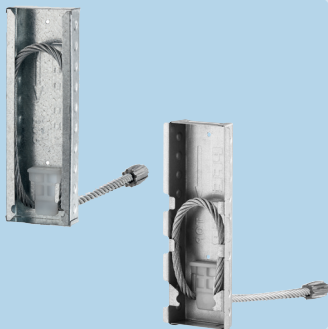




VS[®] Box
CLASSIC

VS[®] Box
EASYFILL

PFEIFER



planning & installation

PFEIFER-VS[®] System: Your solution for lightning-fast, problemfree assembly of precast concrete wall elements

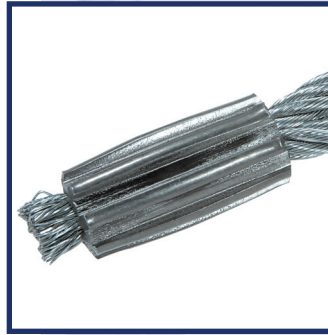


To work with PFEIFER offers you plenty of advantages

Advantages in the planning phase



- Safety from a single source: the intelligently co-ordinated spectrum of products in the PFEIFER-VS® System offers the planner a comprehensive range for any application
- Safety through steel ferrules that transmit the full cable breaking force into the concrete element without additional retention reinforcement
- Spring-back wire rope loops allow the planner to arrange precast concrete sections flexibly



Advantages in precast element production



- Easy fixing to the formwork by nailing or gluing to steel formwork with hot-melt adhesive
- Careful processing and accurate fabrication ensures that the highest demands for sealing against concrete slurry penetration are satisfied



Advantages in precast element assembly



- The wire rope loops are easily folded out using a roofing hammer – no difficult bending of reinforcing steel, no time-consuming screwing
- No corrosion, since the recess rail and wire ropes are galvanized
- Flexible, spring-back wire rope loops allow precast concrete elements to be placed leaving gaps

Advantages for purchasing



- PFEIFER offers a comprehensive, well-rounded range with VS® Boxes
- Special economic solution through modern production plants
- Easy handling saves assembly time and wage costs

The right box for every joint

Joint is filled with grout ...

- Highly penetrating
- Simple handling
- No feed pump required
- Even relatively few joints can be filled economically



VS[®] BOX CLASSIC

Joint is filled with plastic joint filling mortar

- Plastic and stable in the joint without formwork
- No formwork necessary
- Mixing and conveying can be done in one step
- Pump conveying to the joint



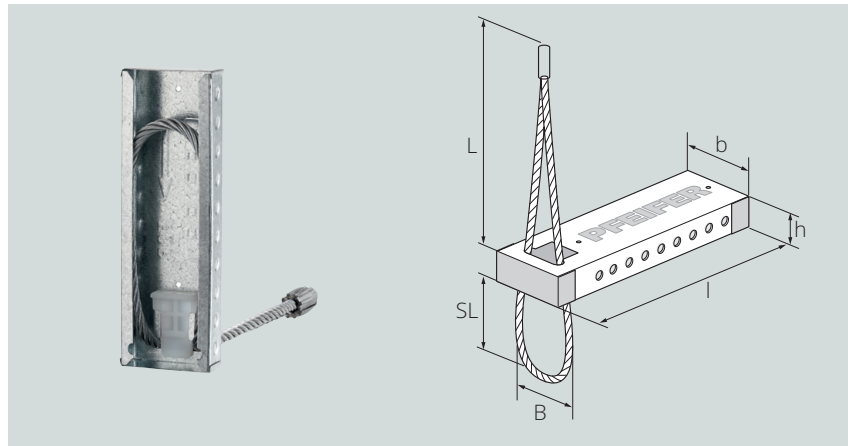
VS[®] BOX EASYFILL

- Flexibility guaranteed by case-specific box positioning
- Color-coded sealing slides for easy assignment
- Optimum profile for optimum connection
- Low mortar consumption
- Design resistances in every direction

