimum wall thickness (cm)	10	12 / 14 ①	14	14
Concrete strength precast unit	C30/37	C25/30 ② / C30/37	C25/30	C30/37
TECHNICAL INFORMATION				
Technical basis	abZ	abZ	abZ	abZ
Max. fire resistance	F 180	Firewall (REI 90-M) and also F 180	F 180	F 180
Mortar grouting	Grouting mortar	Thixo- or grouting mortar	Normal weight concrete	Grouting mortar
Manufacturer of mortar	BETEC	BETEC / P&T	-	P&T

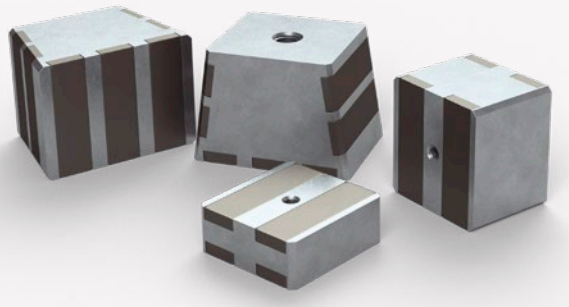
① with P&T / ② with BETEC

Constructive	
Connecting rails	Connecting loop
	
	
-	-
-	-
-	-
✓	✓
✓	✓
✓	✓
✓	✓
✓	✓
-	-
-	-
-	-
F 180	F 180
Mortar or normal weight concrete	Mortar or normal weight concrete
-	-

Accessories

for Connecting rails and loop systems

Magnetic fastener



Mortar

- BETEC Grouting
- BETEC Thixo

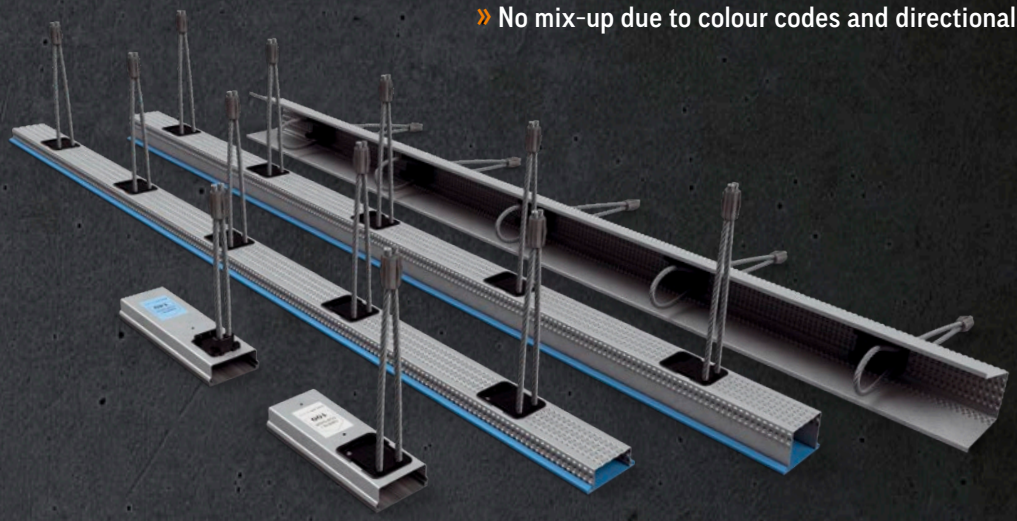
- EuroGrout Varix
- EuroGrout Universalfüller

