

Our ingredient for your wall connection



04/2021



FS Box LIGHT

**PFEIFER
SEIL- UND HEBETECHNIK
GMBH**

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

PHONE Technical +49 83 31-937-345
 Sales +49 83 31-937-231

FAX +49 83 31-937-342

E-MAIL export-bt@pfeifer.de

INTERNET www.pfeifer.info

Contents

| | |
|--|----------|
| FS Box LIGHT advantages | 2 |
| FS Box LIGHT technical data | 3 |
| System description and application | 4 |
| Dimensioning | 5–6 |
| Reinforcement details and minimum dimensions | 7 |
| Installation and assembly instructions | 9 |

MORE EFFICIENT. LIGHTER. TASTY.

+ Application

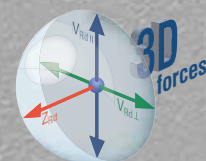
- Application for cast in-situ concrete connections
- Flexible and with a wide range of applications:
 - Precast element/double wall
 - Precast element/cast in-situ concrete
 - Semi-precast element/double wall
 - Cast in-situ concrete/double wall
 - Cast in-situ concrete/cast-in-situ concrete

+ Flexible & easy

- Flexible wire rope loop system
- No rigid rebending connections
- No bending effort
- No risk of injury
- Loop jumps automatically into the intended position
- Any configuration can be achieved
- Timesaving – easy to install

+ Efficient

- High design resistances in all directions
- Robust wire rope loops – perfectly designed for use with in-situ concrete
- Approved system **ETA 20/0785**



FS-Box LIGHT



PFEIFER

Connecting
FS Box

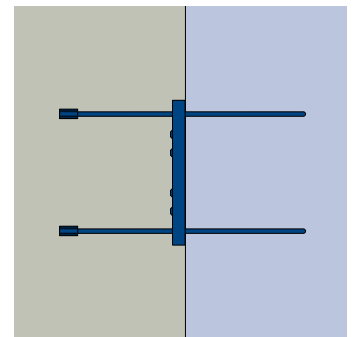
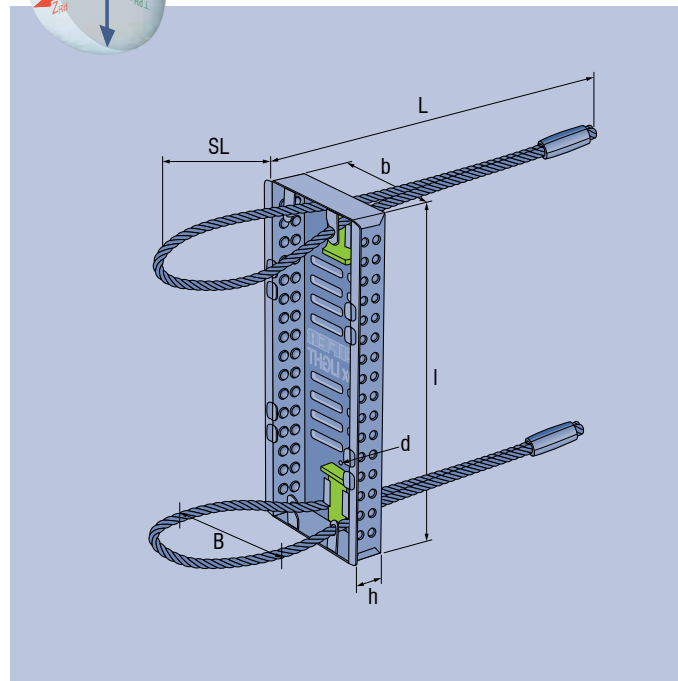
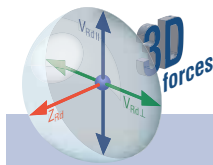
The PFEIFER FS Box LIGHT is installed as a connecting element in cast in-situ concrete structural elements, in steel reinforced semi-precast elements or in completely precast elements. The box is intended to transmit forces from static and quasi-static loads.

