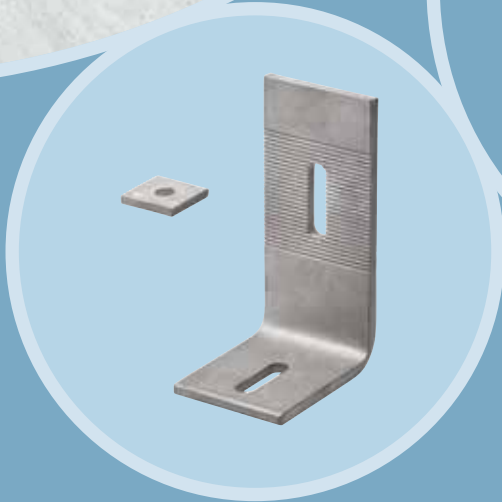# PFEIFER LCON

**fixing bracket system**

PFEIFER

planning & installation

# You're safe with PFEIFER



## Efficient

• Practice-oriented, proven carrying capacities

• Flexibly independent of the anchor system

• User-friendly tolerances

## Safe

• Type-approved

• Reliable manufacturing process

• Monitored production

## Efficient

• Simple and fast assembly

• Toothed connection of bracket and washer

• Corrosion protection

## Cost-effective

• Reusable

• 4 standard sizes

• Combination with PFEIFER-VS®-ISI (p. 10) equal-sided bracket

**NEW!**

# PFEIFER LCON fixing brackets

Item No. 5,280

LCON fixing brackets are steel components intended for the load bearing connection of concrete elements. Assembly is effected by means of a screw connection. Toothed washers enable forces to be transmitted as designed and tolerances to be compensated.

**Advantages:**
• Proven load capacity
• Flexible: versatile anchorage
• Economical through reusability

**Material:**
Fixing bracket: Steel, galvanized
Toothed washer: Steel, galvanized

Toothed washer ZS

LCON fixing brackets
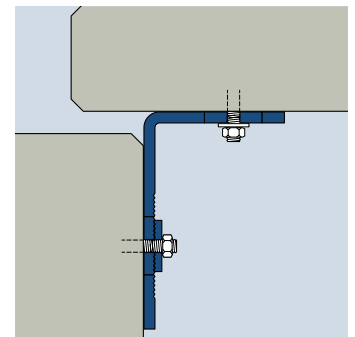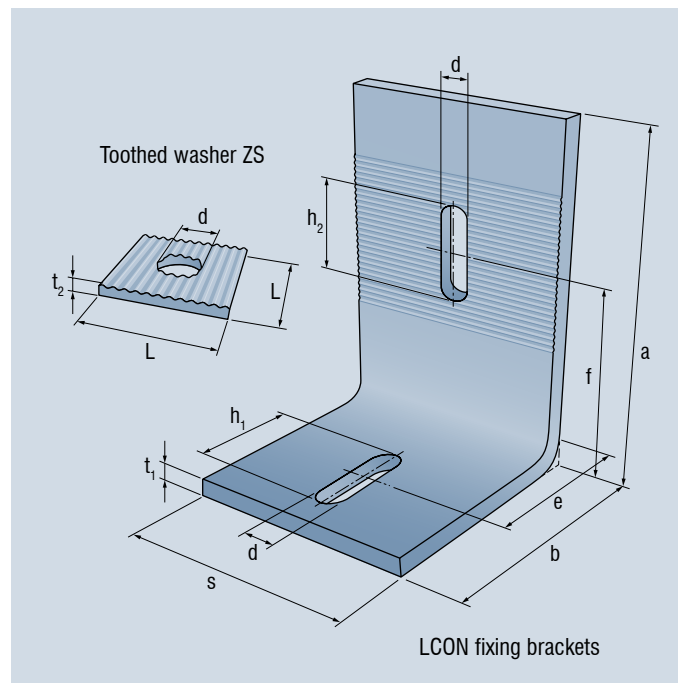
| Ref. no. | Type/size | a | b | s | $t_1$ | d | $h_1$ | $h_2$ | e | f | $t_2$ | L | Packing unit, | weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | [mm] | | | | | | [pieces] | [kg/Pu] |
| 320926 | LCON T1 + ZS 1 | 170 | 110 | 60 | 6 | 11 | 45 | 45 | 70 | 105 | 6,0 | 40 | 12 | 9,96 |
| 374726 | LCON T2 + ZS 2 | 170 | 110 | 80 | 6 | 13 | 50 | 50 | 67,5 | 105 | 6,0 | 40 | 10 | 10,81 |
| 324134 | LCON T3 + ZS 3 | 180 | 110 | 80 | 8 | 13 | 50 | 50 | 70 | 105 | 6,0 | 40 | 8 | 11,54 |
| 374727 | LCON T4 + ZS 4 | 195 | 110 | 80 | 10 | 18 | 60 | 60 | 70 | 120 | 6,0 | 45 | 6 | 11,31 |
| 322471 | ZS 1 | – | – | – | – | 11 | – | – | – | – | 6,0 | 40 | 5 (50)[1] | 0,38 |
| 324138 | ZS 2/3 | – | – | – | – | 13 | – | – | – | – | 6,0 | 40 | 5 (50)[1] | 0,38 |
| 324140 | ZS 4 | – | – | – | – | 18 | – | – | – | – | 6,0 | 45 | 5 (50)[1] | 0,48 |

