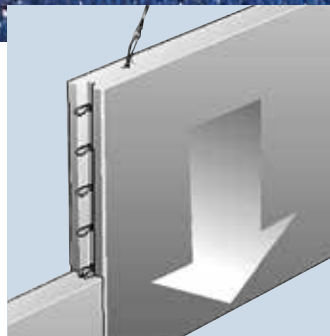


# PFEIFER



05/2020



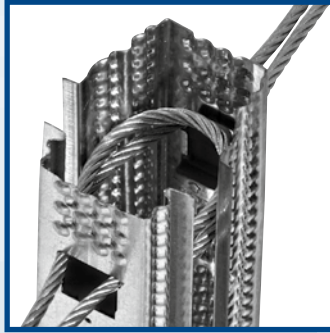
## Constructive VS® Rail systems

**PFEIFER  
SEIL- UND HEBETECHNIK  
GMBH**

DR.-KARL-LENZ-STRASSE 66  
D-87700 MEMMINGEN

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FAX                      083 31-937-342  
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INTERNET www.pfeifer.info



## The VS<sup>®</sup> Rail T50 and the Long Box T20 offer an optimum casting channel for your column-wall connection

### + Efficiency

- Butt and T wall joints, as well as wall-column connections – economical, simple and secure to implement
- Rail profile acts simultaneously as formwork – no additional wooden formwork needed
- No additional tools necessary

### + Innovation

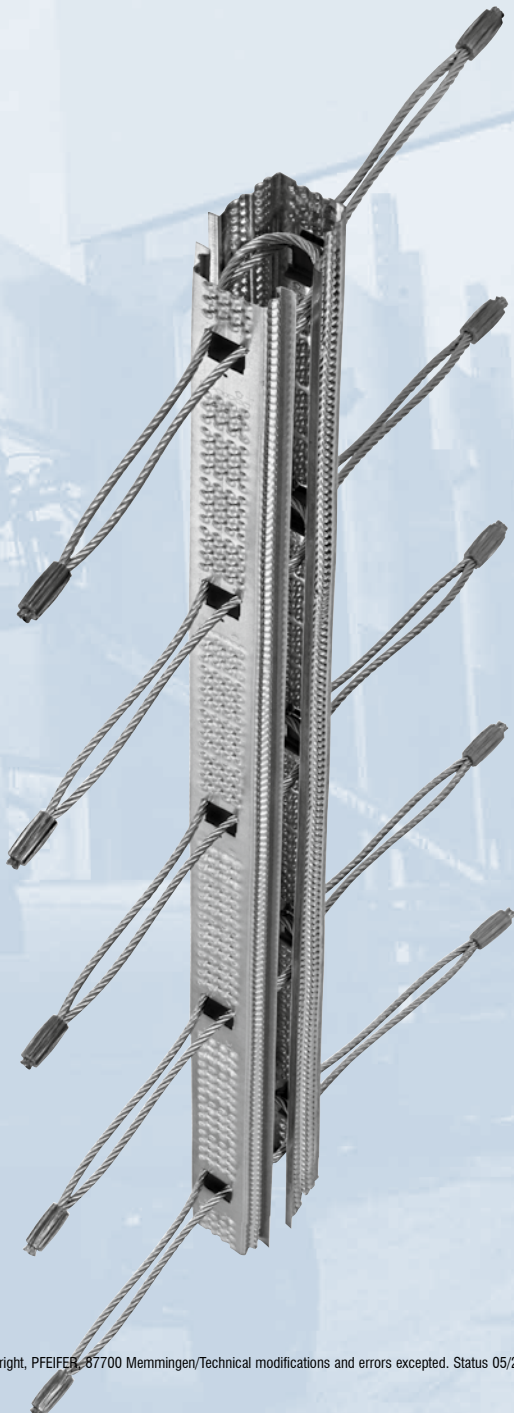
- Optimum loop overlapping through fixed geometry
- Lateral profiling ensures firm hold in the ground

### + Symmetry

- Non-directional installation
- Practical and reliable

### + Quality

- Every application found in practice is covered
- Robust, galvanized sheet steel strip
- Loops protected in the rail when folded out



