



FS Box LIGHT

Dimensioning bases



PFEIFER

Application and dimensioning information

Use

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)

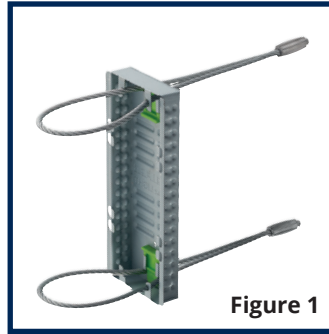


Figure 1

Standard

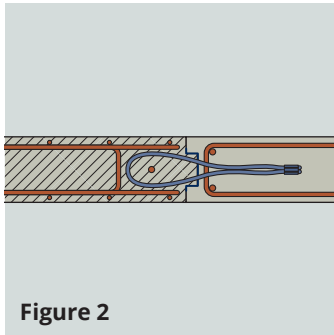


Figure 2

Standard precast element – semi-precast element

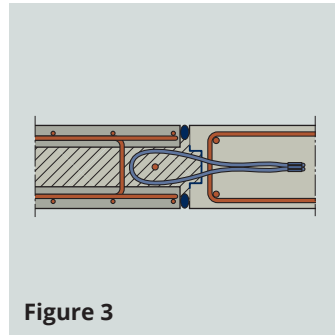


Figure 3

Standard precast element – cast in-situ concrete

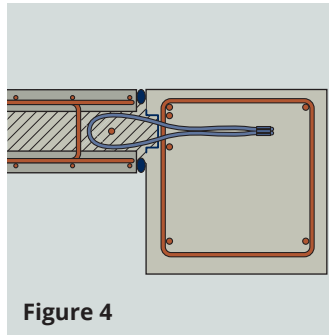





Figure 4

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

Legende:

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

Use with angled wire rope loops

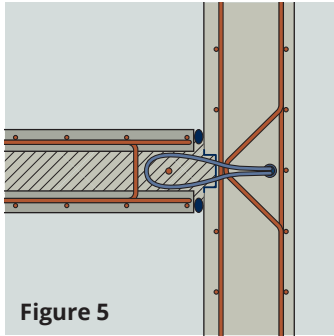


Figure 5

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

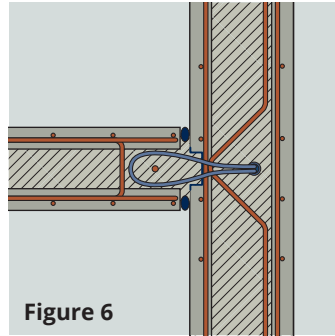
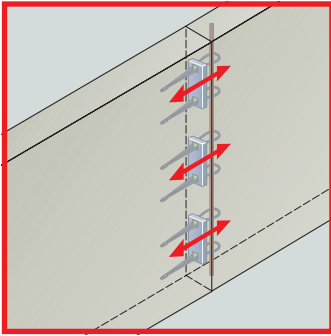


Figure 6

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

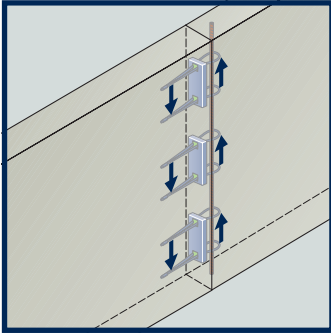
Apart from the layouts shown wall-wall corner connections can also be implemented.

Application and dimensioning information



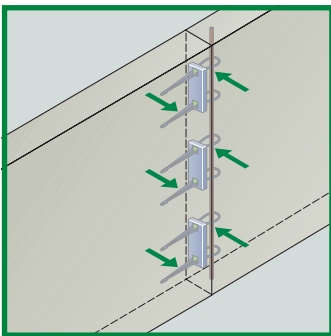
Planned tensile load Z_{Rd}

- 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 $V_{Rd,L}$ 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

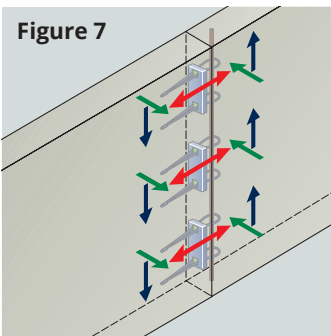


Figure 7

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 $V_{Rd,L}$ [kN/Box]	
	Standard	angled*	Standard	angled*	C 25/30	C30/37
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