Advantages:

- Robust steel box
- Non-directional installation necessary
- High design resistances (see following pages)

Materials:

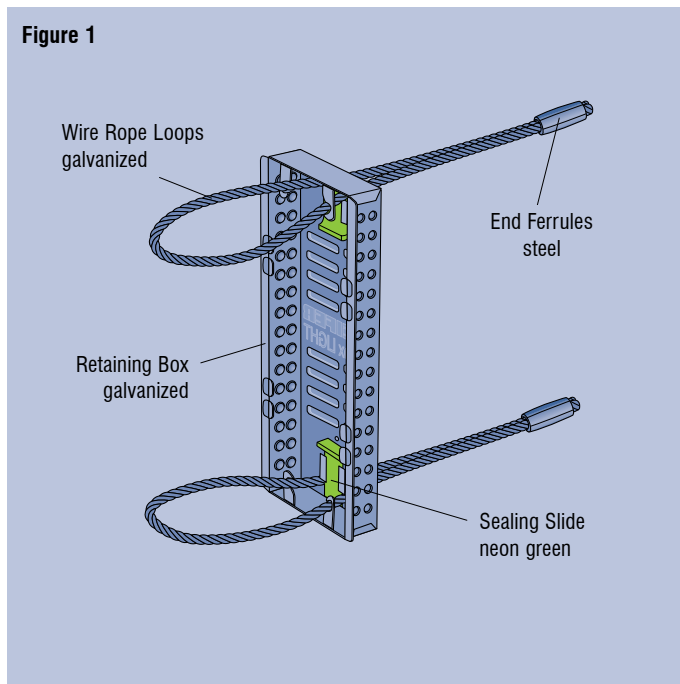
Box: Steel sheet, galvanized
Steel rope: high-strength, galvanized
Ferrule: Special quality steel
Loop cover: Tape



| Ref. no. | Type | Dimensions [mm] | | | | | | | Colour clip | Weight approx. [kg/piece] |
|----------|--------------|-----------------|-----|----|---|-----|-----|----|-------------|---------------------------|
| | | b | I | h | d | L | SL | B | | |
| 378521 | FS-Box LIGHT | 80 | 220 | 25 | 3 | 217 | 100 | 75 | Neon green | 0,45 |

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



The PFEIFER FS System is intended to be used for connecting cast in-situ concrete elements. The unfolded wire rope loop protrudes into in the wall to be connected. In combination with a centrally inserted reinforcement bar and the subsequent concreting on the construction site, a load bearing connection can be manufactured.

Can be used in various concrete structural elements and for connecting:

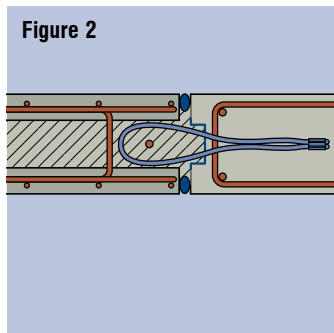
- Precast element/ semi-precast element
- Precast element/ cast in-situ concrete
- Semi-precast element/ semi-precast element
- Cast in-situ concrete/ semi-precast element
- Cast in-situ concrete/ cast-in-situ concrete

Delivered taped with fabric tape, wire rope loops embedded into retaining box.

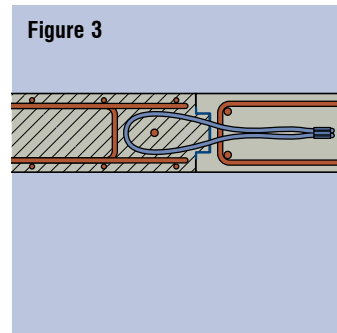
Use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

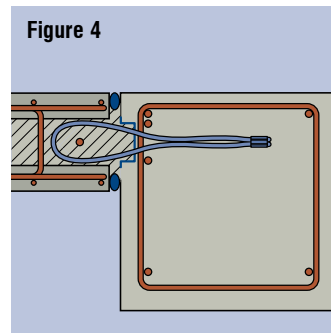
Standard:



Standard precast element – semi-precast element






Standard precast element – cast in-situ concrete

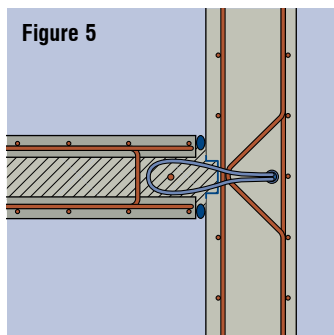


Standard column – semi-precast element (also possible: column – cast in-situ concrete)

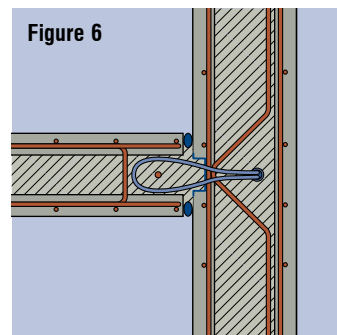
Captions:

-  = Cast in-situ concrete/ precast element (concreted first)
-  = Cast in-situ concrete addition
-  = Double wall

Use with angled wire rope loops:



T-joint precast element – semi-precast element (also possible: precast element – cast in-situ concrete)