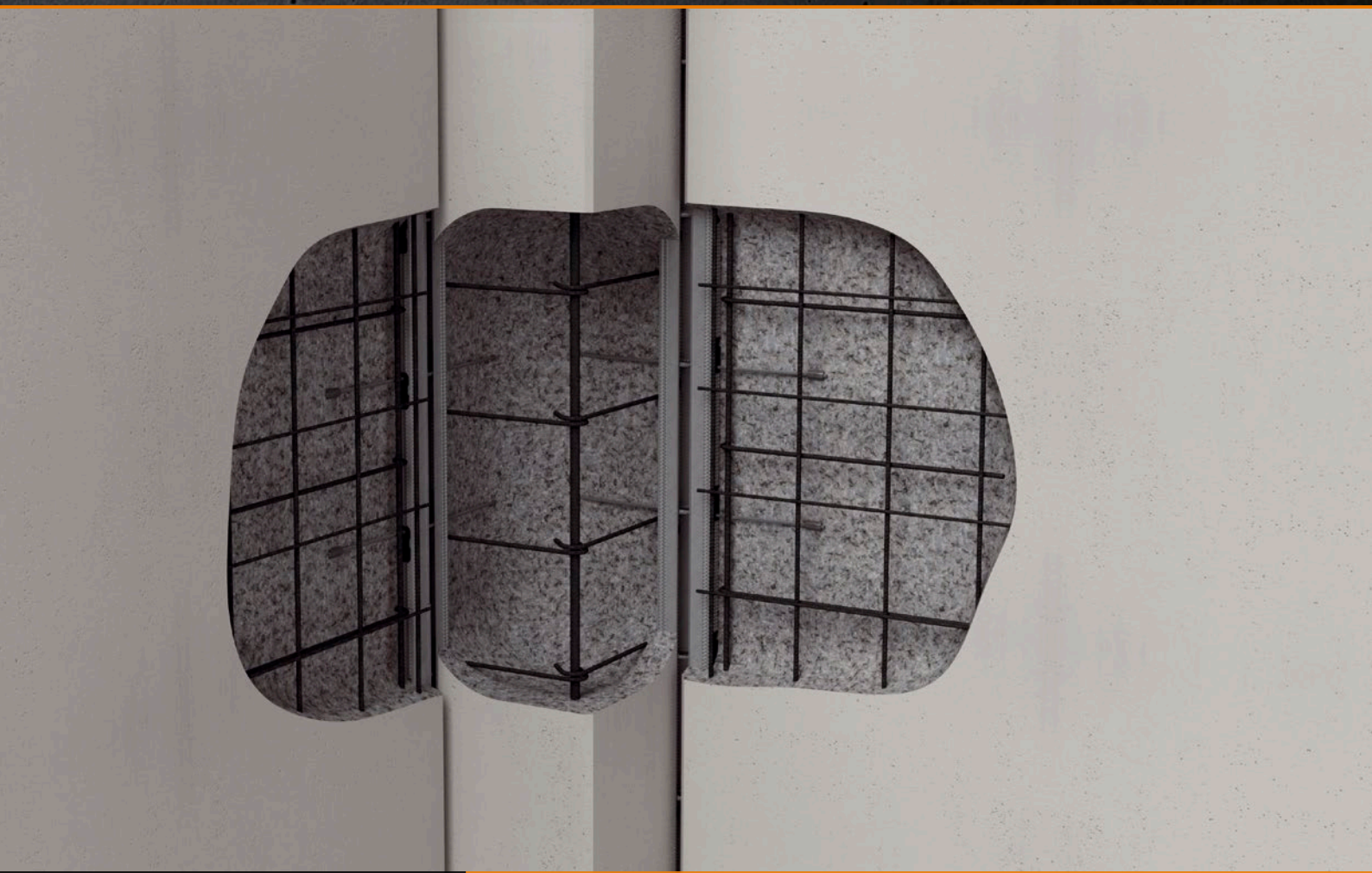
- P&T Grouting mortar (PHILIPP VG)

CONSTRUCTIVE CONNECTING RAILS AND LOOPS

YOUR BENEFITS AT A GLANCE:

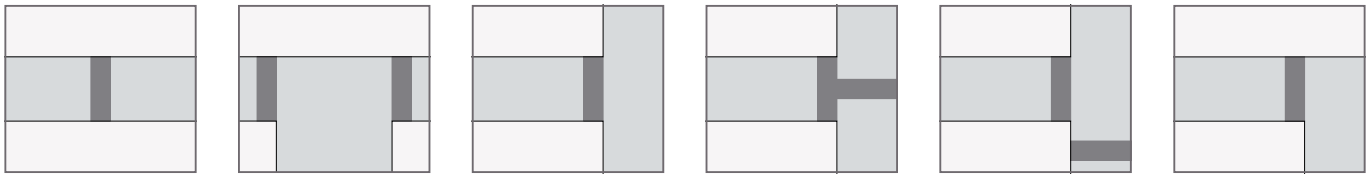
- » Flexible connecting components with small areas of grouting
- » No need to bend back any reinforcement
- » Less weight than a similar rebend connection with stiff reinforcement bars
- » Simple design, as existing reinforcement need not to be changed
- » Simple installation due to flexible wire rope ends and pre-cut nail-holes
- » Anchoring also possible in thin connection walls
- » Weather-proof cover can be removed easily
- » No mix-up due to colour codes and directional marking





APPLICATION OF CONNECTING RAILS AND LOOPS

Connecting rails and loops are only used for constructive connections of reinforced precast concrete elements. Therefore, they are only intended for applications where no approval or load-bearing function is required. All PHILIPP connection systems are highly flexible and create a reinforcement splice which functions on the principle of a lapped splice. Herewith, it is possible to realise even complicate connections in an easy way, ensuring a practical application with a simple installation.