Application and dimensioning information

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

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

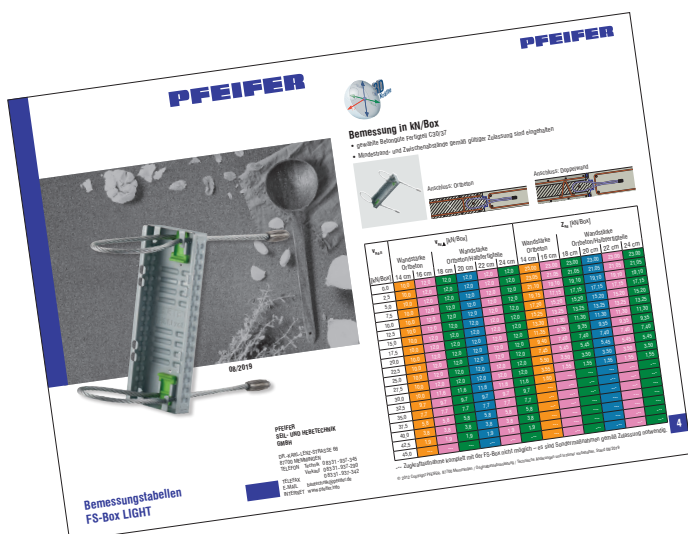
Z_{Rd} [kN/Box]: Dimensioning value of tensile force capacity per FS Box LIGHT according to Appendix 7, Table 1

$Z_{Ed, N}$ [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

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



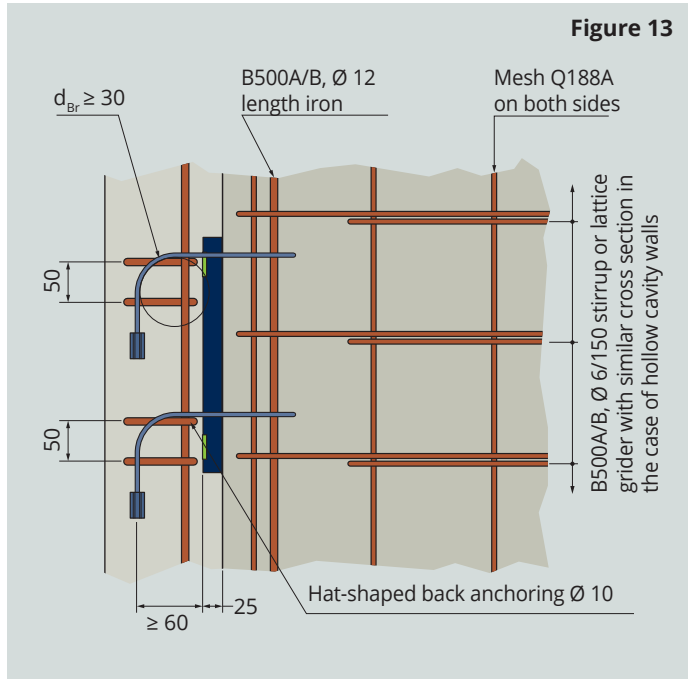
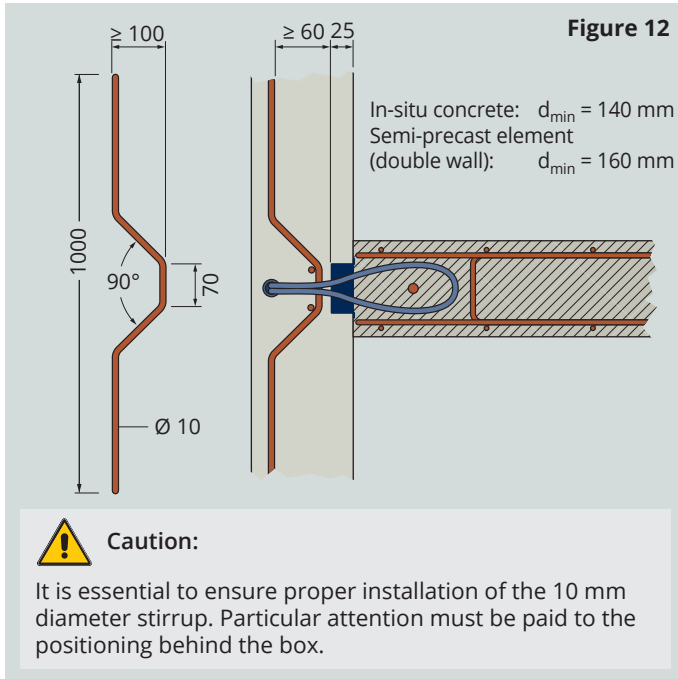
Dimensioning tables for the FS Box LIGHT