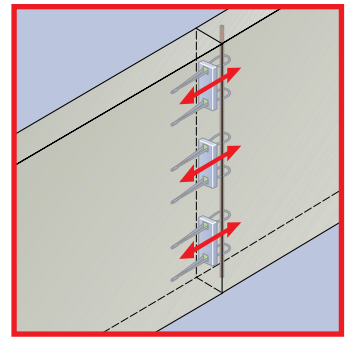


T-joint semi-precast element – semi-precast element (also possible: semi-precast element – cast in-situ concrete)

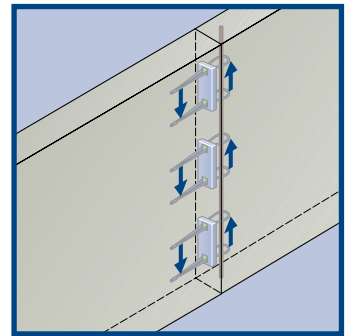
Apart from the layouts shown wall-wall corner connections can also be implemented.



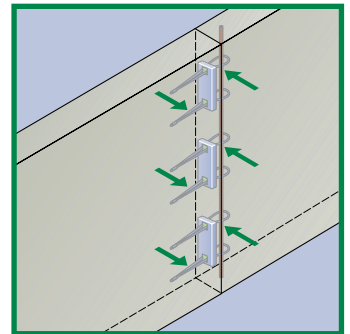
- **Planned tensile load Z_{Rd}**
- Can be used for wall thickness from 140 mm
- Flexible and user-defined spacing – according to the requirements



- **Transversal shear force $V_{Rd,II}$ parallel building authority regulated**
- High transfer of transversal shear forces thanks to interlock in the box
- Robust transversal shear force model with two loops



- **Transversal shear force $V_{Rd,I}$ vertically approved**
- From a wall thickness of 140 mm
- Design resistances available for highly varied concrete strengths and wall thicknesses



Design resistances

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

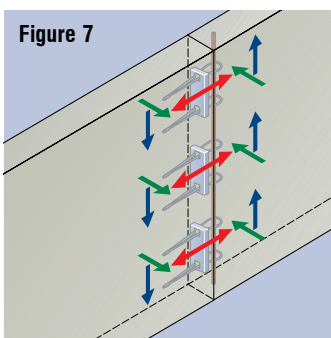


Table 1: Design resistances for FS Box LIGHT

| Wall thickness [mm] | Tensile force capacity Z_{Rd} [kN/Box] | | Transversal shear force carrying capacity parallel $V_{Rd,II}$ [kN/Box] | | Transversal shear force capacity vertical $V_{Rd,I}$ [kN/Box] | |
|---------------------|--|---------|---|---------|---|---------|
| | Standard | angled* | Standard | angled* | C 25/30 | C 30/37 |
| 140 | 35 | 18 | 45 | 25 | 9,00 | 10,00 |
| 160 | 35 | 18 | 45 | 25 | 12,00 | 12,00 |
| 180 | 35 | 18 | 45 | 25 | 12,00 | 12,00 |
| 200 | 35 | 18 | 45 | 25 | 12,00 | 12,00 |
| 220 | 35 | 18 | 45 | 25 | 12,00 | 12,00 |
| 240 | 35 | 18 | 45 | 25 | 12,00 | 12,00 |

* Use with angled wire rope loops

Prerequisites:

- Minimum concrete strength C 25/30 in both structural elements
- Maximum aggregate size – 16 mm
- Consistency not less than F4 (acc. to DIN EN 206-1:2001-07)
- For predominantly static loads



Notice:

Further detailed information on dimensioning can be found in the approval Z-21.8-2106.

Proof of parallel shear forces

$$\frac{V_{Ed, II}}{V_{Rd, II}} \leq 1$$

$V_{Ed, VII}$ [kN/Box]: Transversal shear force acting parallel to the joint
 $V_{Rd, II}$ [kN/Box]: Dimensioning value of transversal shear force carrying capacity parallel to the joint

Proof of perpendicular shear forces

$$\frac{V_{Ed, \perp}}{V_{Rd, \perp}} \leq 1$$

$V_{Ed, \perp}$ [kN/Box]: Transversal shear force acting perpendicular to the joint
 $V_{Rd, \perp}$ [kN/Box]: Dimensioning value of transversal shear force carrying capacity perpendicular to the joint