# PFEIFER VS<sup>®</sup> Rail T20

# PFEIFER VS<sup>®</sup> Long Box T50

Item no. 05.031  
Item no. 05.030

For constructive wall and column connections in prefabricated construction



**PFEIFER**

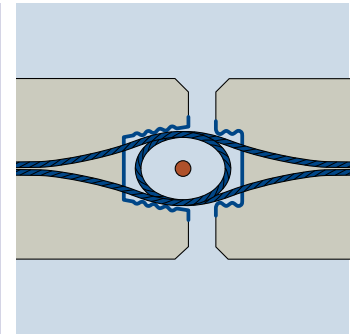
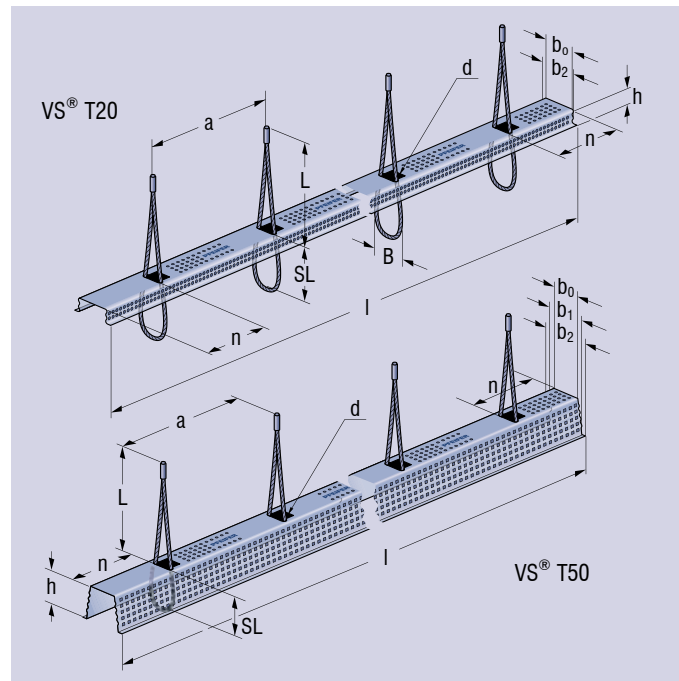
Connection Systems  
VS<sup>®</sup> Systems

The PFEIFER rails and strips T20 and T50 are used for the construction of prefabricated partition walls and supports as well as wall-wall connections.  
Filling materials as well as grout mortars having plastic / thixotropic properties can be used as joint filling material.

VS<sup>®</sup> PAGEL<sup>®</sup> GROUT and the VS<sup>®</sup> P PAGEL<sup>®</sup> JOINT FILLING MORTAR are, for example, available to users as joint filling materials.  
Casting is particularly fast and effective with the help of the FDS VS<sup>®</sup> Joint Pressure Formwork.

**Material:**

Rail: steel sheet, galvanized  
Steel rope: high-strength, galvanized  
steel spit clamp  
Cover: tape



Ref.-No.	Type/size	Dimensions [mm]											Loops Quantity	Colour clip	Packing unit/pieces	Weight approx. kg/piece
		b <sub>0</sub>	b <sub>1</sub>	b <sub>2</sub>	h	l	SL	L	a	n	B	d				
05.030.002.075	VS <sup>®</sup> -T20/2	50	-	70	20	1180	75	205	590	295	60	3	2	black	100	0,88
05.030.004.075	VS <sup>®</sup> -T20/4	50	-	70	20	1180	75	205	295	148	60	3	4	black	100	1,08
05.030.006.075	VS <sup>®</sup> -T20/6	50	-	70	20	1180	75	205	186	125	60	3	6	black	100	1,40
05.030.007.075	VS <sup>®</sup> -T20/7	50	-	70	20	1180	75	205	155	125	60	3	7	black	100	1,70
05.027.002.075	VS <sup>®</sup> -T50/2	50	65	80	50	1180	75	205	590	295	60	3	2	black	60	1,15
05.027.004.075	VS <sup>®</sup> -T50/4	50	65	80	50	1180	75	205	295	148	60	3	4	black	60	1,35
05.027.006.075	VS <sup>®</sup> -T50/6	50	65	80	50	1180	75	205	186	125	60	3	6	black	60	1,75
05.027.007.075	VS <sup>®</sup> -T50/7	50	65	80	50	1180	75	205	155	125	60	3	7	black	60	1,90
05.030.000	VS <sup>®</sup> -T20/0	50	-	70	20	1180	-	-	-	-	-	3	-	-	150	0,68
05.027.000	VS <sup>®</sup> -T50/0	50	65	80	50	1180	-	-	-	-	-	3	-	-	150	1,00



Lateral rail profiling  
ensures firm hold!



# The PFEIFER VS<sup>®</sup> Rail W50 – implement wall joints economically, simply and securely



## Efficiency

- Comprehensive range for all applications
- Fast, efficient assembly using materials by the meter
- Simple fabrication of storey-height casting channel



## Innovation

- Lateral rail profiling ensures firm hold in the concrete – even during demoulding



## Symmetry

- Non-directional installation
- Practical and reliable



## Quality

- Strong, convenient steel sheet box for any desired configuration
- The rails can be separated or shortened easily
- Optimum joint casting due to simple rail geometry



# PFEIFER VS® Rail T50

Item no. 05.027



**PFEIFER**

Connection Systems

VS® Rail T50

The PFEIFER VS® Rail T50 is used for non-load-bearing connections between concrete elements. Wall joints can be achieved economically, easily and securely. The length of the wire rope loops is matched to the rail profile so that optimum connection conditions are achieved in the casting channel.