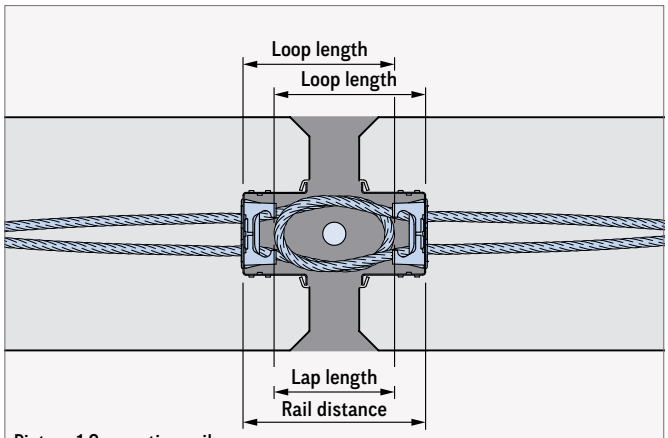


CONNECTING RAILS

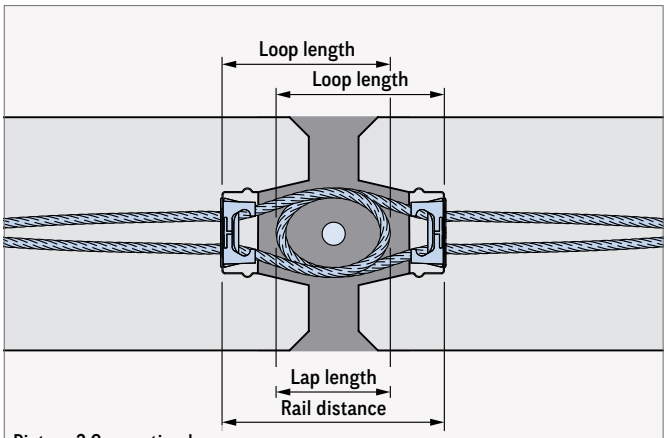
The Connecting rail is available in different versions (page 8) and is chosen on the basis of rail spacing, rail height, loop length and overlap length. It can be fixed directly to the formwork or by using a timber board in recessed position (picture 7 and 9).

CONNECTING LOOP

Connecting loops are available with different loop lengths (page 10). By varying the depth of the timber board and the loop length numerous connections can be combined. All connecting loops are always to be fixed to the formwork using a timber board, otherwise no mortar channel will be created (picture 15 and 16).



Picture 1 Connecting rail



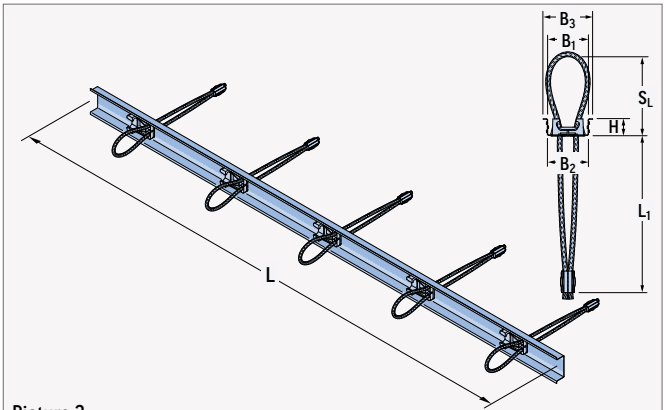
Picture 2 Connecting loop

FIRE PROTECTION

For the fire resistance class F180 a wall thickness of ≥ 15 cm is required, F120 applies for thinner walls.

CONNECTING RAILS

This version is a combination of steel wire ropes and a metal channel (rail) in which the ready-for-use wire ropes are inserted. A high adhesion to the concrete is guaranteed by the profiled channel surface.
Available dimensions of the rails are: width of 50 mm (other widths on demand) and depths of 20, 40 and 70 mm. With a rail length of 1.25 m, it is possible to choose between 2, 3 or 5 loops, with different loop lengths each. Other rail dimensions, also without loops, are available on request.

