

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-20/0785
of 9 December 2020

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

PFEIFER FS-Box LIGHT

Product family
to which the construction product belongs

Wire loop system for the connection of precast and in-situ
concrete elements

Manufacturer

Pfeifer Seil- und Hebeteknik GmbH
Dr.-Karl-Lenz-Str. 66
87700 Memmingen
DEUTSCHLAND

Manufacturing plant

Production Plants A/B/C

This European Technical Assessment
contains

18 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 332589-00-0601, Edition 09/2020

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Specific Part

1 Technical description of the product

The PFEIFER FS-Box LIGHT is a wire loop system and cast-in element, consisting of a box and two wire loops made of steel, for the connection of precast and in-situ concrete elements and used for load transferring.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the FS-Box LIGHT is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the FS-Box LIGHT of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Resistance under tension loading	See Annex C 1
Resistance under shear load 90°	See Annex C 2
Resistance under shear load 0°	See Annex C 3
Minimum edge distances, spacing and member thickness	See Annex B 2
Load combination factors for resistance under combined loading	See Annex C 4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD No. 332589-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

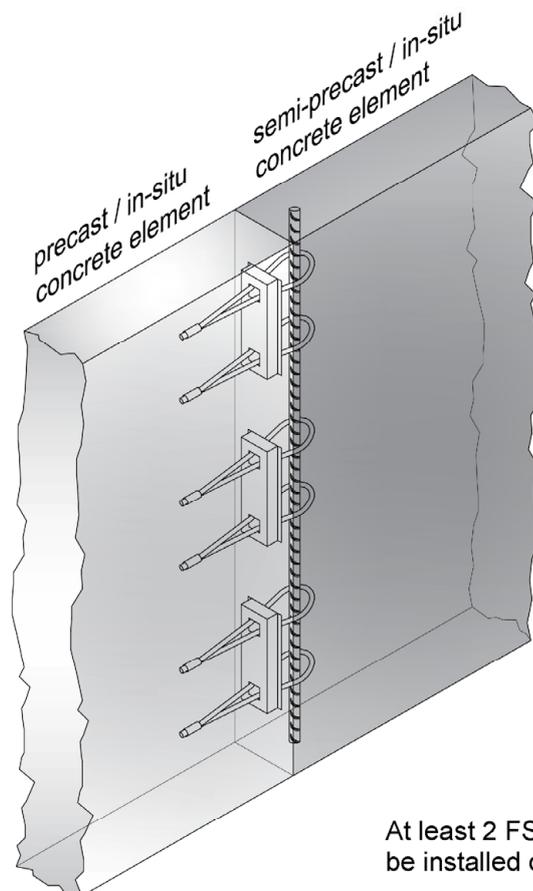
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 9 December 2020 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Tempel



At least 2 FS-Boxes LIGHT have to be installed one upon the other!