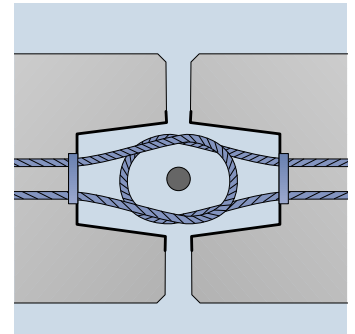
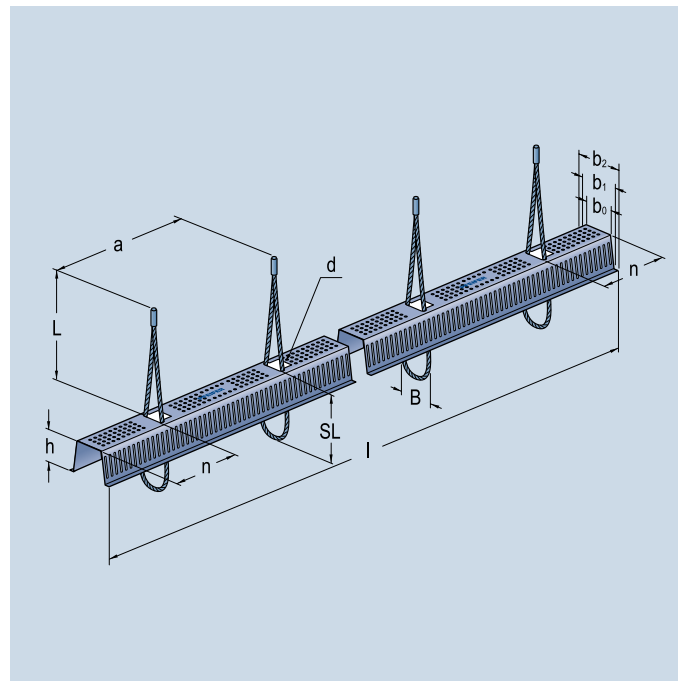
The trapezoidal rail guarantees secure, easy casting of the joint over the entire height of the storey.

VS® PAGEL® GROUT and the VS® P PAGEL® JOINT FILLING MORTAR are, for example, available to users as joint filling materials.

Casting is particularly fast and effective with the help of the FDS VS® Joint Pressure Formwork.

## Materials:

Box: steel sheet, galvanized  
 steel rope: high-strength, galvanized  
 steel ferrule  
 cover: tape

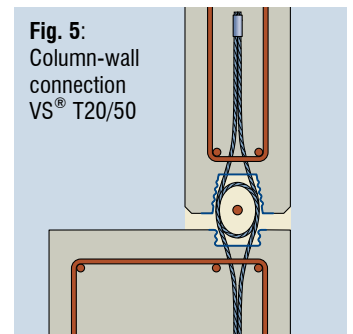
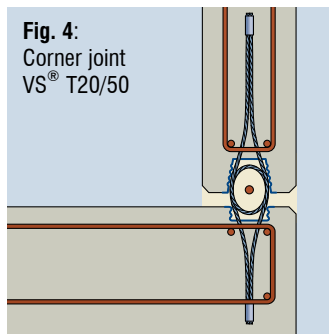
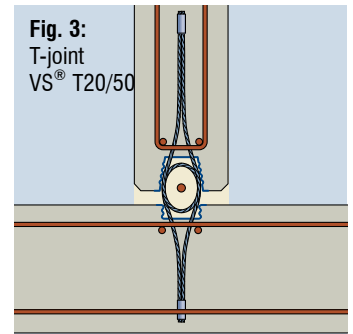
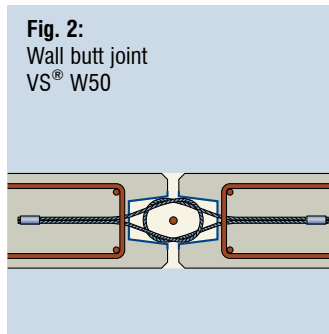
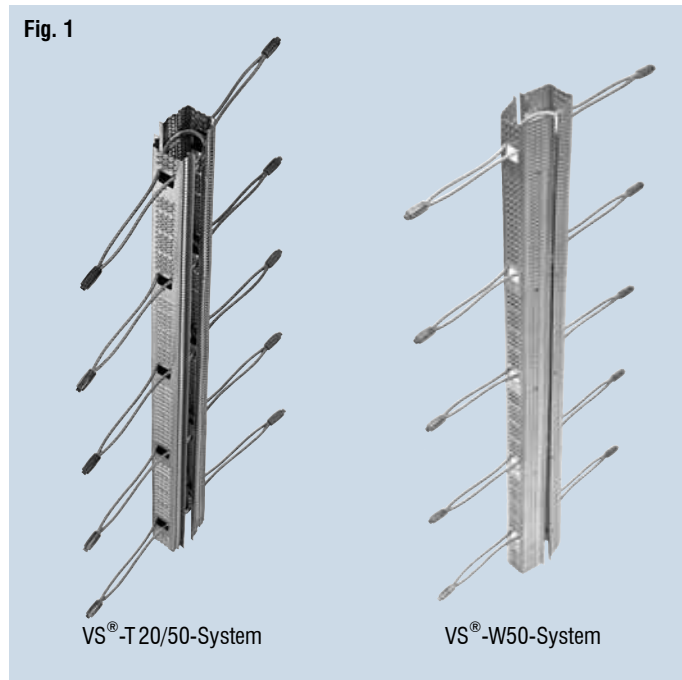