Proof of tensile forces/interaction

Standard use:

$$Z_{Rd} \geq Z_{Ed, VII} + Z_{Ed, V \perp} + Z_{Ed, N}$$

wherein: $Z_{Ed, VII} = 0,78 \cdot V_{Ed, II}$

and: $Z_{Ed, V \perp} = 0,5 \cdot V_{Ed, \perp}$

Z_{Rd} [kN/Box]: Dimensioning value of tensile force capacity per FS Box LIGHT according to Appendix 7, Table 1
 $Z_{Ed, N}$ [kN/Box]: Central acting tensile force (per box)
 $Z_{Ed, VII}$ [kN/Box]: Acting tensile force components from transversal shear force parallel to the joint
 $Z_{Ed, V \perp}$ [kN/Box]: Acting tensile force components from transversal shear force perpendicular to the joint

Use with angled wire rope loops:

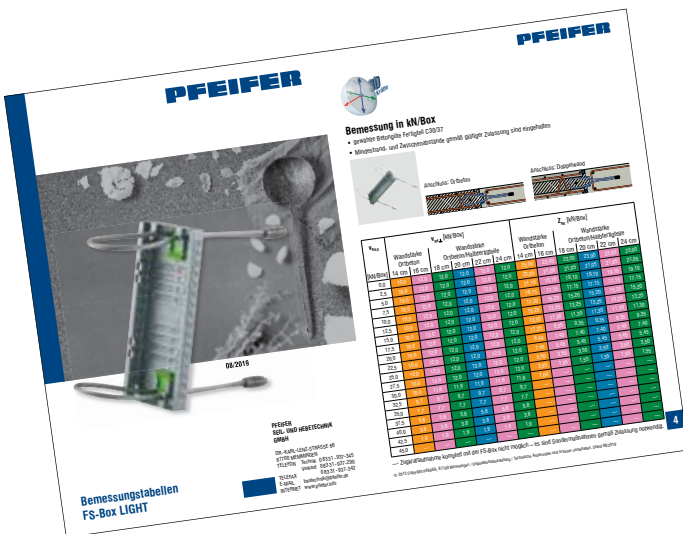
$$Z_{Rd} \geq Z_{Ed, VII} + Z_{Ed, V \perp} + Z_{Ed, N}$$

wherein: $Z_{Ed, VII} = 0,72 \cdot V_{Ed, II}$

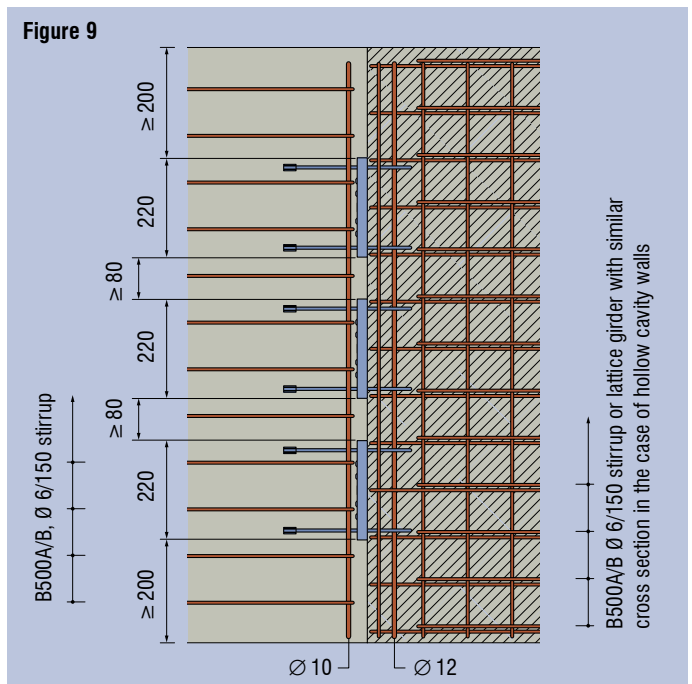
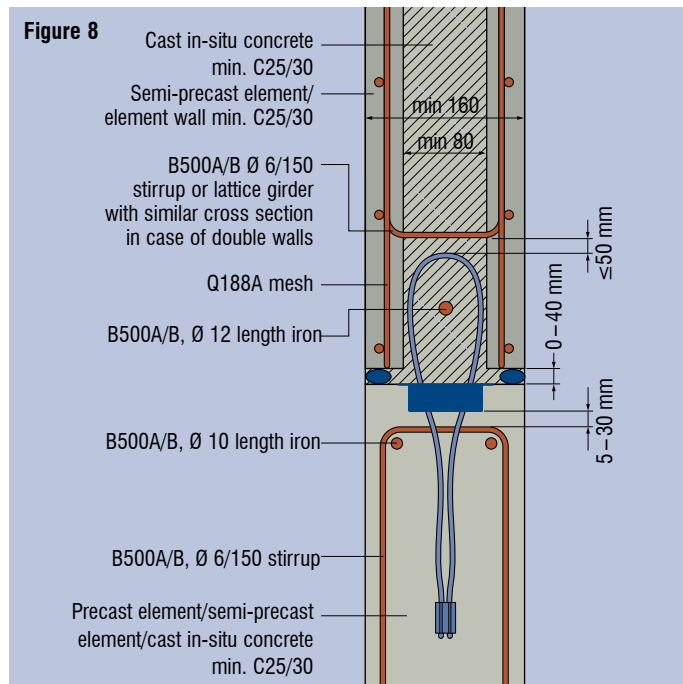
and: $Z_{Ed, V \perp} = 0,25 \cdot V_{Ed, \perp}$