Component recommendation

- Precast wall
- Column

VS[®] Box CLASSIC



VS[®] Box CLASSIC

Type			VS [®] -B-C-60	VS [®] -B-C-80	VS [®] -B-C-100	VS [®] -B-C-120
Number of loops		pcs	1	1	1	1
Colour coding			Yellow	Black	White	Fenstergrau
Box length	l	mm	160	160	160	160
Box height	h	mm	20	20	20	20
Box width	b	mm	50	50	50	50
Loop length	SL	mm	60	80	100	120
Loop width	B	mm	50	60	70	80
Length of rope end	L	mm	200	200	200	200
Packing unit		St	110	110	110	110
Reference no.	on request		389146	389147	389148	

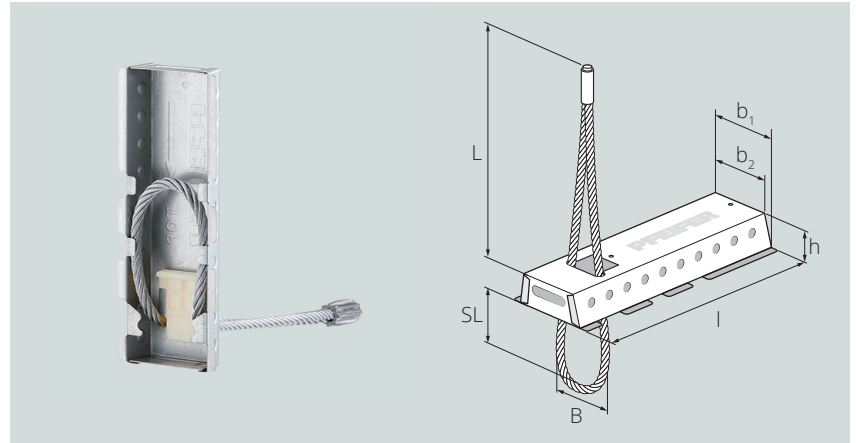
- Flexibility guaranteed by case-specific box positioning
- Joint filling with grout or plastic/thixotropic mortar possible
- Optimum profile for optimum connection
- Low mortar consumption
- Design resistances in every direction

VS[®] Box EASYFILL

- Cable loop boxes for the friction-locked connection of prefabricated parts
- The VS[®] Box EASYFILL are used in pairs and installed opposite each other. Their overlapping loops are connected to each other via a threaded reinforcement bar. The joint between the components is then filled with a suitable mortar

Component recommendation

- Precast wall
- Column



VS[®] Box EASYFILL

Type			VS [®] -B-E-60	VS [®] -B-E-80	VS [®] -B-E-100	VS [®] -B-E-120
Number of loops		pcs	1	1	1	1
Colour coding			Yellow	Black	White	Gray
Box length	I	mm	160	160	160	160
Box height	h	mm	20	20	20	20
Loop length	SL	mm	60	80	100	115
Loop width	B	mm	50	55	60	70
Length of rope end	L	mm	205	205	205	205
Outer width box			50	50	50	50
Width box flange			42	42	42	42
Packing unit		pcs	280	280	280	280
Quantity per load carrier		pcs	280	800	800	800
Reference no.			423914	423915	423916	423917

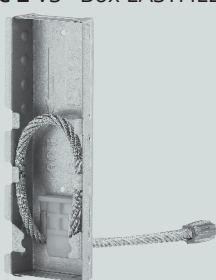
General installation instructions for the PFEIFER-VS® Box

Use

Figure 1 VS® Box CLASSIC



Figure 2 VS® Box EASYFILL



The PFEIFER-VS® Boxes are provided for the connection of reinforced concrete precast wall elements (Figures 3 to 6) made of concrete quality C30/37 or better. The following joint filling variants are possible:

	Grout	plastic mortar
VS® Box CLASSIC	✓	✗
VS® Box EASYFILL	✓	✓

Figure 3:
Butt joint

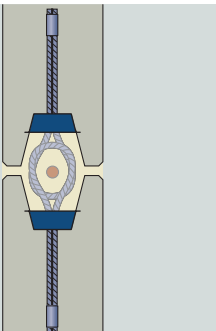


Figure 4:
Corner joint

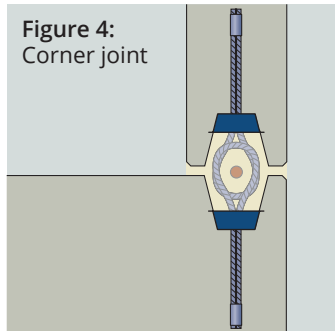


Figure 5:
T-joint

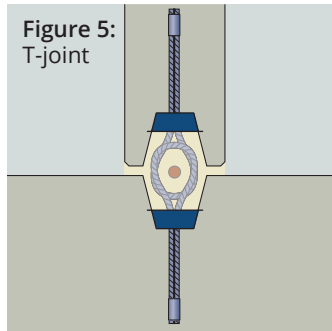
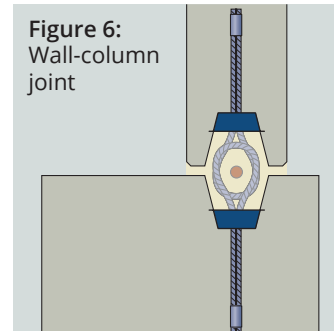


Figure 6:
Wall-column joint



Installation

Figure 7: Joint geometry

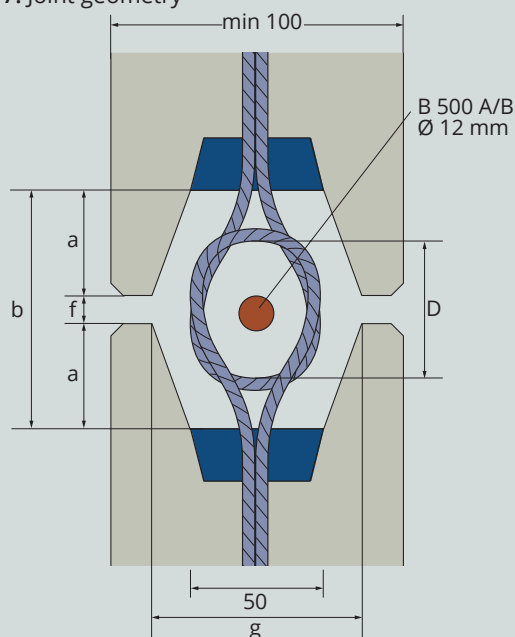
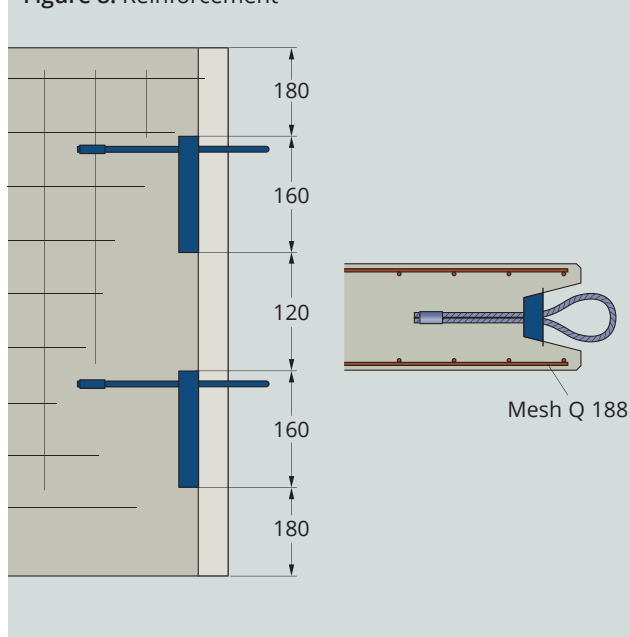


Figure 8: Reinforcement



Box type	Standard joint f		Minimum joint f			Maximum joint f		
	a [mm]	max. g [mm]	f [mm]	b [mm]	D [mm]	f [mm]	b [mm]	D [mm]
VS®-B-C/E-60	25	60	20	70	50	10	60	60
VS®-B-C/E-80	35	70	20	90	70	10	80	80
VS®-B-C/E-100	45	70	20	110	90	10	100	100
VS®-B-C/E-120	55	70	20	130	100	10	120	110