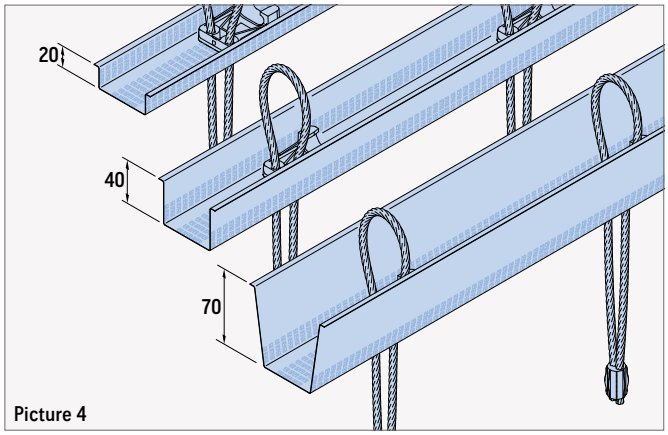


Picture 3

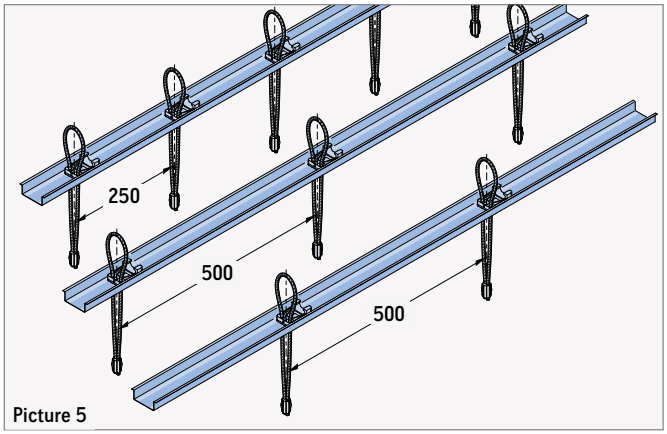
TABLE 1: CONNECTING RAILS

Ref. no.	No. of loops (pcs.)	S_L ② (mm)	H (mm)	L (mm)	B_1 (mm)	B_2 (mm)	B_3 (mm)	L_1 (mm)
Rail depth H = 20 mm								
84VS200802	2							
84VS200803	3	80						
84VS200805	5							
84VS201002	2							
84VS201003	3	100	20	1250	50	50	60	190
84VS201005	5							
84VS201202	2							
84VS201203	3	120						
84VS201205	5							
Rail depth H = 40 mm								
84VS400802	2							
84VS400803	3	80						
84VS400805	5							
84VS401002	2							
84VS401003	3	100	40	1250	50	50	60	190
84VS401005	5							
84VS401202	2							
84VS401203	3	120						
84VS401205	5							
Rail depth H = 70 mm								
84VS701005	5	100	70	1250	70	50	80	190

① When choosing the loop length (measured from the rail bottom) please note that the required lap length for the loops is met (page 12, picture 17).



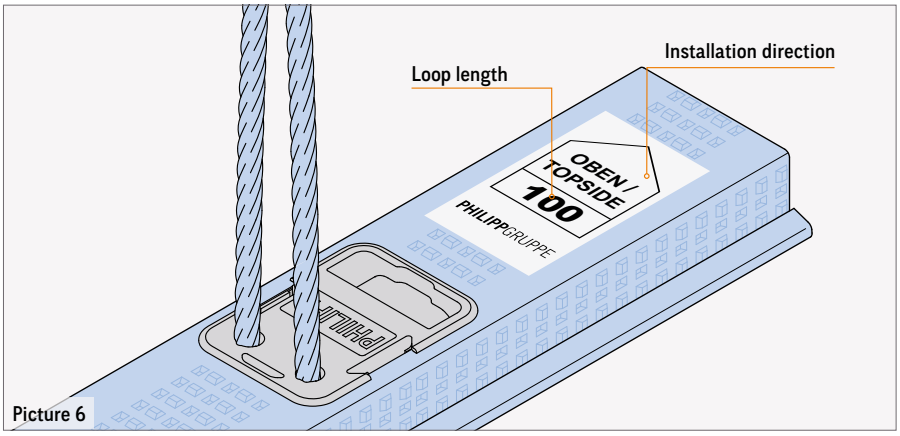
Picture 4



Picture 5

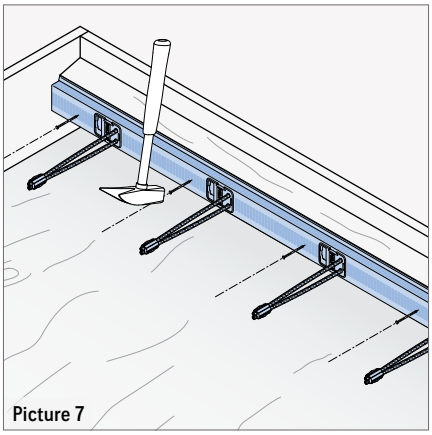
CONNECTING RAILS

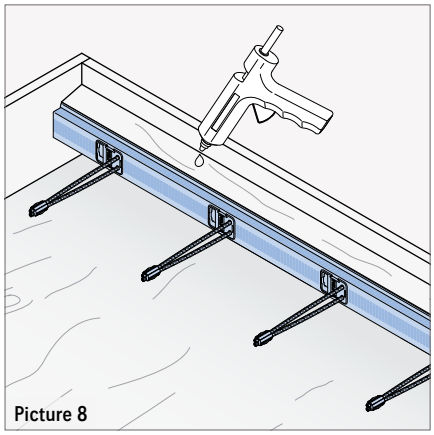
In order to identify the installation direction and the length of the loops a colour-coded marking is provided on the backside of the rail. Attention must be paid that the directional arrow of an installed Connecting rail points to the top of the wall.



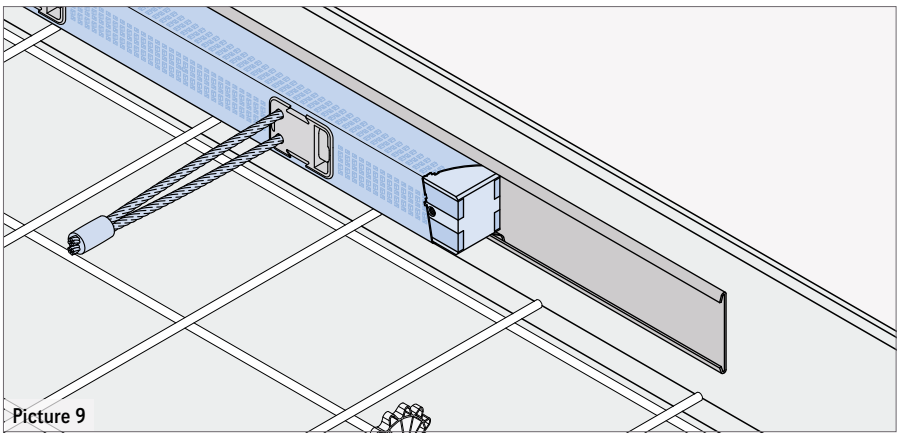
Picture 6

The Connecting rail can be fixed by nailing or hot bonding to the formwork.