Simplest dimensioning with the dimensioning tables for the FS Box LIGHT.

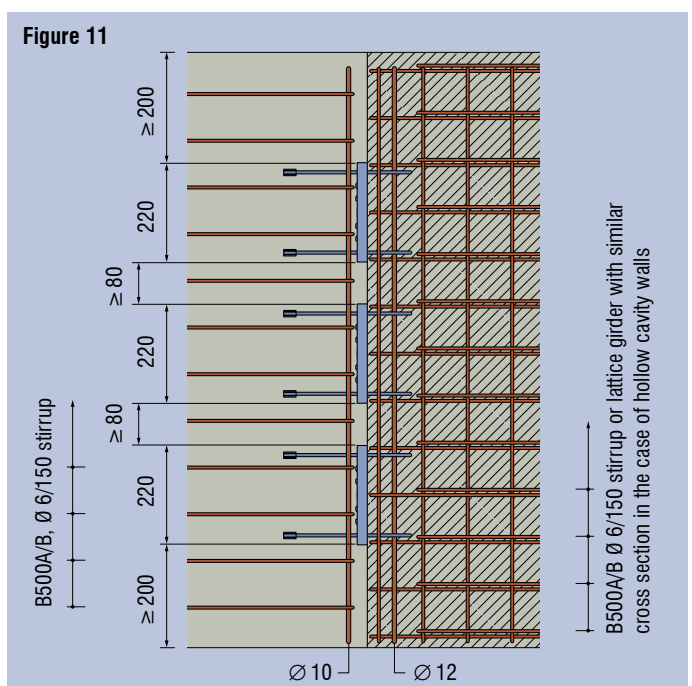
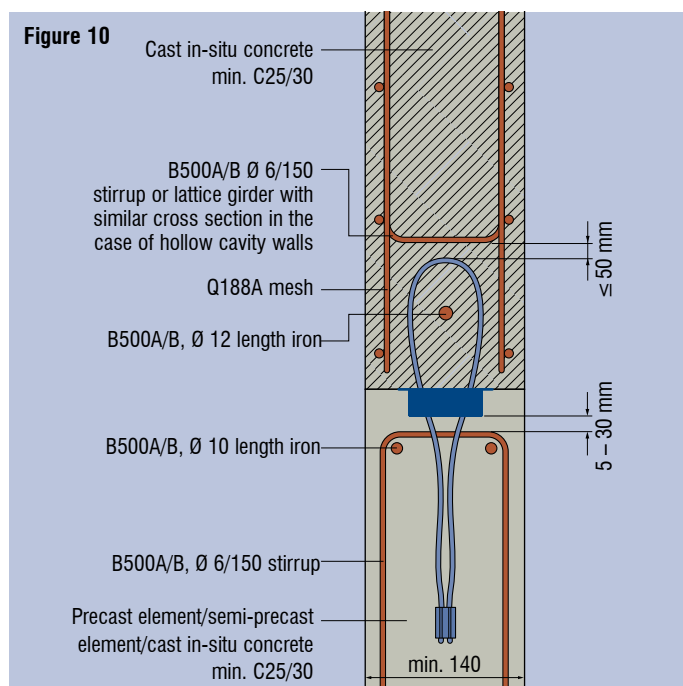
Dimensioning tables for the FS Box LIGHT
 Now at www.pfeifer.info/fs-box



Standard use precast element – semi-precast element:



Standard use precast element – cast in-situ concrete:

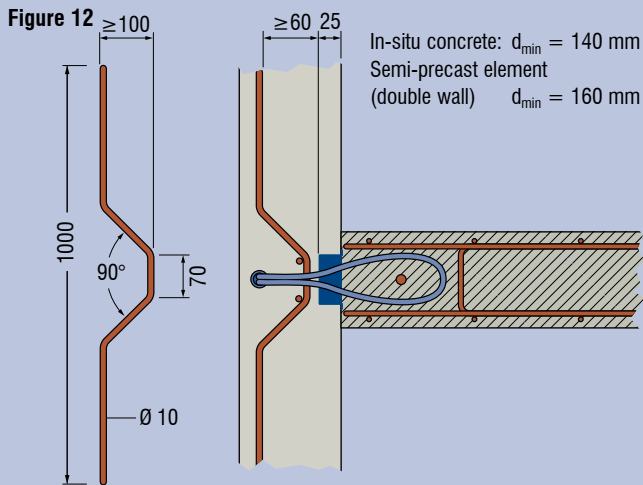


Notice:

Not all structural element reinforcements for transmitting the loads are shown or defined. They must be defined by the responsible planner! The drawings show the ideal position of the stirrups (back anchoring). The vertical arrangement of the stirrups between the wire rope loops is possible as an alternative!

Reinforcement details and minimum dimensions

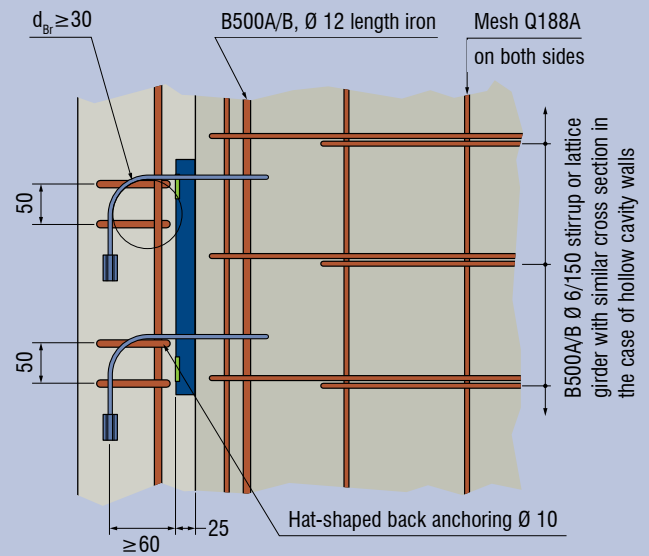
Use with angled wire rope loops for T-joint:



Caution:

It is essential to ensure proper installation of the 10 mm diameter stirrup. Particular attention must be paid to the positioning behind the box.

Figure 13



Use with angled wire rope loops for corner joint:

Figure 14

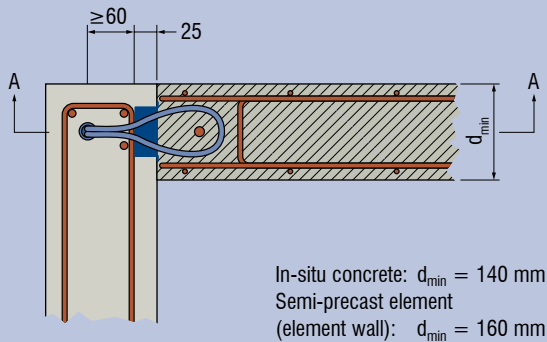
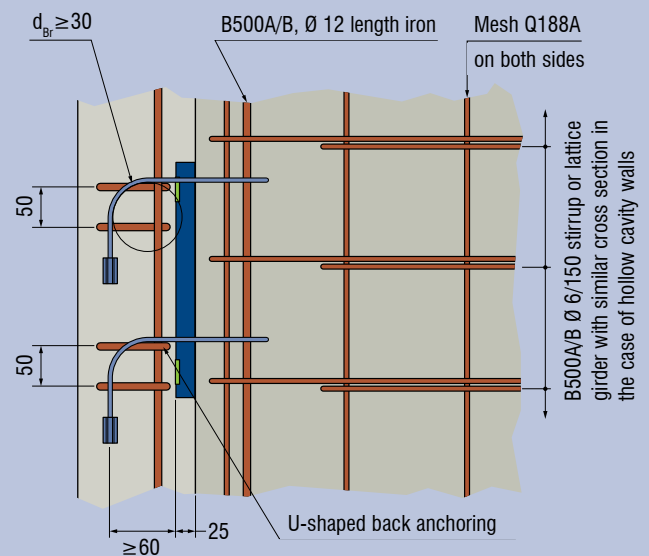


Figure 15

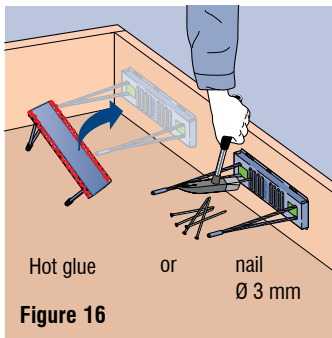


Notice:

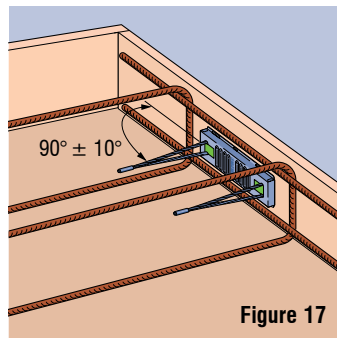
Not all structural element reinforcements for transmitting the loads are shown or defined. They must be defined by the responsible planner! The drawings show the ideal position of the stirrups (back anchoring). The vertical arrangement of the stirrups between the wire rope loops is possible as an alternative!

Installation/assembly

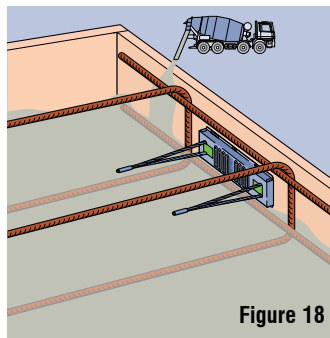
Precast plant:



Fasten FS Box LIGHT immovably to the formwork.

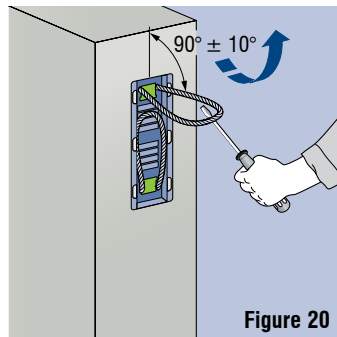
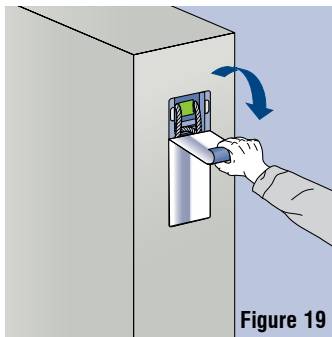


Install the additional reinforcement according to the appendices in the approval.



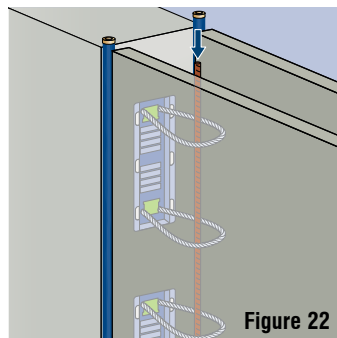
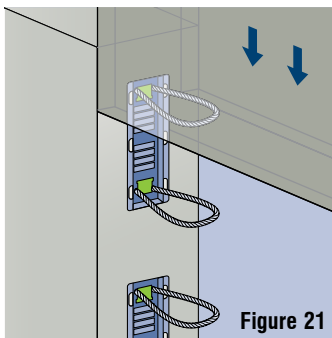
Pour in and compact the concrete carefully; do not move the built-in components.

Building site:



Notice:

Ensure correct latching of the rope loop in the recesses of the retaining box!



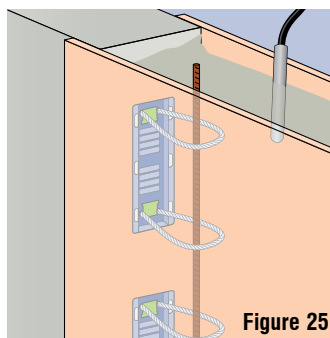
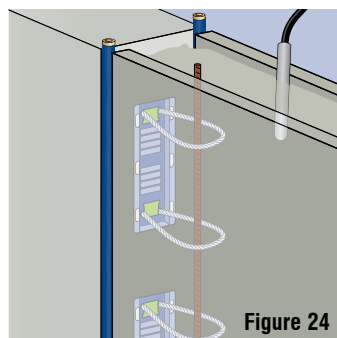
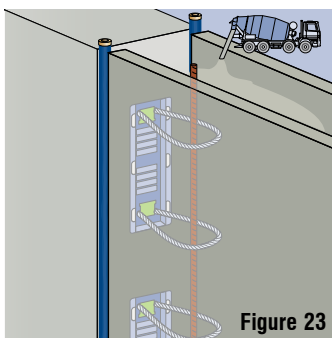
Caution:

Ensure that the wire rope loops are perpendicular to the surface (adjust if necessary without damaging them)! Incorrectly aligned loops reduce the design resistances!