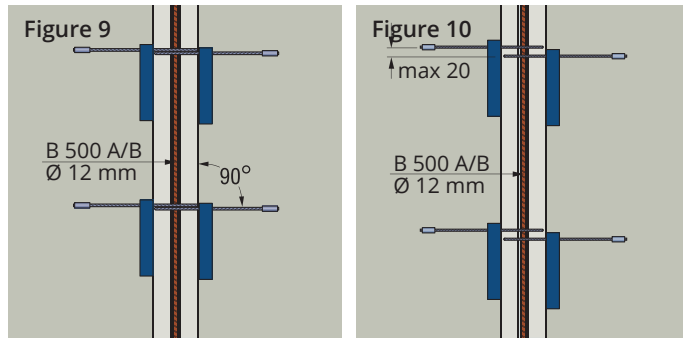


Notice:

Reinforcement layout according to Figures 7 and 8 is recommended in the reinforced concrete precast elements for the VS® Box systems. Other national regulations have local priority over this recommendation, and if they exist it is essential that they are observed.

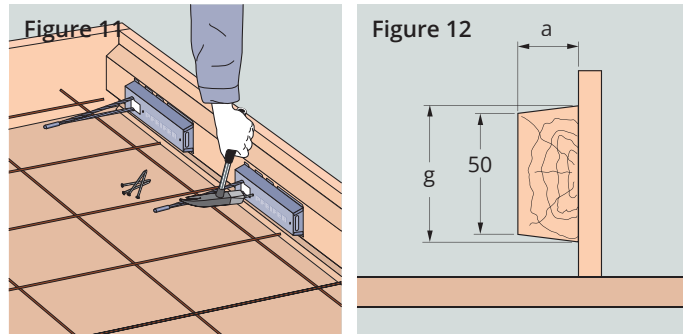
Instructions for installation and use

Installation tolerances

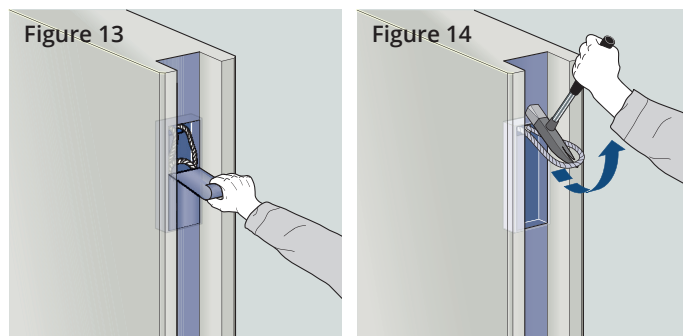


Vertically, the loops are usually to be fitted without any offset, so that they touch one another and lie directly on top of one another (Figure 9). A maximum vertical position tolerance of 20 mm is permitted (Figure 10).

Manufacture of the steel reinforced concrete precast elements



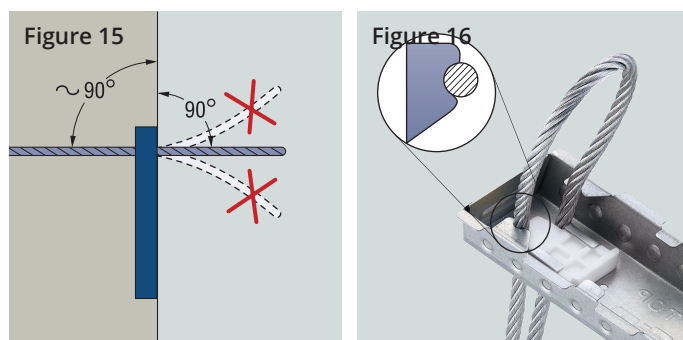
At the end face of the wall elements, a trapezoidal strip is attached to the front of the wall elements as shown in Fig. 11. The dimensions of the trapezoidal wood are shown in Fig. 12 and the table on page 7. When inserting the VS® box into the formwork, make sure that the rope end is threaded as straight as possible between the reinforcement. Thread the loops onto the mesh reinforcement prevents the loops from slipping.