Picture 7


Picture 8

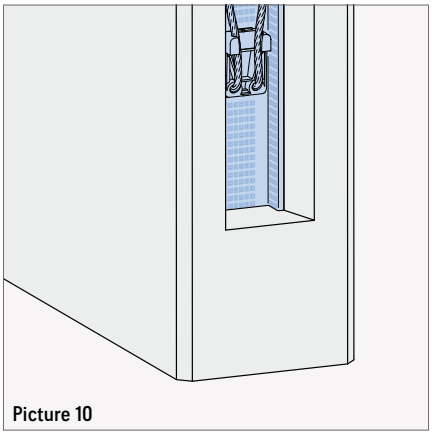
By using the Magnetic fastener the Connecting rails can be fixed to steel formworks fast and easily.

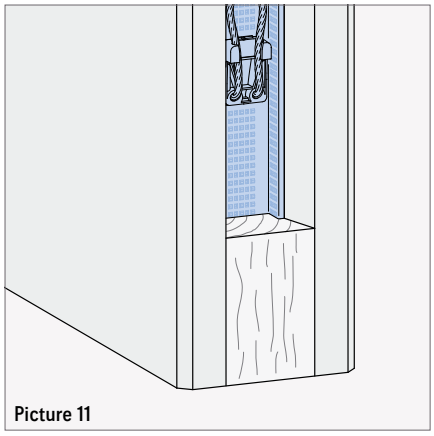

Picture 9

MAGNETIC FASTENER

For more information about the Magnetic fastener please refer to the separate Application Instruction.

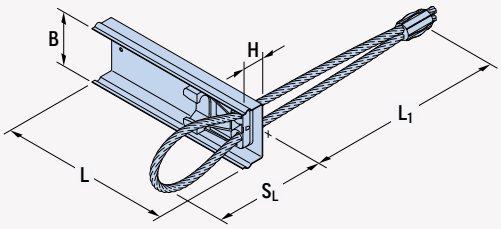
It is recommended to start the installation at the top element edge if you have elements with the same height. This allows a concreting of the rail-free part at the bottom element edge.
Alternatively, for the rail-free part a simple timber board can be installed to get a continuous grouting channel.


Picture 10


Picture 11

CONNECTING LOOPS

The Connecting loop is a combination of a steel wire rope and a metal recess former (box) in which the ready-for-use wire rope is inserted. It is made of galvanized sheet steel and is suitable for use in normal weight concrete.
The Connecting loop is a component to create a form-fit connection between precast concrete walls. Its advantage is that flexible loops do not require a complicated bending-back and therefore even a connection between columns is not a problem anymore.



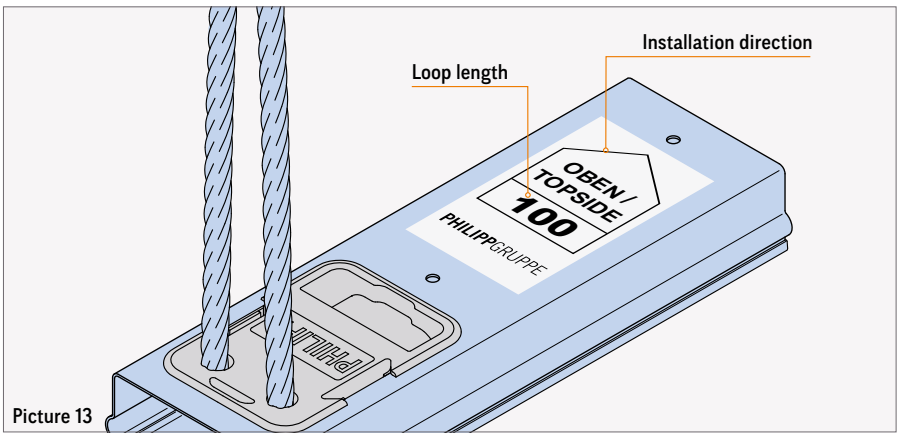
Picture 12

TABLE 2: CONNECTING LOOP

Ref. no.	S_L ② (mm)	L (mm)	L_1 (mm)	B (mm)	H (mm)	Rope Ø (mm)	Weight (kg/100 pcs.)
54VSM080	80	160	190	50	20	6	13.0
54VSM100	100	160	190	50	20	6	14.0
54VSM120	120	160	190	50	20	6	15.0
54VSM140	140	190	190	50	20	6	16.0

① When choosing the loop length (measured from the bottom of the box) please note that the required lap length for the loops is met (page 12, picture 17).