Ref.-No.	Type/size	Dimensions [mm]											Loops Quantity	Colour clip	Packing unit/pieces	Weight approx. kg/piece
		b <sub>0</sub>	b <sub>1</sub>	b <sub>2</sub>	h	l	SL	L	a	n	B	d				
05.027.590.100	VS®-W50/2	50	65	80	50	1180	100	180	590	295	60	3	2	white	60	1,15
05.027.295.100	VS®-W50/4	50	65	80	50	1180	100	180	295	148	60	3	4	white	60	1,35
05.027.186.100	VS®-W50/6	50	65	80	50	1180	100	180	186	125	60	3	6	white	60	1,75
05.027.155.100	VS®-W50/7	50	65	80	50	1180	100	180	155	125	60	3	7	white	60	1,90
05.027.000.000	VS®-W50/0	50	65	80	50	1180	-	-	-	-	-	3	-	-	150	1,00

# General installation instructions for VS<sup>®</sup> rail systems

## Use

The PFEIFER VS<sup>®</sup> rail systems are provided for the connection of reinforced concrete precast wall elements (Figures 2 to 5), or walls and columns made of concrete of grade C30/37 or better. The systems always consist of the VS<sup>®</sup> profiled rails and of a suitable casting mortar.

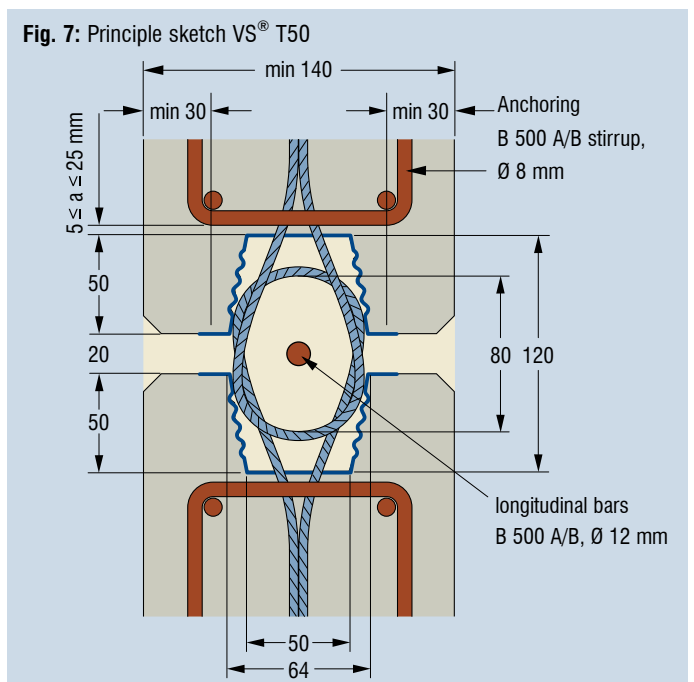
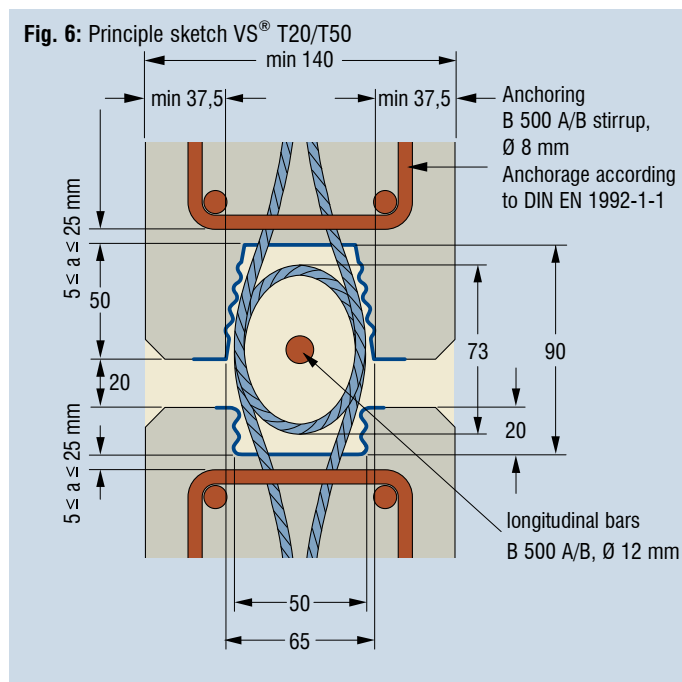


## Dimensioning



**Notice:** It is strongly recommended that the VS<sup>®</sup> ISI / VS<sup>®</sup> BZ 50 rails are used in accordance with national regulations for static load-bearing connections.