Now at
www.pfeifer.info/fs-box

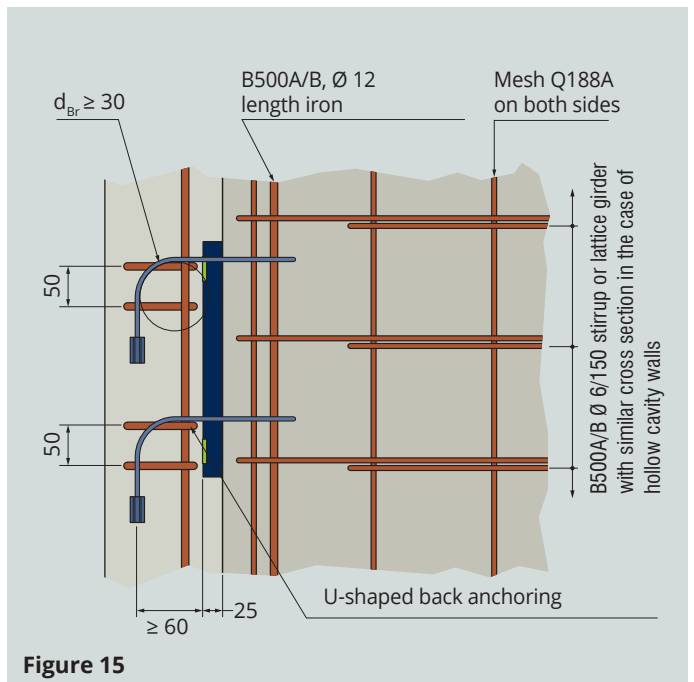
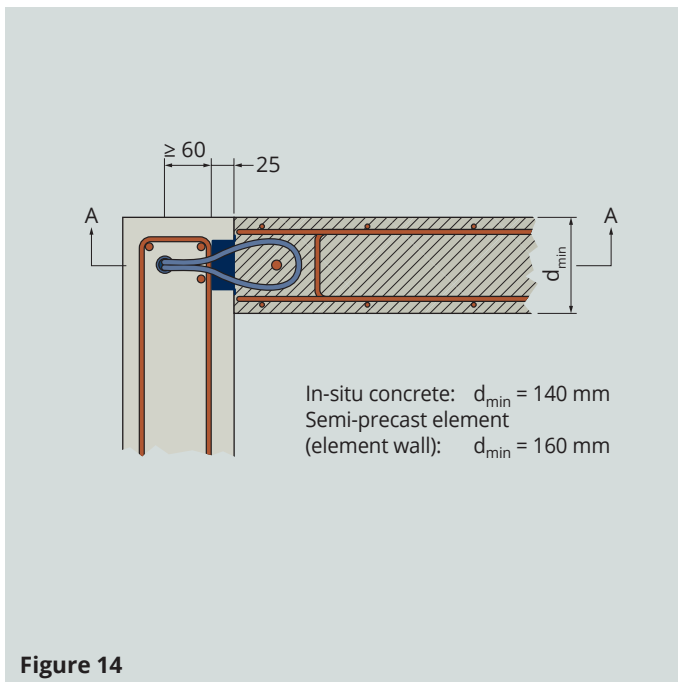


Application and dimensioning information

Use with angled wire rope loops for T-joint:



Use with angled wire rope loops for corner joint:

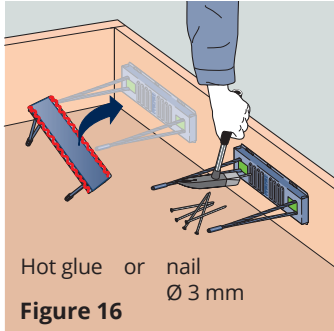


Notice:

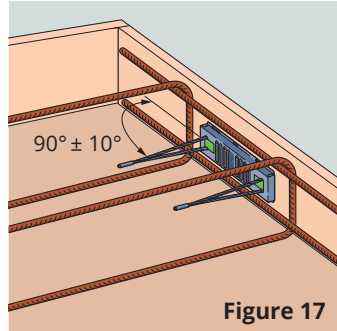
Not all structural element reinforcements for transmitting the loads are shown or defined. They must be defined by the responsible planner! The drawings show the ideal position of the stirrups (back anchoring). The vertical arrangement of the stirrups between the wire rope loops is possible as an alternative!