PFEIFER-FS-Box LIGHT

Product description
Installed condition

Annex A1

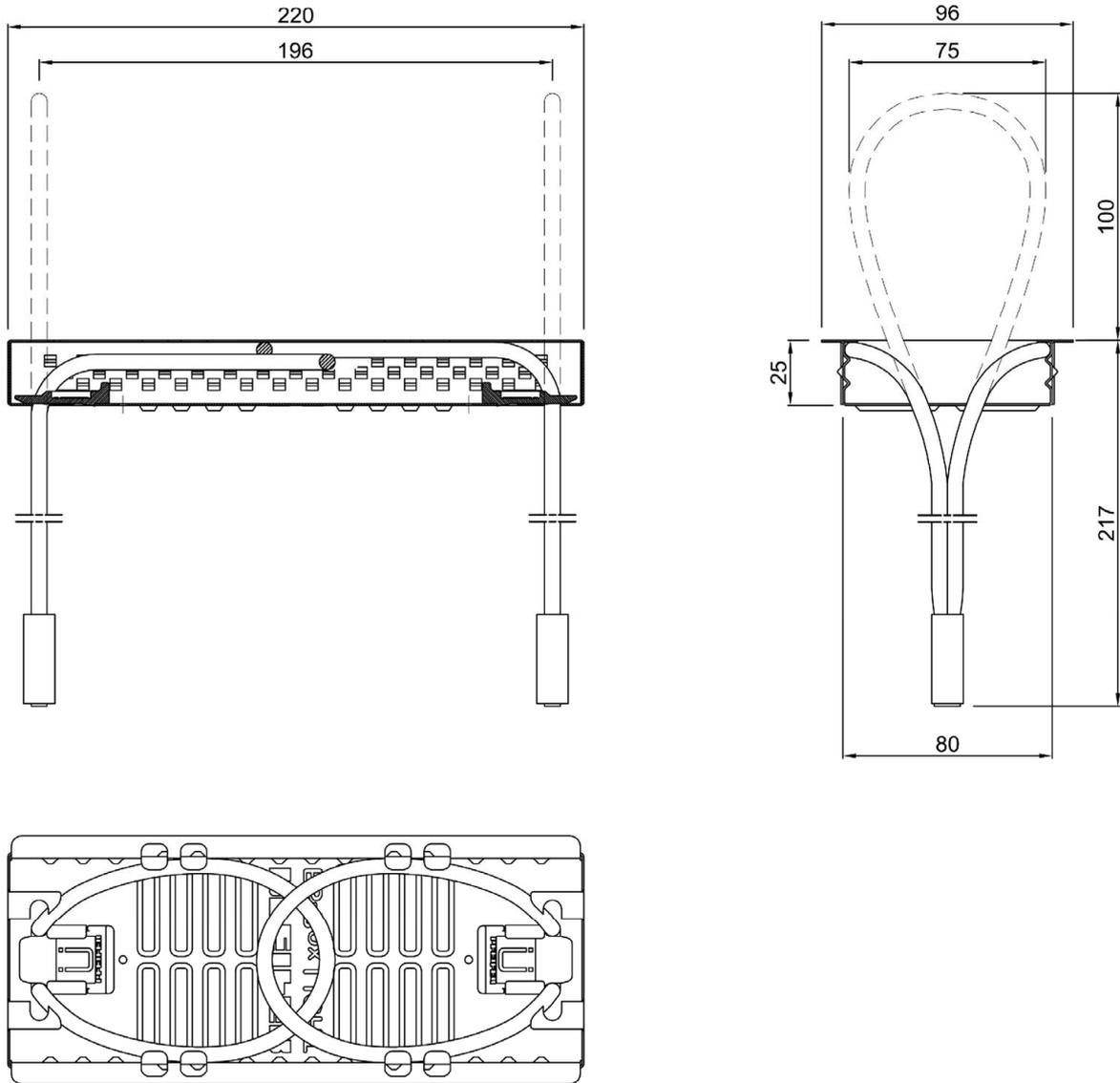


Fig. 1: Dimensions

PFEIFER-FS-Box LIGHT

Product description
Dimensions

Annex A2

Specification of intended use

Wire loop system subject to

- Static and quasi-static load

Base materials

- Reinforced concrete components (precast / semi-precast, in-situ) according to EN 1992-1-1:2004+AC:2010 made of compacted concrete without fibres, with a strength class in the range C25/30 to C50/60 and a maximum grain size of 16 mm according to EN 206:2013
- Cracked or uncracked concrete
- Minimum reinforcement according to Annex B3 – B6

Use conditions (Environmental conditions)

- FS-Boxes LIGHT are to be installed with concrete covering. EN 1992-1-1:2004 + AC:2010, section 4 applies for the verification of the concrete covering in combination with the exposure class related to the environmental requirement.

Design

- The anchorage design is carried out under the responsibility of an engineer experienced in the field of anchorages and concrete construction.
- Verifiable calculations and design drawings are made taking into account the loads to be anchored. In the design drawings the position of the anchorages as well as the required anchoring reinforcement are specified.
- The design of anchoring is carried out according to EOTA Technical Report TR 074:2020-04

Installation

- Installation of the wire loop system is carried out by appropriately trained workers according to the manufacturer's instructions (Annex B8 and B9)
- The installation stability (positioning) of the anchoring ends (pressed-on clamps) must be ensured by a suitable fixing to the reinforcement (tying wire).

PFEIFER-FS-Box LIGHT

Intended use
Specifications

Annex B1

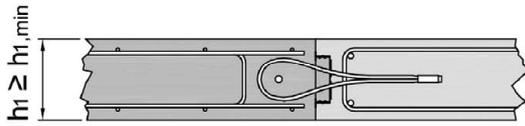


Fig. 2: Wall to wall connection

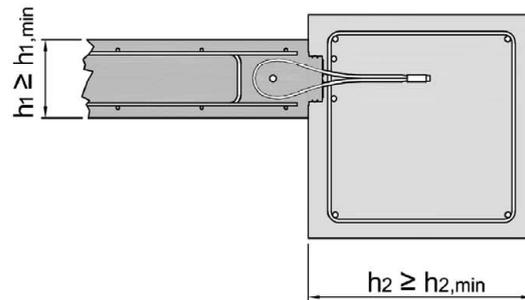


Fig. 3: Wall to column connection

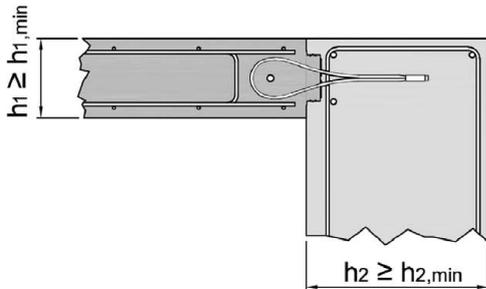


Fig. 4: Wall to wall corner-connection

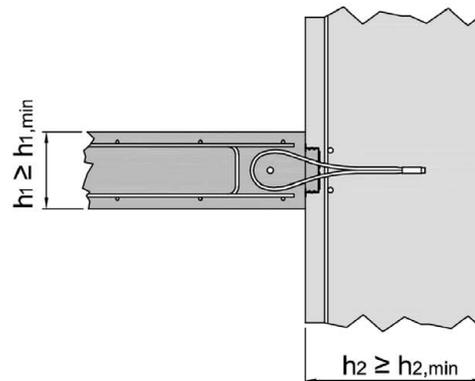


Fig. 5: Wall to wall T-connection

Table B1: **Component thickness, distances**

Minimum thickness of component to be connected Standard detail with in-situ concrete supplement (Annex B3)	$h_{1,min}$ [mm]	140
Minimum thickness of component to be connected Standard detail with precast/semi-precast concrete supplement (Annex B3)	$h_{1,min}$ [mm]	160
Minimum thickness of component	$h_{2,min}$ [mm]	240
Minimum edge distance (Annex B4)	$c_{1,min}$ [mm]	200
Minimum edge distance (Annex B3)	$c_{2,min}$ [mm]	30
Minimum spacing (Annex B4)	s_{min} [mm]	80

Note

All reinforcement intended to be used for the transmission of loads within the reinforced concrete component is not shown in the figures above. It has to be defined by the responsible engineer!