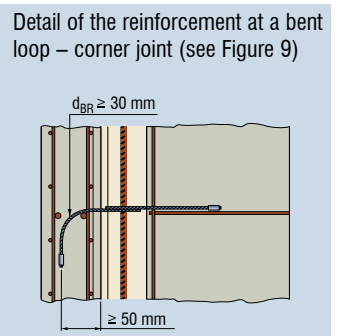
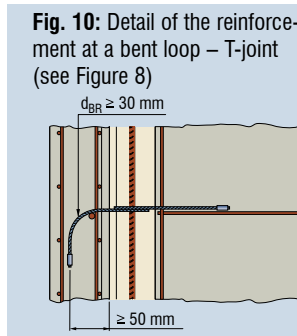
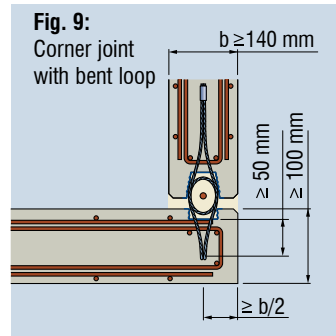
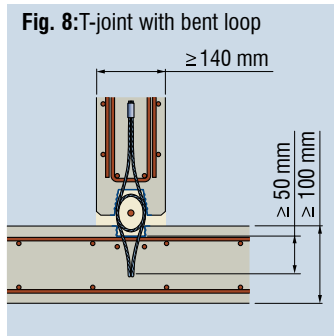
## Installation and usage



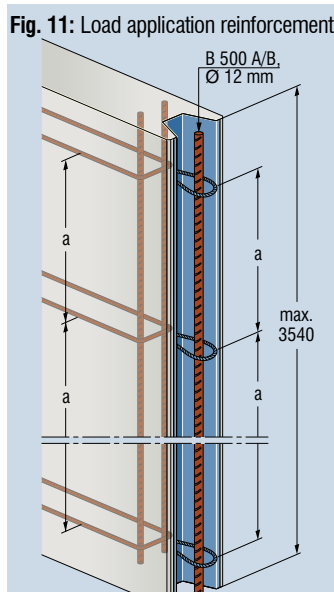
# Installation and usage

## Bending the anchoring loop

When the elements have small dimensions, the anchoring loop of the VS® Long Boxes can be bent. The crucial factor here are the bending dimensions given, for example, in Figures 8 to 10. At a corner joint, a  $\varnothing 8$  mm stirrup is recommended in the region of the bent loop.



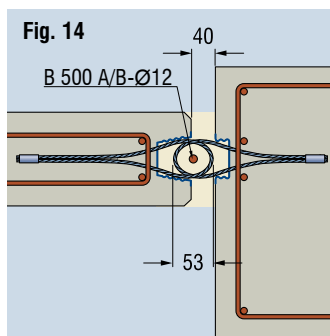
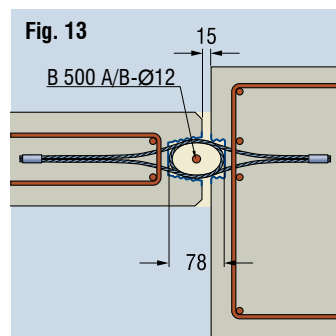
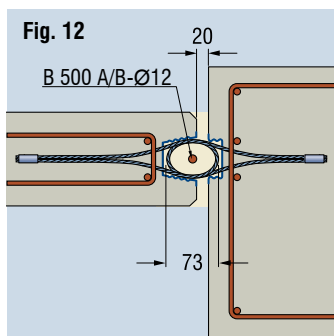
## Reinforcement



Reinforcement according to Figures 6, 7 and 11 is recommended in the reinforced concrete precast elements for the VS® rail systems. Other national regulations have local priority over this recommendation, and if they exist it is essential that they are observed.

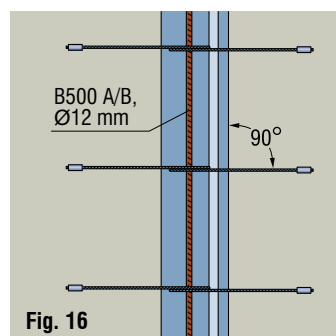
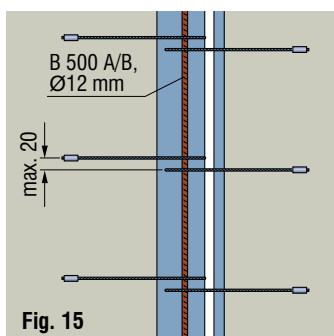
**! Notice:** As an alternative to the stirrups, a suitable mesh cap can also be installed.

## Element joints



Standard joint = 20 mm (Fig. 12)  
 Minimum joint = 15 mm (Fig. 13)  
 Maximum joint = 40 mm (Fig. 14)

## Installation tolerances



The planning must not provide for any offsets between the loops over the length of the joint. The loops must therefore be installed in such a way that they are in contact and lie directly on top of one another (Figure 16). If the joints extend over a number of floors, it may in some circumstances be useful to set regular zero points for orientation of the rail sections. Maximum vertical height tolerance from standard construction variations of 20 mm is admissible (Figure 15).

**! Note:** Due to the geometrical arrangement of the loops, a greater distance between the loops is achieved for the variants with 6 and 7 loops when impacting between two profiles.