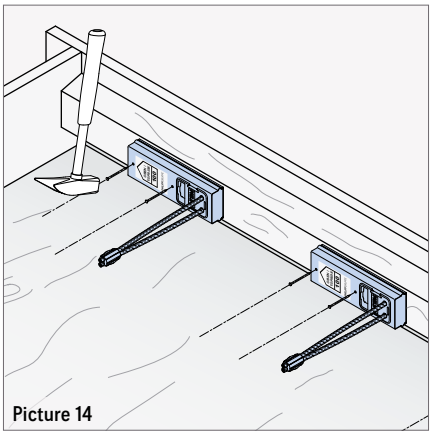
In order to identify the installation direction and the length of the loops a colour-coded marking is provided on the backside of the box. Attention must be paid that the directional arrow of an installed Connecting loop points to the top of the wall.



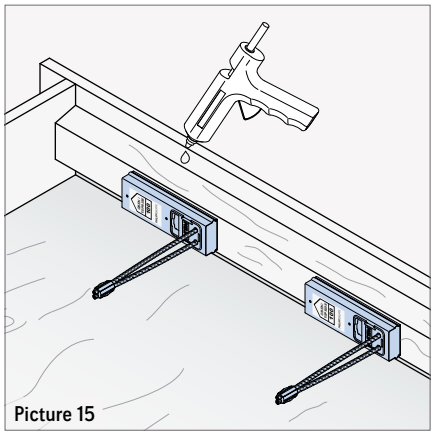
Picture 13

CONNECTING LOOPS

Its fixation to the timber board is done either by nailing or hot bonding.

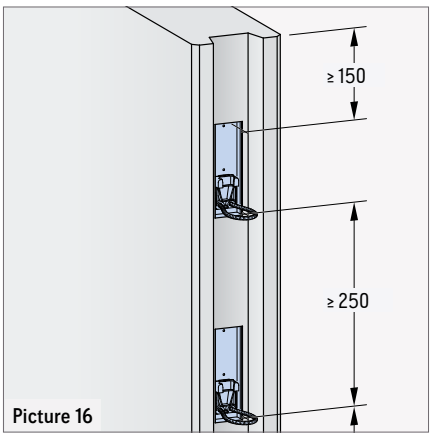


Picture 14



Picture 15

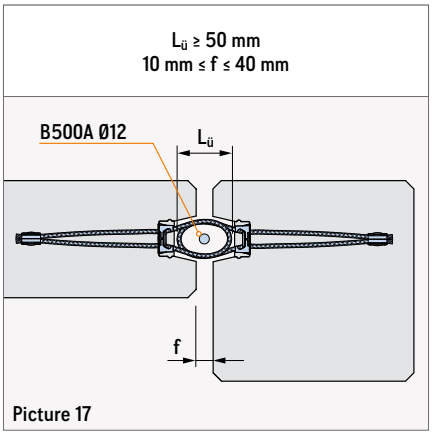
With the Connecting loop attention must be paid to given edge and centre distances. The minimum edge distance is 150 mm and the minimum centre distance is 250 mm.



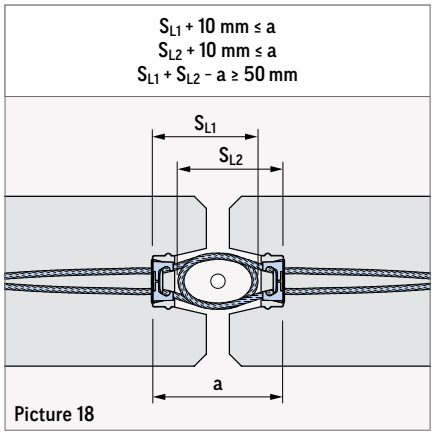
Picture 16

GENERAL

The Connecting loop and rail functions as a lapped splice and are installed flush or as recessed version in a groove. The depth of the groove has to be chosen according to the loop length and height of the rail. The loops must face each other and create a lapped splice. For the installation of the reinforcement bar Ø12 mm a minimum overlap $L_ü$ of the loops must be ensured (picture 17).



Picture 17

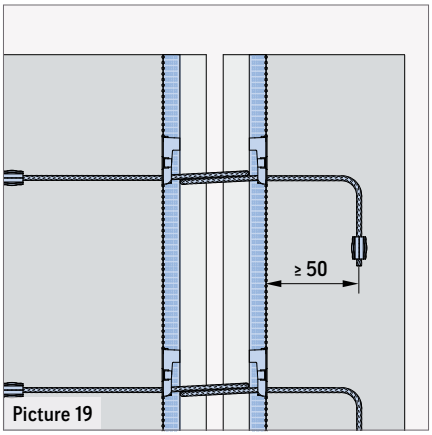


Picture 18

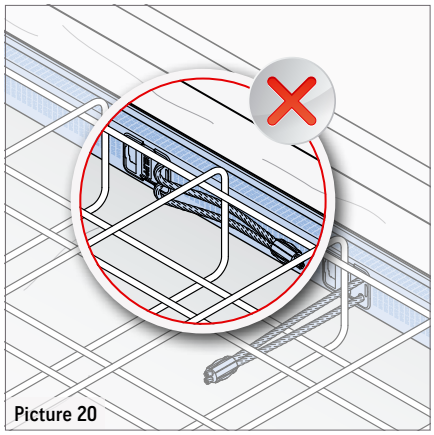
In thin concrete elements it is possible to bend the end of the loop under consideration of the bending radius.