[1] Quantity per carton

**3**

# PFEIFER-LCON anchoring elements

**anchoring elements**

**LCON**

Both PFEIFER-DB anchors and concrete screws as well as bolt anchors are suitable for anchoring the forces in the concrete.

Alternatively, anchor rail systems can be used.

**DB Anchor:**
No drilling and maximum resistances

**Bolt anchor:**
Time-saving through-hole fitting

**Concrete screw:**
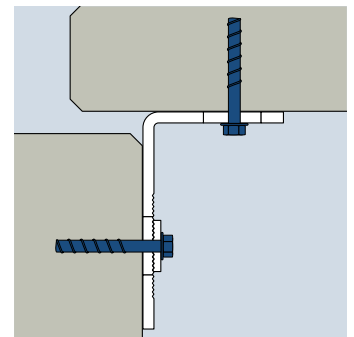Minimal edge/axis distances due to use without expansion pressure
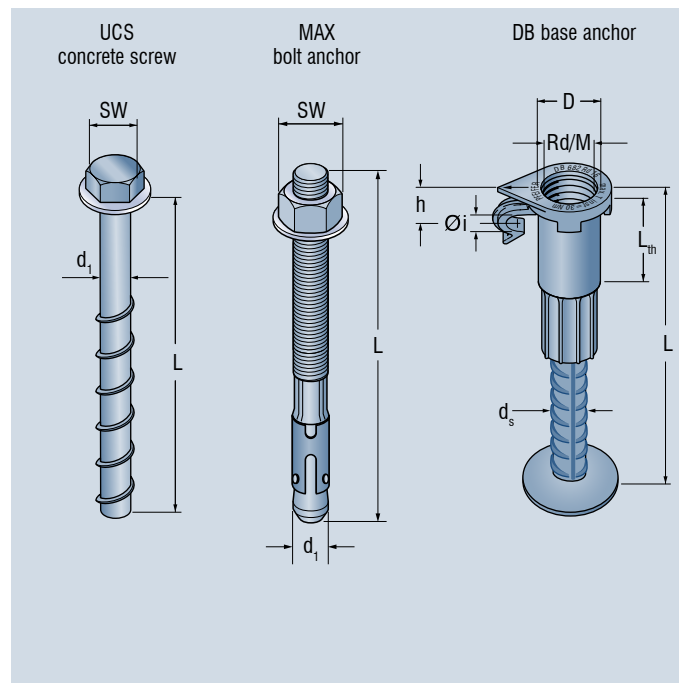
**DB anchor material:**
Reinforcing steel bar B500 B
Socket of precision steel tube
Sign clip: Plastic

**UCS concrete screw material:**
Steel, galvanized

**MAX bolt anchor material:**
Steel, galvanized

| Concrete screw / bolt anchor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ref. no. | Type/Size | Suitable for bracket*[1] | Drill Ø $d_1$ [mm] | Drill depth*[2] [mm] | L [mm] | SW [mm] | Packing unit [pieces] | Weight [kg/100 pieces] |
| 396792 | UCS 8 x 70 | LCON 1 (11 mm) | 8,0 | 80 | 70 | 13 | 50 | 3,9 |
| 396797 | UCS 10 x 100 | LCON 2/3 (13 mm) | 10,0 | 110 | 100 | 15 | 50 | 7,8 |
| 396802 | UCS 14 x 125 | LCON 4 (18 mm) | 13,7 | 140 | 125 | 21 | 10 | 18,4 |
| 396810 | MAX 8/10/75 | LCON 1 (11 mm) | 8,0 | 65 | 75 | 13 | 100 | 3,1 |
| 396811 | MAX 10/10/95 | LCON 2/3 (13 mm) | 10,0 | 85 | 95 | 17 | 50 | 6,3 |
| 396815 | MAX 16/25/148 | LCON 4 (18 mm) | 16,0 | 135 | 148 | 24 | 20 | 23,7 |