# Manufacture of the steel reinforced concrete precast elements

When a precast element connection is established using the VS<sup>®</sup> Rail and Long Box system, the casting channel is automatically formed by rail profiles. This means that it is not necessary to provide any additional recessing blocks, depressions or the like. When inserting the VS<sup>®</sup> profiles into the formwork, it is necessary to ensure that the wire rope ends are threaded as straight as possible between the reinforcement. Starting from the lowest point of the element, the profiles are then simply nailed into place with the loops at the same height for both elements (Figure 18), or attached with hot-melt adhesive in the case of steel formwork. Fixing the loops to the reinforcing mat with wire prevents the rails and loops from slipping out of place. The anchorages for the wire rope ends are to be arranged at 90 ° to the joint. They are to be positioned in such a way that the heights of facing loops correspond precisely.

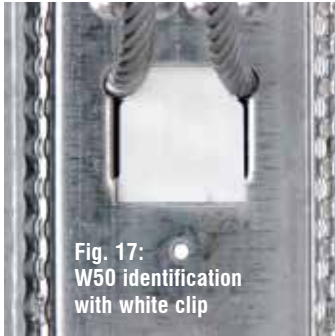


Fig. 17:  
W50 identification  
with white clip

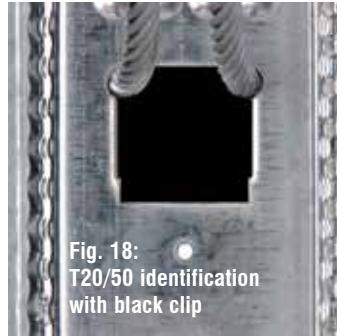


Fig. 18:  
T20/50 identification  
with black clip



**Caution:** Install the rails in the two elements that are to be joined with the loops at the same height. No profiles with different clip colors may be combined.

## After demoulding

The flexible covering foil is simply pulled off after demoulding (Figure 19). The inside of the VS<sup>®</sup> profiles is then exposed, and the wire rope loops are visible. The wire rope loop can easily be folded out (Figure 20). The wire rope loop should protrude perpendicularly from the element, and should spring back to this position again even after having been pushed aside when assembling the elements. This is important in order to ensure the correct overlap. The wall elements are now ready for final installation on site.

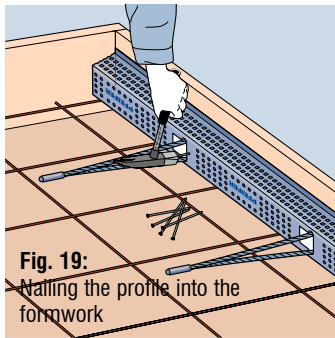


Fig. 19:  
Nailing the profile into the  
formwork

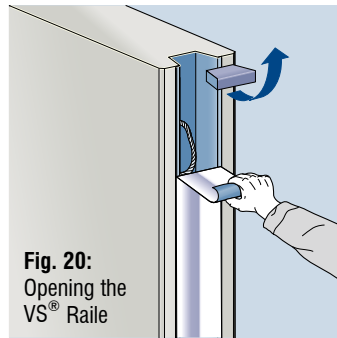


Fig. 20:  
Opening the  
VS<sup>®</sup> Raile

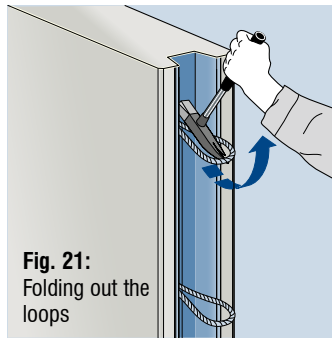


Fig. 21:  
Folding out the  
loops



**Notice:** PFEIFER application consultation service should be consulted if **increased formwork pressure** is to be expected as a result of vertical formwork.

## Assembling the precast elements

The joints, the rail profiles and the loops must be free from dirt or from separative fluids. With the permitted connection method, the wall elements are either placed on a bed of mortar or on levelling plates. The elements must be levelled so that their position and heights are in accordance. Within the framework of the approval, the spacing of the joint may be between 15 mm and 40 mm. Vertically, the loops should lie in contact one the other, or may have a distance of no more than 20 mm between them.



# Permitted VS<sup>®</sup> rails and joint material combinations

		VS <sup>®</sup> T20/T50	VS <sup>®</sup> W50
<b>PAGEL<sup>®</sup></b> <b>Spezialbeton GmbH &amp; Co. KG</b> Wolfbankring 9 D-45355 Essen Telephone +49 (0) 201 685 040 Fax +49 (0) 201 685 0431 Email info@PAGEL.com Internet www.PAGEL.com	VS <sup>®</sup> -PAGEL <sup>®</sup> grout	✓	✓
	VS <sup>®</sup> -P PAGEL <sup>®</sup> joint filling mortar	✓	✓
<b>P &amp; T</b> <b>Technische Mörtel GmbH &amp; Co. KG</b> Bataverstrasse 84 41462 Neuss Telephone +49 (0) 2131 5669-0 Fax +49 (0) 2131 5669-22 Email info@eurogrout.de Internet www.eurogrout.de	EuroGrout <sup>®</sup> Varix	✓	✓
	EuroGrout <sup>®</sup> universal filler	✓	✓
<b>BETEC<sup>®</sup></b> <b>GCP Germany GmbH</b> Alte Bottroper Str. 64 45356 Essen Telephone +49 (0) 201 86147-0 Fax +49 (0) 201 86147-43 Email info.betec@gcpat.com Internet www.gcpat.de	Betec <sup>®</sup> VS <sup>®</sup> grout	✓	✓
	Betec <sup>®</sup> VS <sup>®</sup> thixotropic	✓	✓



**Notice:**

The manufacturer's information must be observed for processing! You will also find detailed information there regarding processing, and an extensive list of recommended devices. Technical details can also be found in the technical documentation issued by the respective company.