PFEIFER-FS-Box LIGHT

Intended use

STANDARD: Application range, component thickness, distances

Annex B2

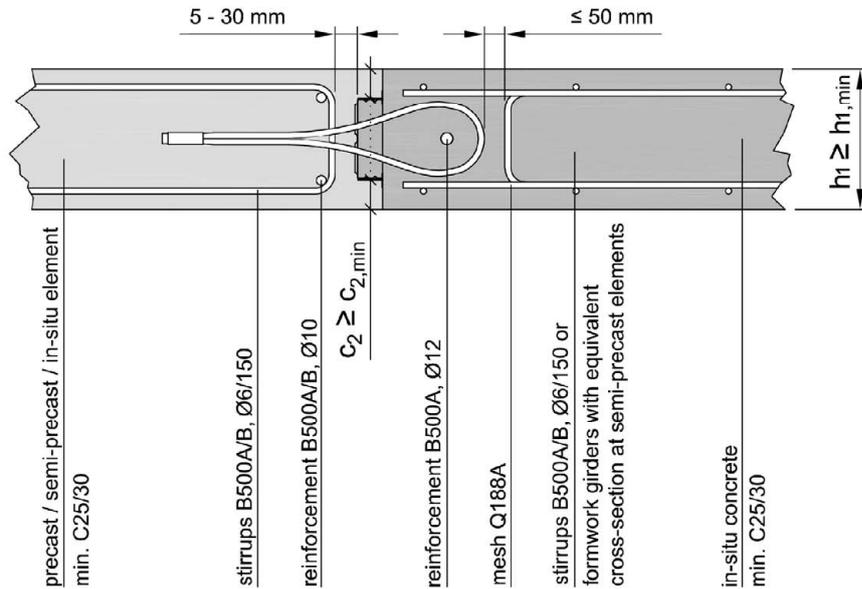


Fig. 6: Standard detail (cross section) with in-situ concrete supplement, reinforcement

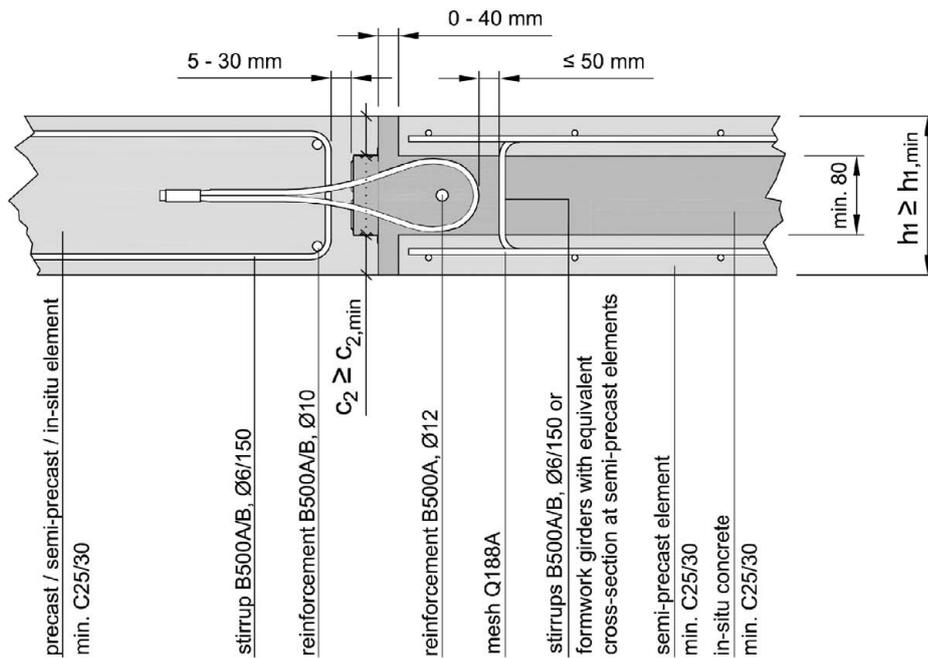


Fig. 7: Standard detail (cross section) with precast/semi-precast concrete supplement, reinforcement

Note

All reinforcement intended to be used for the transmission of loads within the reinforced concrete component is not shown in the figures above. It has to be defined by the responsible engineer!