Application and dimensioning information

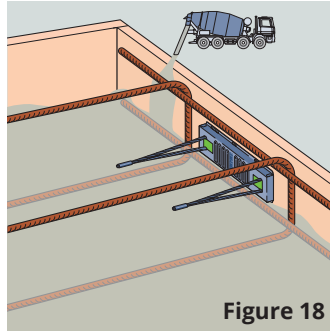
Precast plant



Fasten FS Box LIGHT immovably to the formwork.

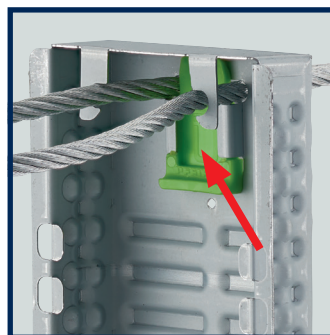
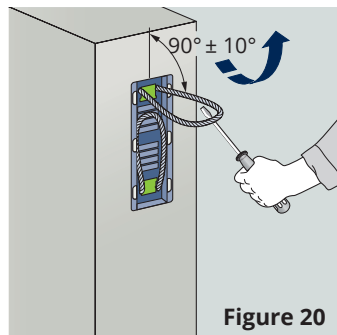
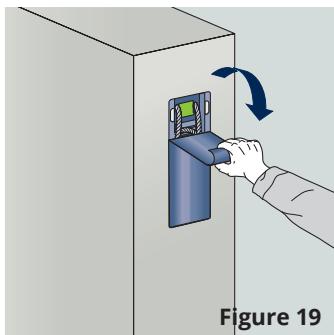


Install the additional reinforcement according to the appendices in the approval.

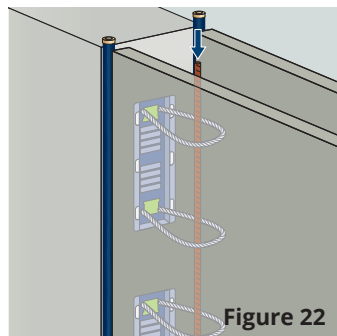
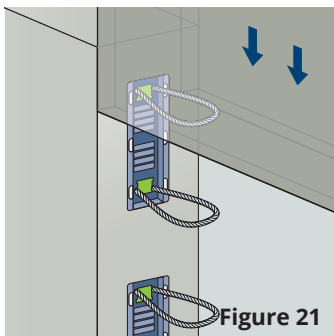


Pour in and compact the concrete careful; do not move the built-in components.

Building site

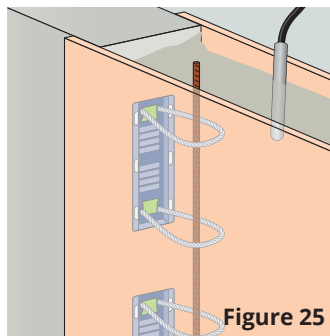
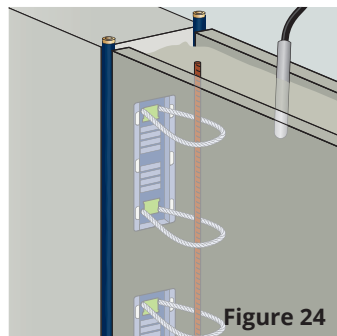
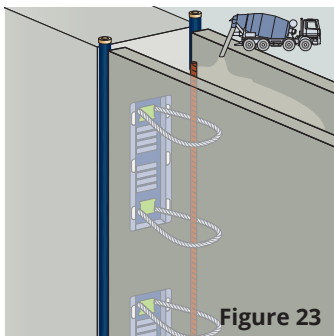


! Notice:
Ensure correct latching of the rope loop in the recesses of the retaining box!



! 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

DEUTSCHLAND

87700 Memmingen
+49 (0) 83 31937345
bautechnik@pfeifer.de

ÖSTERREICH

+43 (0) 72 24 66 224-70
austria-bt@pfeifer.de

SCHWEIZ

8934 Knonau
+41 (0) 447 68 5555
info@pfeifer-isofer.ch

www.pfeifer.info/bautechnik

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