PLEASE NOTE!

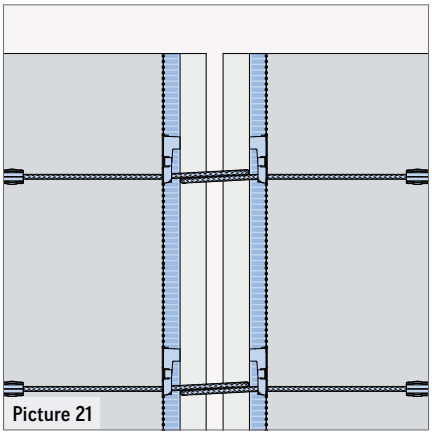
A buckling of the end anchorage by the reinforcement, as shown in picture 20, is not permissible.

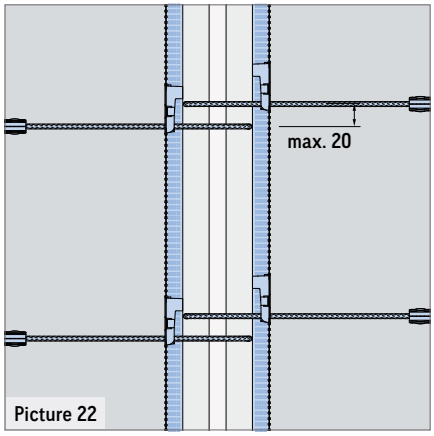


Picture 19


Picture 20

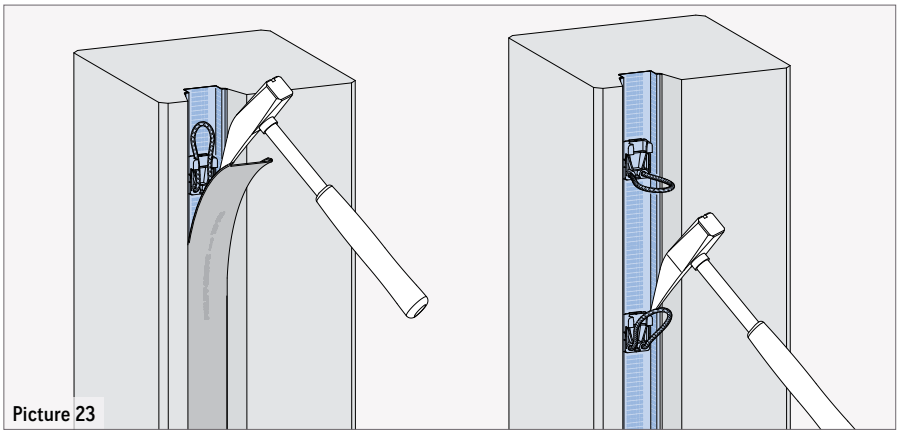
The function of a lapped splice can only work if a maximum vertical distance of 20 mm between the loops is not exceeded.


Picture 21



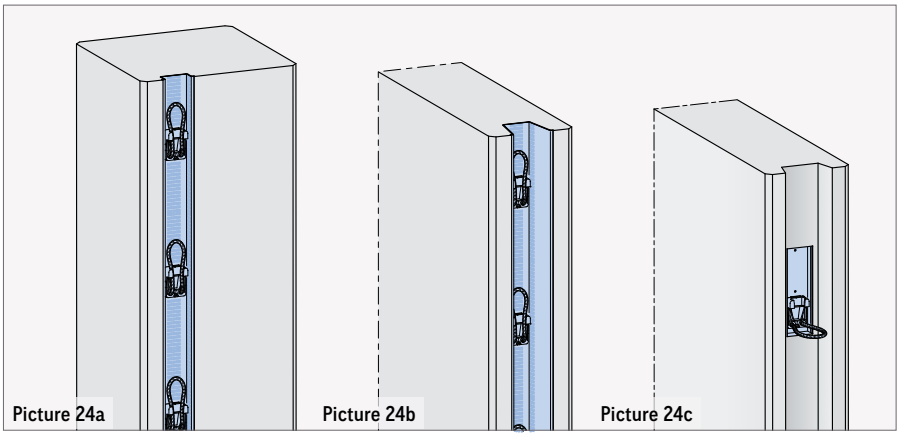
Picture 22

The plastic cover of the installed rail must be released at one end. Then, it can be removed easily from the rail. The loops are now folded out right-angled to the metal box or rail.