PFEIFER-FS-Box LIGHT

Intended use
STANDARD: Cross section, dimensions, reinforcement

Annex B3

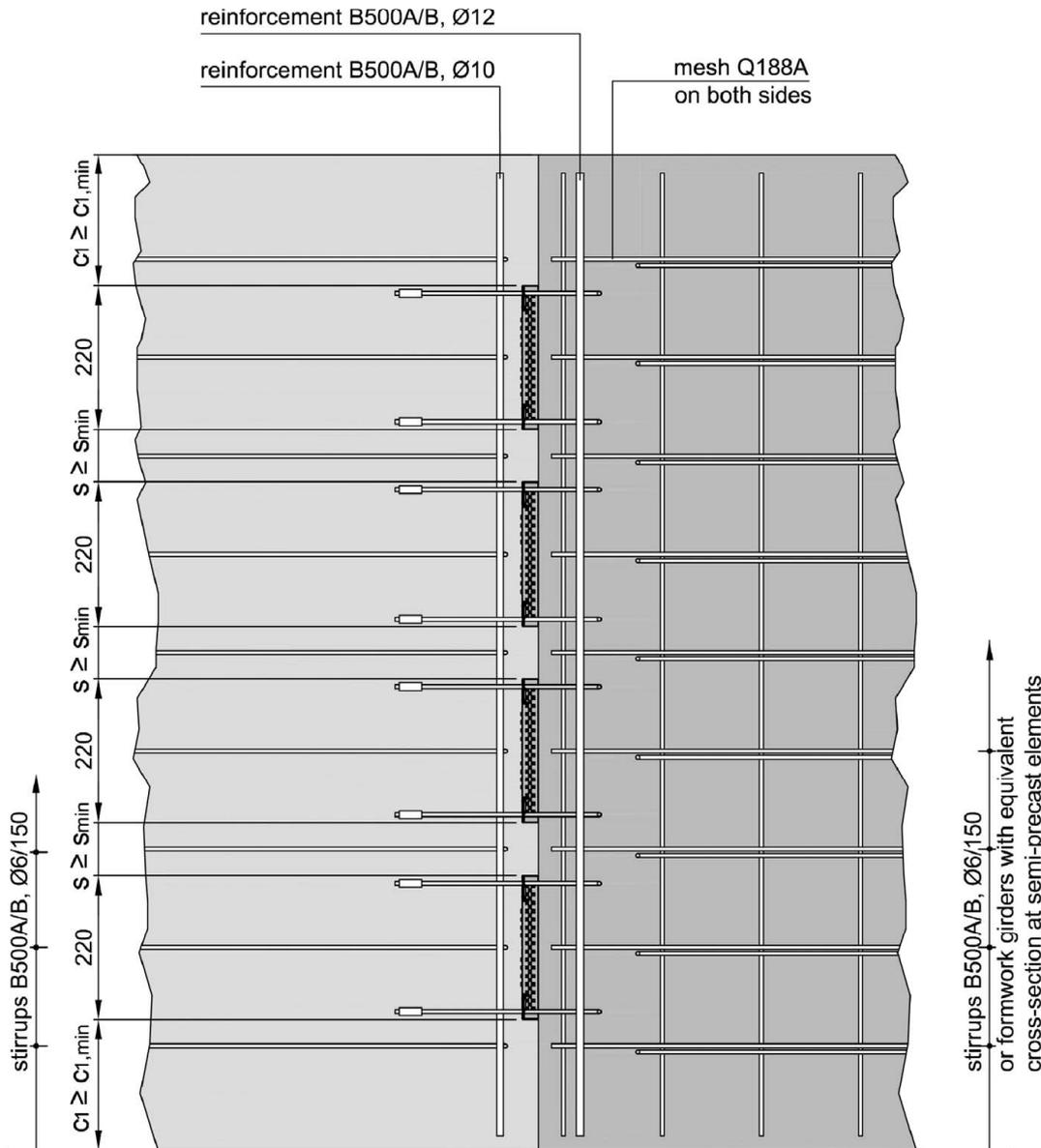


Fig. 8: Standard detail (longitudinal section)

Note

All reinforcement intended to be used for the transmission of loads within the reinforced concrete component is not shown in the figures above. It has to be defined by the responsible engineer!

The figure above shows the optimal position of the stirrups (anchorings). Alternatively their position in the vertical axis is also possible between the wire loops!