Notice:

For the simple lateral sealing of joints during concreting we recommend PFEIFER FDS Joint Pressure Formwork!

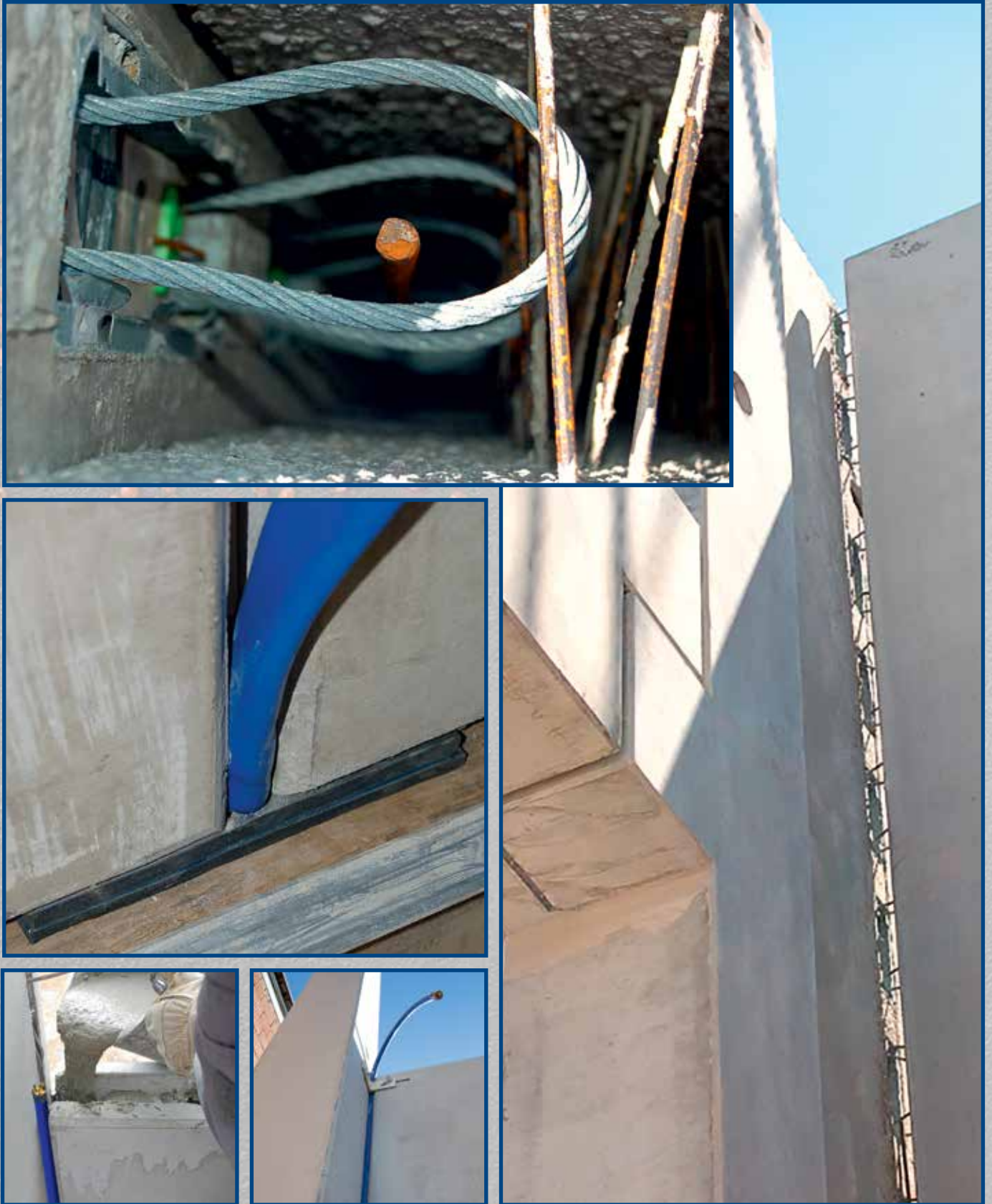


Notice:

Pour concrete carefully and compact without forcibly moving the loops!

Alternative in-situ concrete addition with formwork

Assembly and reference pictures



Notes



PFEIFER



Further information



www.pfeifer.info/fs-box-light

We look forward to hearing from you!

This document is superseded when
a new edition appears at www.pfeifer.info.

**PFEIFER
ROPE AND LIFTING
GMBH**

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

PHONE Technical
Support +49 83 31-937-345
Sales +49 83 31-937-231

FAX +49 83 31-937-342

E-MAIL export-bt@pfeifer.de

INTERNET www.pfeifer.info