Picture 23

MORTAR GROUTING

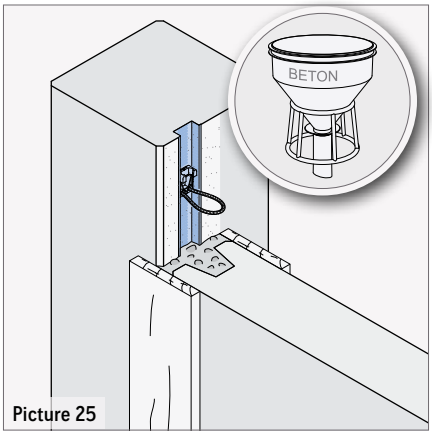
Please make sure, if a connection of two concrete elements is created with Connecting loops or rails a continuous channel for the grouting must be available. With Connecting rails the grouting channel is realised only by their steel sheet shape (picture 24 a+b). Connecting loops have to be installed always on a timber board in order to create the needed grouting channel (picture 24c).



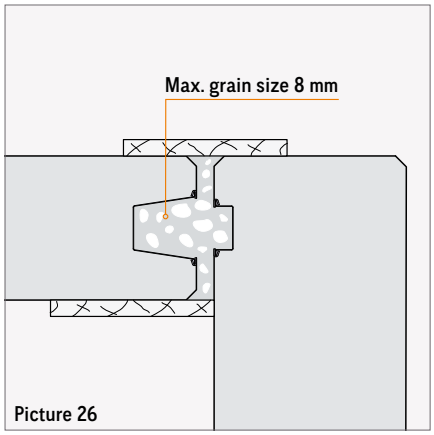
Picture 24a Picture 24b Picture 24c

CONCRETE

As the Connecting loops and rails can only be used for constructive applications the grouting material can be chosen freely by the user. If concrete is used, a maximum grain size of 8 mm should not be exceeded, otherwise this aggregate might plug the joint. This may cause some voids which "weaken" the cross section.



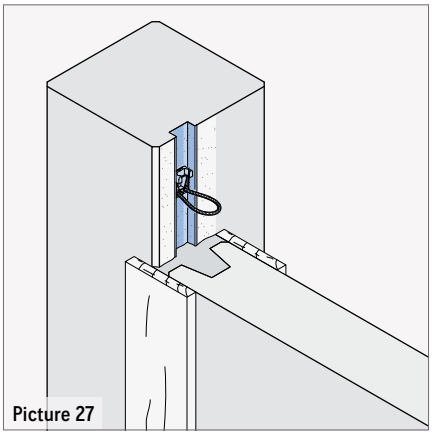
Picture 25



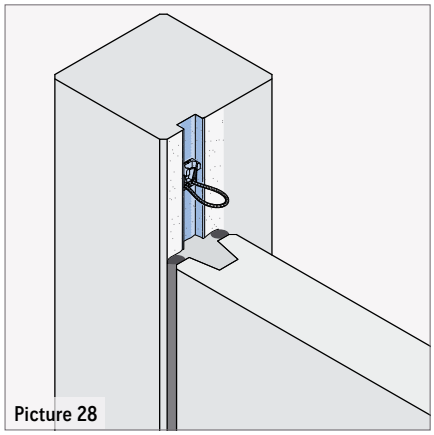
Picture 26

GROUTING MORTAR

A good alternative to concrete is a grouting mortar. To fill the mortar into the joint, it has to be sealed in the same way as with concrete, e.g. using form boards, rope seals or thixotropic mortar. After hardening of the grouting mortar we recommend to do concrete cosmetics or a sealing with a permanently elastic joint tape.



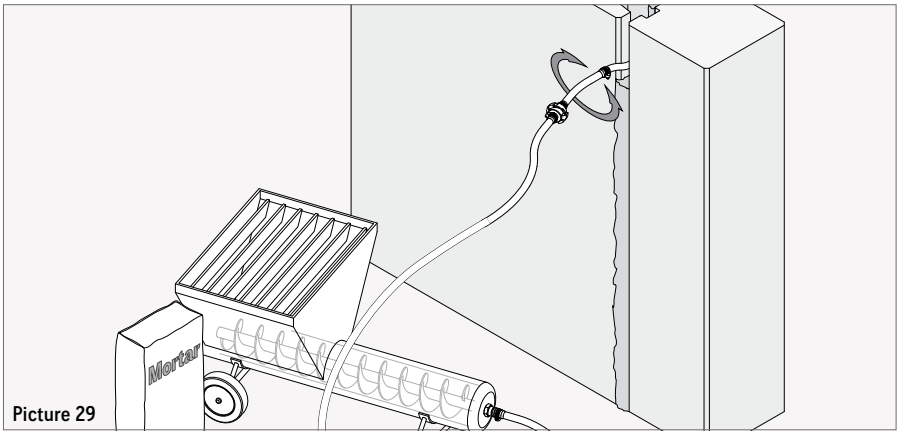
Picture 27



Picture 28

THIXOTROPIC MORTAR

If thixotropic mortar is used no further sealing of the grouting channel is needed. Either the thixotropic mortar is mixed and pumped with a screw pump, compulsory mixer or a suitable continuous mixer. First, one side is closed with the mortar or a joint tape is installed. Then the mortar is filled in from the other side – pay attention that the loops resp. rails are filled up completely.



Picture 29

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