PFEIFER-FS-Box LIGHT

Annex B4

Intended use
STANDARD: Longitudinal section, distances, reinforcement

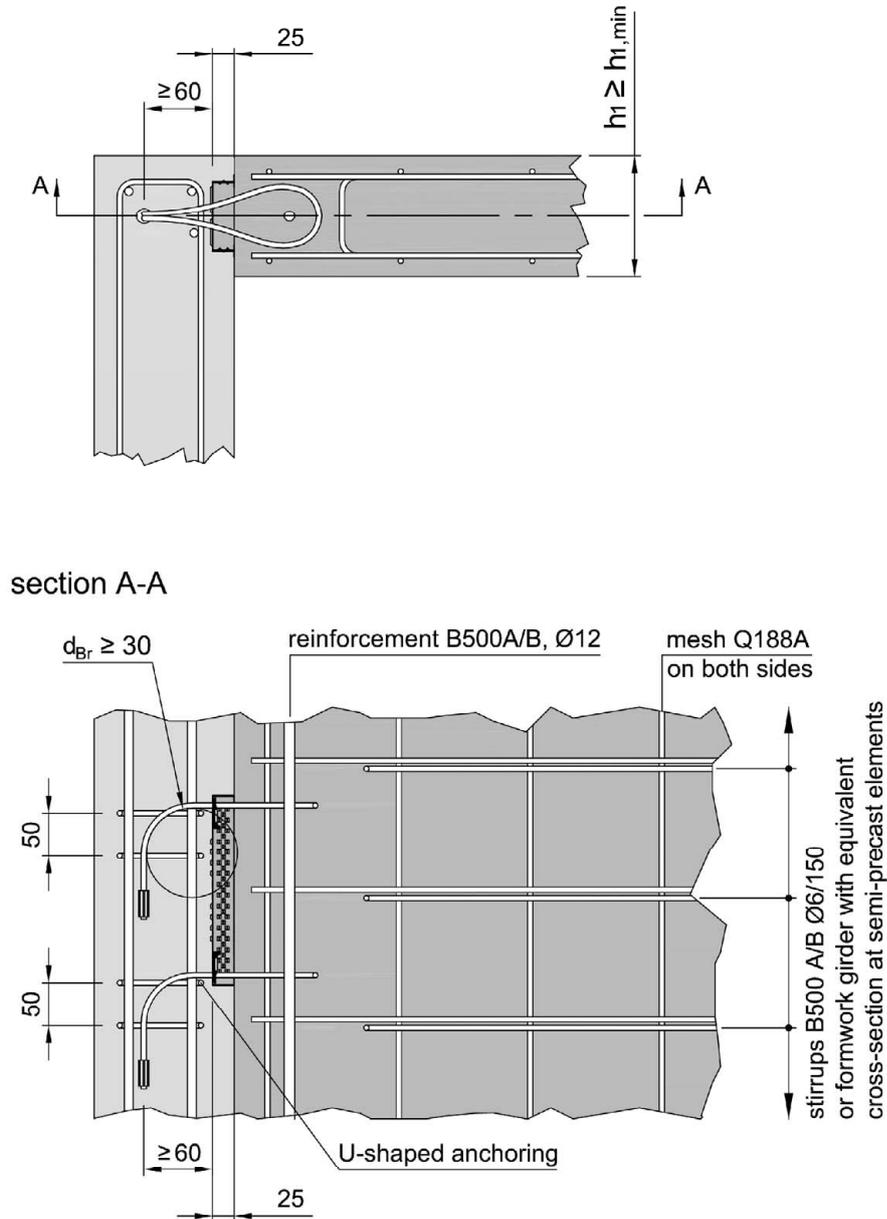


Fig. 9: Corner connection with angled wire loops, dimensions, reinforcement

Cross section: Annex B3
Edge distances and spacings: Annex B2 and B4

Note

All reinforcement intended to be used for the transmission of loads within the reinforced concrete component is not shown in the figures above. It has to be defined by the responsible engineer!