After stripping the formwork

After stripping the formwork, the flexible masking tape is simply removed (Fig. 13). The rope loop can be easily folded out with a tool to prevent injuries (Fig. 14).

The rope loop should protrude vertically from the component (Fig. 15) and spring back into this position even after deflection when installing the components. To do this, the loop must be hooked into the integrated fixings of the sheet metal box (Fig. 16).



Assembling the precast elements:

The joints, the VS® Boxes and the loops must be clean, free from dirt or oil. The wall components are either placed on a bed of mortar or on underlaid plates of different heights using the permitted connection method. The components must be levelled so that their position and heights are in accordance.

Joint filling with grout

Information and notes

The properties of the grout in the joint play an important role in a load-bearing connection of precast concrete elements with the PFEIFER-VS® system elements.

Grout properties

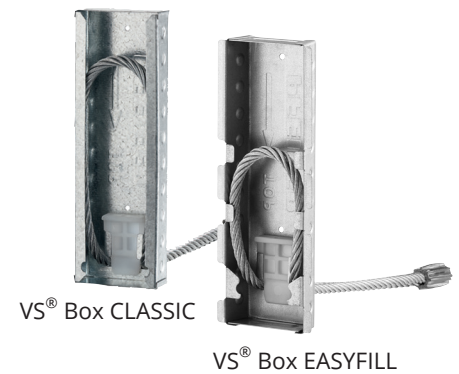
- ✓ Very free-flowing for at least 90 minutes
- ✓ Shrinkage-compensated
- ✓ Resistant to frost and de-icing salt
- ✓ Can be pumped with mixing and conveying pumps
- ✓ Corrosion inhibiting
- ✓ Production certified according to DIN ISO 9001
- ✓ Delivered as bagged goods (25 kg bags)

Joint filling

The grout is added continuously until the planned height is reached.

The formwork must be able to withstand the pressure created in this way.

Compaction is not necessary. Nevertheless, air removal by poking with the reinforcing steel or the application of an internal vibrator is recommended. The grout sets very quickly, and allows work to continue promptly.



Joint formwork variants

1. Board formwork

In order to completely fill a precast element joint flush with grouting, a shuttering board (Figure 17) is to be attached on both sides. It is recommended that foam rubber is applied to the shuttering boards in order to compensate for unevenness. When the shuttering boards are properly fastened and it has been ensured that grout material cannot flow anywhere, the joint can be filled. The formwork can be removed, cleaned and reused after the material has hardened.

2. Mortar seal

Another variant makes it possible to close the joint flanks with the plastic mortar (Figure 18). After this mortar has hardened, the core area of the joint can be filled with grout and the higher performance of the systems can be achieved.

3. Sealed compriband

Another way to cast the joints with grout is the variant sketched in Figure 19. In this case, prior to grouting, a foam cord/compriband is inserted into the joint in a defined manner, after which a permanent elastic jointing is applied. When this jointing has completely hardened, the grouting can be carried out without any additional formwork measures. The pressure that arises during grouting must, however, be borne in mind. This should be determined by the operating company, allowing suitable grouting sections to be chosen to avoid the jointing from being pushed out.

Grout consumption

Table 4 below makes it possible to calculate an estimation of the fully-filled joints; an average grout consumption per metre of joint, based on walls that are 3.5 m high, is given.



Caution:

If joint pressure formwork or pre-compressed strips are to be pressed into the side joints without affecting the casting space, the effective lateral concrete coverage of the rail and the wire rope loop is reduced. The remaining cross-section must satisfy the applicable minimum requirements.