## Grout



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

This high strength and extremely free flowing grout flows perfectly into the recesses of the PFEIFER VS<sup>®</sup> systems. As a result there are no strength-limiting faults. In combination with the PFEIFER-VS<sup>®</sup> FDS Joint Pressure Formwork, this mortar makes it possible to fabricate extremely high-quality joint casting quickly and securely. The material can also be used with VS<sup>®</sup> rail systems.

## Joint filling mortar



- Plastic and stable in the joint without formwork
- Less preparatory work is required
- Mixing and conveying can be done in one step
- Pump conveying to the joint

PFEIFER VS<sup>®</sup> Rail Systems have an optimised profile without unfavourable recesses. It is therefore possible to use a mortar that is plastic/thixotropic and that stands in the joint independently. The big advantage of this is that only very little formwork is needed here. This technology offers significant savings, particularly on large building sites with many metres of joint.

## VS® rail system joints with grouting material

### Information and tips

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. The specially developed grouting materials have proven their suitability in combination with the PFEIFER VS® rails system in elaborate tests. These grouts are approved within the framework of the building authority approvals.

### Grout characteristics

- ✓ Highly free flowing
- ✓ Shrinkage-compensated
- ✓ Resistant to frost and de-icing salt
- ✓ Can be pumped with mixing and feed pumps
- ✓ Corrosion-resistant
- ✓ Production certified to DIN ISO 9001
- ✓ Supplied as a bagged product (bags of 25 kg)

### Mixing

The material is delivered as a ready-to-mix product and only needs to be mixed with water according to the instructions printed on the packaging. The material is then immediately ready to use.

### Casting the joint

The grout is poured in continuously until the desired level (max. 3.54 m) is reached. The formwork must be able to absorb the stress that arises from this. Compacting is not necessary. Degassing by poking with the reinforced concrete steel bar or the fitting of a vibrator is, however, recommended. The grout bonds very quickly and allows rapid continuation of work. After the corresponding bonding times, the joint can be loaded to the permitted scope.

### Consumption

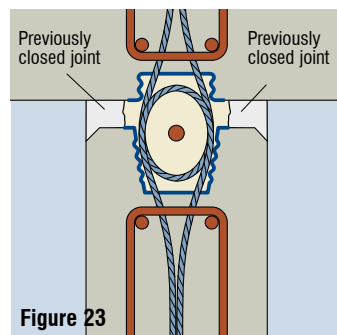
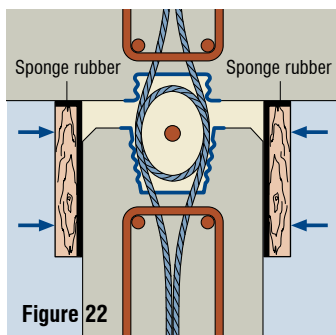
The PFEIFER Suite dimensioning software works out the grout volume for the selected grouting joint with the real quantities and masses of the project entered, displays the number of sacks for this.

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

**Table 6 – casting volume in case of standard joint (2 cm)**

	Wall thickness [cm]					
	14	16	18	20	22	24
VS® T20/T50	6.68	7.08	7.48	7.88	8.28	8.68
VS® W50	8.50	8.90	9.30	9.70	10.10	10.50

Amount in l/m for standard joint 2 cm;  
approx. 2 kg of material are required per l



### Joint formwork variants

#### 1. Board formwork (Figure 22)

In order to completely fill joints between precast elements, a shuttering board 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. If the shuttering boards are correctly fixed and it is assured that the grout material cannot escape, the joint can be filled as described in the section entitled "Filling the joint". After the material has hardened the formwork can be removed, cleaned and reused.

#### 2. Mortar seal (Figure 23)

Another variant makes it possible to close the joint flanks with a mortar. After this mortar has hardened, the core of the joint can be filled with grouting material and the higher performance of the systems can be achieved.

#### 3. VS® FDS air tube form (Figure 24)

The air tube form consists of two 4 m-long air tubes. These are very slightly pumped and pressed into the joint slot, so that the casting space of the loops is not adversely affected. After the air tube is applied over the entire joint height, the air tubes are brought to the nominal pressure and the joint is sealed. Now the joint can be cast from above across the entire height of 3.54 m. After the grout has hardened, the air pressure can be released and the air tube removed. After cleaning, it can be used again.