PFEIFER-FS-Box LIGHT

Annex B5

Intended use
Angled wire loop: Corner connection

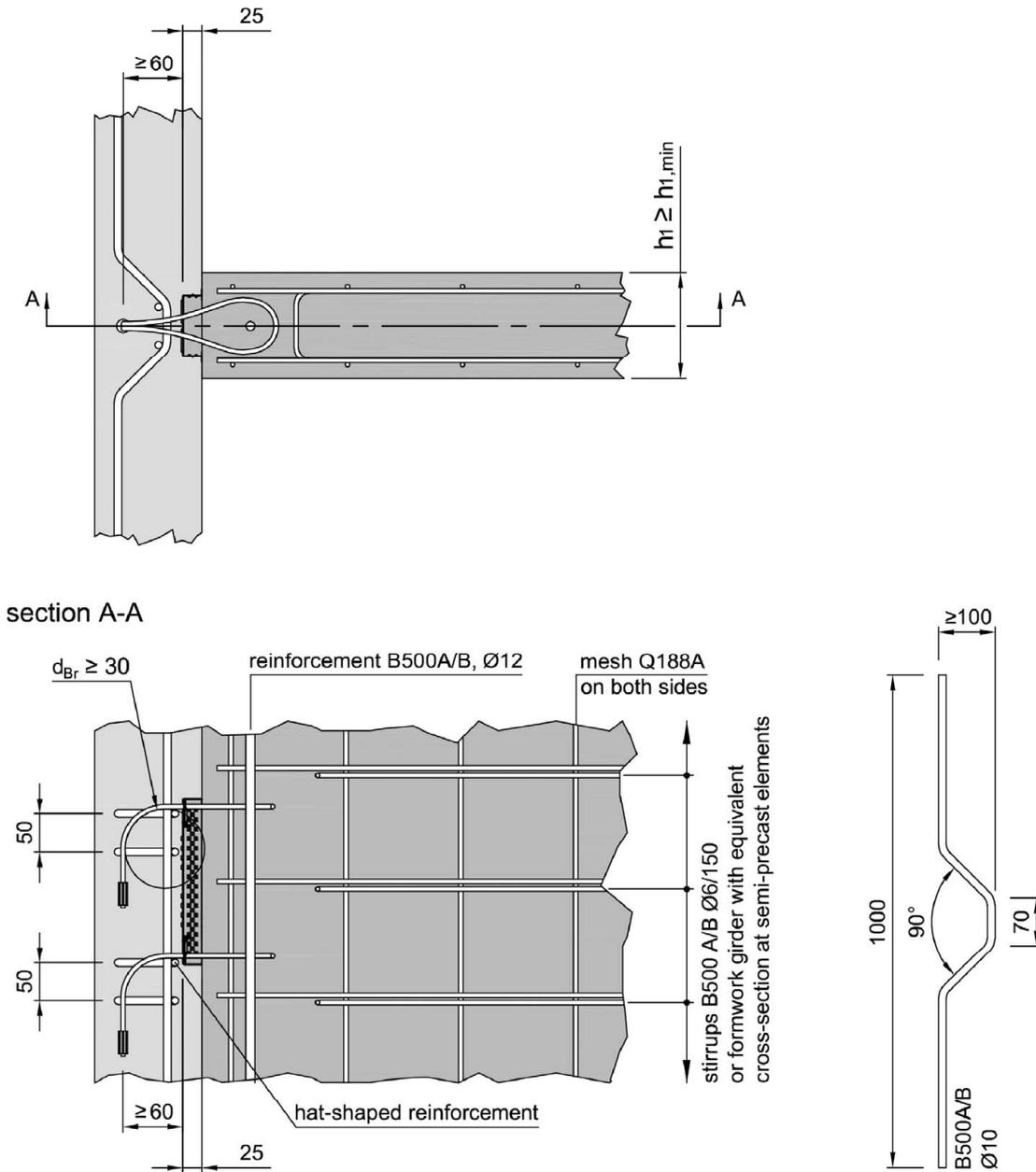


Fig. 10: T-connection with angled wire loops, dimensions, reinforcement

Cross section: Annex B3
Edge distances and spacings: Annex B2 and B4

Note

All reinforcement intended to be used for the transmission of loads within the reinforced concrete component is not shown in the figures above. It has to be defined by the responsible engineer!

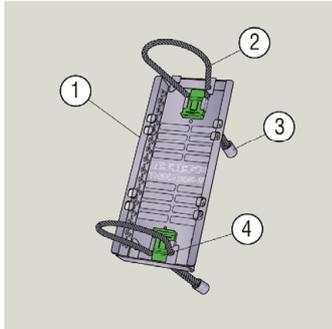
PFEIFER-FS-Box LIGHT

Annex B6

Intended use
Angled wire loop: T-connection

Installation instructions – Part 1

1. Scope of delivery

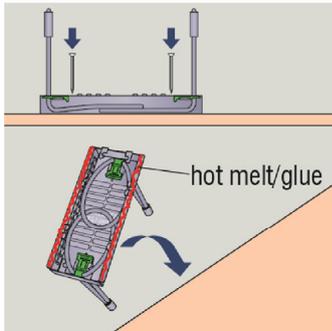


PFEIFER FS-Box LIGHT according to Annex A1 and A2, consisting of the following individual components:

1. Storage box, galvanized
2. Wire loops made of wire ropes, galvanized
3. Ferrule made of steel
4. Sealing slider neon green

Storage box in delivery condition closed with tape, wire loops folded into box.

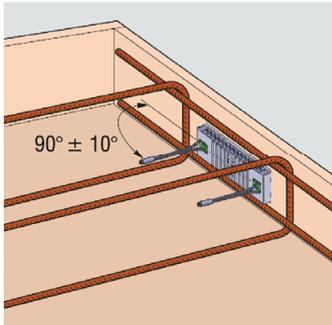
2. Fixing FS-Box LIGHT at formwork



Fix PFEIFER FS-Box LIGHT at formwork securely, mind edge distances and spacings!

- Nailing holes $\varnothing 3$ mm (preferred for formwork made of wood)
- Application of hot melt/glue along the stable edges of the box (preferred for formwork made of steel)

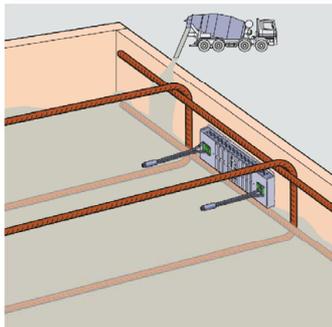
3. Reinforcing



Install reinforcement and additional reinforcement securely

- Mind Annex B3 and B4 for details of reinforcement and distances
- Mind Annex B5 and B6 in case of angled wire loops!
- Observe additional information of the engineer!

4. Pouring and compacting concrete



Pour in concrete carefully, take care for built-in parts!

Compact concrete carefully, avoid contact between vibrating compactor and FS-Box LIGHT.

- Do not move or damage wire loops by force!

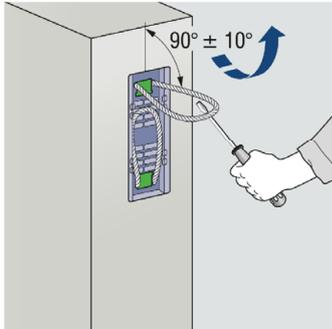
PFEIFER-FS-Box LIGHT

Intended use
Installation instructions - Part 1

Annex B7

Installation instructions – Part 2

5. Removing formwork / Folding out wire loops



Remove formwork carefully.

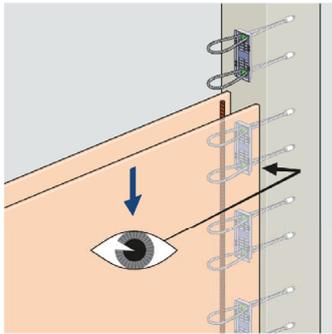
Remove tape.

Remove wire loops from fixture and mount them in desired/proper position.

→ Make sure that wire loops engage correctly in notches of the box!

If necessary, remove adhesion inhibiting and/or components (dirt, cement slurry, grease).