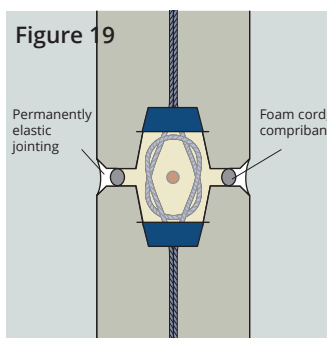
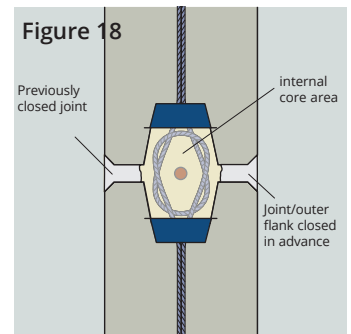
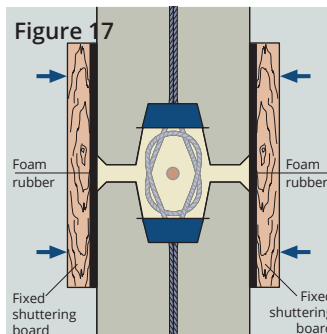


Table 4:

Grout volumes l/m for standard joint (20 mm), 2 VS® Boxes/m

Wall thickness [cm]	10	14	18	22
VS®-B-C/E-60	5,39	6,19	6,99	7,79
VS®-B-C/E-80	6,84	7,64	8,44	9,24
VS®-B-C/E-100	8,04	8,84	9,64	10,44
VS®-B-C/E-120	9,24	10,04	10,84	11,64

1 cm Wandbreite zusätzlich = 0,2 l/m

Joint filling with plastic joint filling mortar

Information and notes

The advantage of joint filling mortar is the filling of precast joints without formwork. The optimised, plastic/thixotropic properties of this mortar means that it is stable after being poured in the joint, without the need for further measures.

Mortar properties

- ✓ Non-shrinking, with a gel-like consistency
- ✓ Easy preparation
- ✓ Can be pumped with conventional screw pumps
- ✓ High early and final strengths
- ✓ Resistant to frost and de-icing agents
- ✓ Impermeable to water
- ✓ Low water/cement ratio
- ✓ Production certified according to DIN ISO 9001
- ✓ Monitored externally and in-house
- ✓ Delivered as bagged goods (25 kg bags)

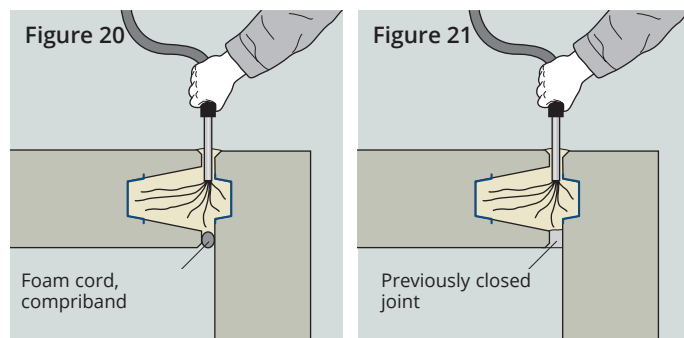


VS® Box EASYFILL

Joint filling

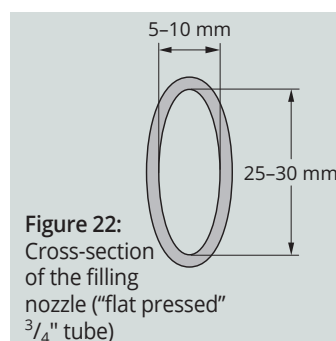
First completely close off one joint flank using foam cord, profiled rubber (Figure 20) or alternatively using joint filling mortar (Figure 21). After sealing with a joint filling mortar, wait for the mortar to harden. After this, working from the other side, the remaining joint, which is now closed on one side, should be filled from the bottom to the top evenly and continuously. Gently poking the joint with the filling nozzle or the filling pipe ensures a proper result. The joint can easily be drawn flat after having been filled.

Joint formwork variants



Nozzle making

The user can make the filling nozzle from commercially available 22 mm ($\frac{3}{4}$ ") copper heating pipe. It can be attached to the pump hose with the aid of a solder fitting (Figures 22 and 23).



Notice:

This information only concerns the introduction of the material into the joint!



Caution:

Do not constrict the filling space. If pre-compressed strips are to be pressed into the side joints without affecting the casting space, the effective lateral concrete coverage of the rail and the wire rope loop is reduced. This must also be taken into account by the planners in the dimensioning.

Notes



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