#### 4. Sealed compriband (Figure 25)

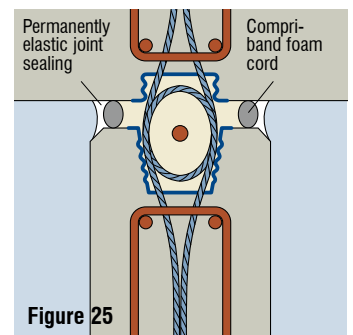
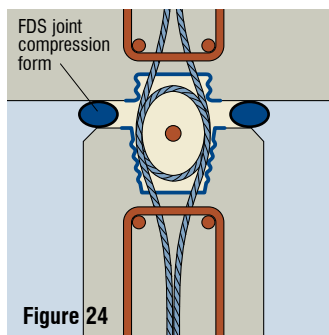
Another way to cast the joints with a grout is the variant sketched in Figure 25. In this case, prior to casting, a foam cord/compriband is inserted into the joint in a defined manner, after which a permanently elastic jointing is applied.

After the joint sealing has completely hardened on both sides, the grout can be used without additional formwork measures. However, the stresses that occur during casting must be taken into account here.

These should be determined by the construction company and the appropriate casting sections selected so that any squeezing out of the joint sealing is prevented.



**Caution:** When the air tube form or precompressed tapes are pressed into the lateral joints without adversely affecting the casting space, the effective lateral concrete cover for the rails and for the rope loop is reduced. The residual cross-section must be at least 14 cm.



## VS<sup>®</sup> rail system joint with plastic/thixotropic joint filling mortar

### Information and notes

The advantage of the joint filling mortar is the filling of joints between precast elements, where formwork can mostly be dispensed with. 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. The approval for the VS<sup>®</sup> System<sup>3b</sup> covers tensile and transversal shear forces acting both in parallel and vertically in relation to the joint.

### Mortar characteristics

- ✓ Non-shrinking with gel-type consistency
- ✓ Ease of production
- ✓ Can be pumped with commercially available screw pumps
- ✓ High initial and final hardening strengths
- ✓ Frost and de-icing salt resistant
- ✓ Impermeable to water
- ✓ Low water/cement ratio
- ✓ Production certified to DIN ISO 9001
- ✓ Externally and internally monitored
- ✓ Supplied as a bagged product (bags of 25 kg)

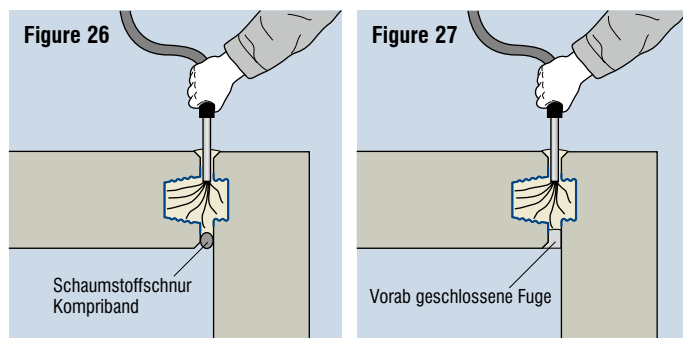
### Mixing

The ready-to-use mortar supplied only needs to be mixed to a usable material by adding water. It is imperative to follow the mixing instructions on the bags.

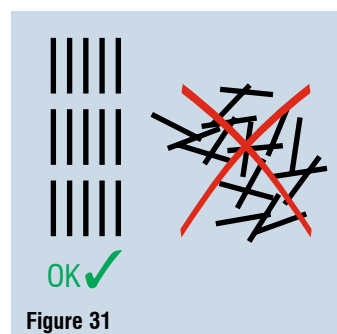
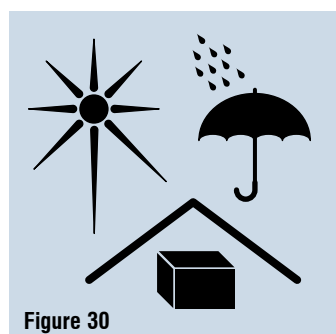
### Joint filling

First completely close off one joint flank using foam cord, profiled rubber (Figure 26) or alternatively using JOINT FILLING MORTAR (Figure 27). After closing with joint filling mortar, wait for the mortar to become stiff. 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

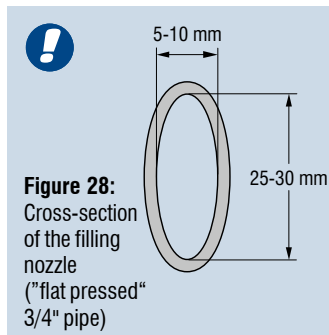


### Storage



### Nozzle manufacture

The filling nozzle, made of commercially available 22 mm (3/4") copper heating pipe (with the aid of a solder fitting for connecting to the pump air tube), can be attached (Figs 28 and 29).



**Notice:** This information only applies to placing the material in the joint!

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

### Qualification

Suitable machinery and instructed personnel are important for the quality and efficiency of the mortar system.

If necessary, enquiries regarding instruction can be made at any time to the mortar manufacturers.

# PFEIFER



The contact details of our locations and sales partners can be found at



[www.pfeifer.info/contacts-cls](http://www.pfeifer.info/contacts-cls)

We look forward to hearing from you!

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