6. Mounting semi-precast element / Preparing formwork for in-situ finishing



Thread in semi-precast element over the wire loops from above or prepare formwork for in-situ finishing correctly.

In case of in-situ concrete finishing, install additional reinforcement according to specification of the engineer respectively Annex B3 and B4.

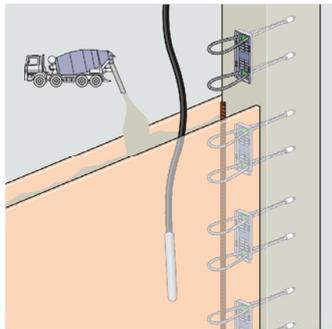
→ Make sure that wire loops are aligned perpendicular to the surface! (adjust them if necessary)

→ Observe max. distance between wire loops and additional reinforcement!

→ Do not damage wire loops by force!

Thread in reinforcement bar B500A/B, $\varnothing 12$ mm.

7. Pouring and compacting in-situ concrete



Pour in concrete carefully, take care for built-in parts!

Compact concrete carefully, avoid contact between vibrating compactor and FS-Box LIGHT.

→ Do not move or damage wire loops by force!

PFEIFER-FS-Box LIGHT

Intended use

Installation instructions - Part 2

Annex B8

Table C1: Resistances under tension load

application		STANDARD	angled wire loops (Annex B5/B6)
strength class of concrete	[-]	C25/30	C25/30
thickness of concrete member h_1	[cm]	≥ 14	≥ 14
resistance	N_{Rd} [kN/FS-Box LIGHT]	35	18

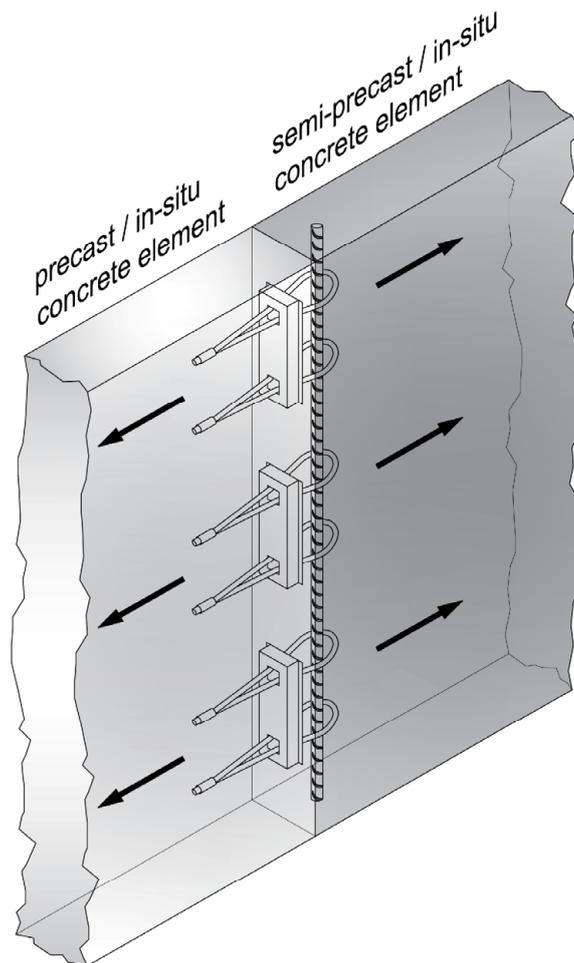


Fig. 11: Exposure of tension load

PFEIFER-FS-Box LIGHT

Performances
Resistances under tension load

Annex C1

Table C2: Resistances perpendicular to longitudinal axis of joint (90°)

application		STANDARD / angled wire loops (Annex B5/B6)					
resistance		$V_{Rd,x}$ [kN/FS-Box LIGHT]					
strength class of concrete	[-]	C25/30	C30/37	C35/45	C40/50	C45/55	
thickness of concrete member	h_1 [cm]	14	9,1	10,0	10,8	11,6	12,3
		15	11,5	12,6	13,6	14,1	14,1
		≥ 16	14,1	14,1	14,1	14,1	14,1

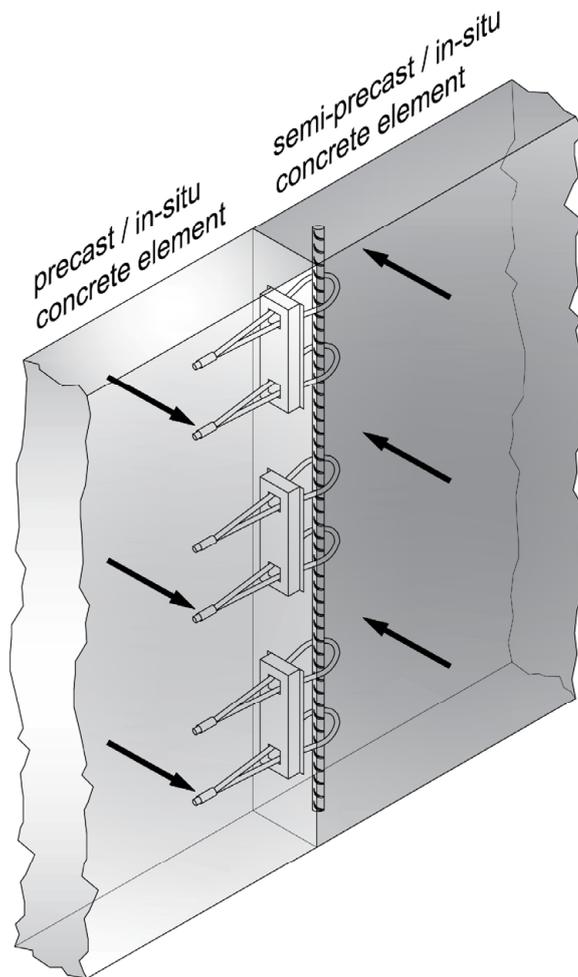


Fig. 12: Exposure of shear load perpendicular to longitudinal axis (90°)

PFEIFER-FS-Box LIGHT

Performances

Resistances under shear load perpendicular to longitudinal axis of joint (90°)

Annex C2

Table C3: Resistances in longitudinal axis of joint (0°)

application		STANDARD	angled wire loops (Annex B5/B6)
strength class of concrete	[-]	C25/30	C25/30
thickness of concrete member h_1	[cm]	≥ 14	≥ 14
resistance	$V_{Rd,y}$ [kN/FS-Box LIGHT]	45	25

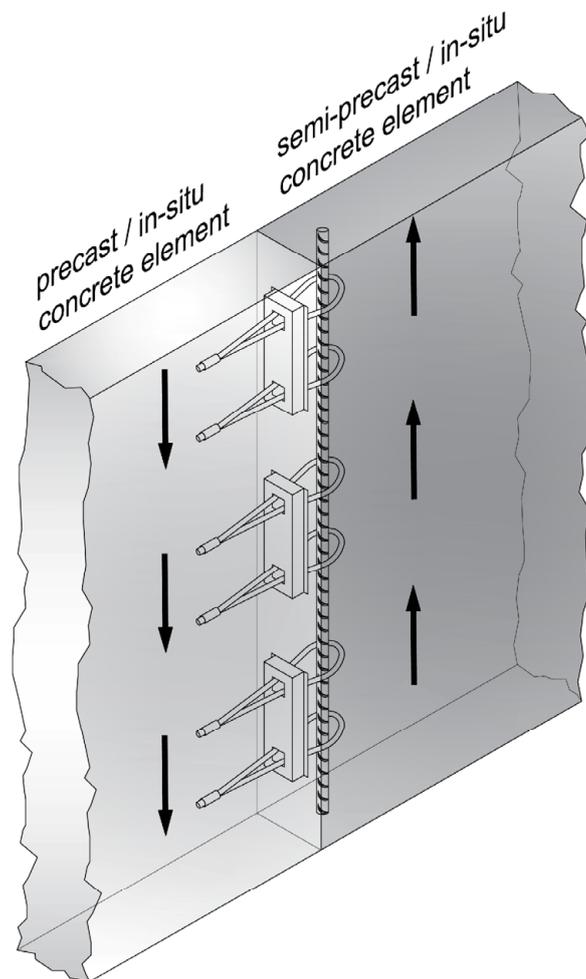


Fig. 13: Exposure of shear load in to longitudinal axis (0°)

PFEIFER-FS-Box LIGHT

Performances
Resistances under shear load in longitudinal axis of joint (0°)

Annex C3

Table C4: Load combination factors for the resistance under combined loading

k_x	[-]	0,50
k_y	[-]	0,78

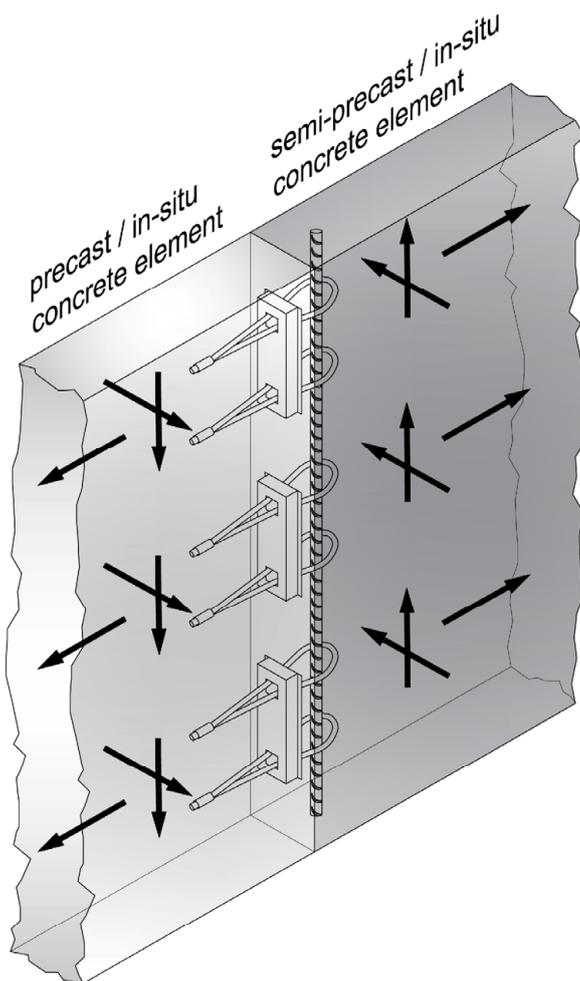


Fig. 14: Combined loading