| DB base anchor | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ref. no. galvanized | Ref. no. stainless steel | Type/Size | Suitable for bracket*[1] | Rd/M [mm] | $d_s$ [mm] | D [mm] | $L_{th}$ [mm] | L [mm] | Packing unit [pieces] | Weight [kg/100 pieces] |
| 238295 | 238320 | DBF 12 | LCON 2/3 | 12 x 1,75 | 8 | 15,0 | 22,0 | 80 | 100 | 5,00 |
| 238312 | 238322 | DBF 16 | LCON 4 | 16 x 2,00 | 12 | 21,0 | 27,0 | 120 | 50 | 20,00 |

*[1] The responsible planner makes the selection (x) = width of the bracket slot  *[2] Min. drill hole depth in case of through-hole fitting

**❗ Notice:**

Detailed technical information on dimensioning and use is always to be taken from the currently valid European Technical Assessment **ETA-18/0762 (UCS concrete screw)**, **ETA-10/0170 (MAX bolt anchor)** and **ETA-11/0288 (DB anchor)**.

**❗ Notice:**

Check whether the width of the slot corresponds to the specific requirements of the chosen bolt anchor. A washer is to be used if necessary.

**4**

Connections using LCON fixing brackets must be designed and dimensioned in line with engineering practice.
Within the framework of the proof recording, a distinction is made between the proof of the LCON fixing bracket and the proof of the anchoring elements, including the load application into the structural elements being connected. PFEIFER-DB anchors or comparable anchoring elements such as concrete screws or bolt anchors are suitable for anchoring the forces in the concrete element. Alternatively, anchor channel systems can be used. The responsible planner selects and dimensions the anchoring in the concrete.

## Recommended procedure for dimensioning

### 1. Determine the stress $N_{Ed}$

### 2. Select LCON in accordance with table 1

$$N_{Ed} \leq N_{Rd}$$

### 3. Dimensioning the anchoring points bearing point ①:

$$N_{Sd,1} = N_{Ed}$$

→ Select approved fastener

→ Observe maximum bolt size (table 2)

### Bearing point ②:

$$N_{Sd,2} = 2{,}2 \cdot N_{Ed}$$
$$V_{Sd,2} = N_{Ed}$$

→ Select approved fastener (observe interaction!)

→ Observe maximum bolt size (table 2)



**Figure 1** **Figure 2**
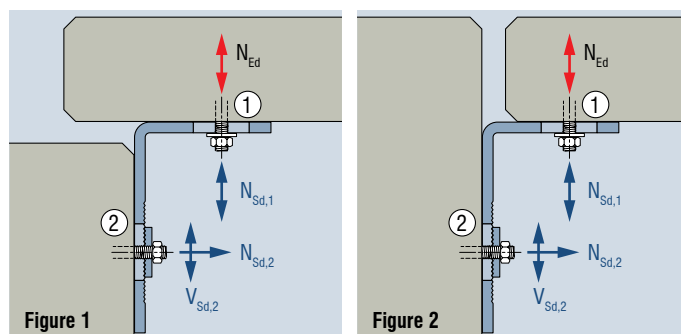
Static system with the bearing points 1 and 2.
Both the connection of an overlapping, non-flush wall (fig. 1) and the connection of a wall flush with the outer edge of the column (fig. 2) are dimensioned in the same way.

**Table 1: Design resistances**

| Type/Size | Design resistances $N_{Rd}$ [kN] |
|-----------|----------------------------------|
| LCON 1    | ± 2,3                            |
| LCON 2    | ± 3,0                            |
| LCON 3    | ± 5,2                            |
| LCON 4    | ± 8,0                            |

The design resistances specified in the following apply to the proof of forces arising from static and quasi-static stress.
They can be used for structural elements made from normal concrete with 3a strength grade of at least C20/25.
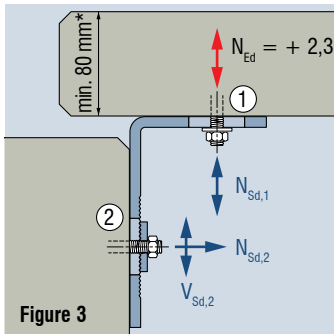
**Table 2: Maximum diameter of the anchoring elements**

| Type/Size | Bolt size M |
|-----------|-------------|
| LCON 1    | 10          |
| LCON 2    | 12          |
| LCON 3    | 12          |
| LCON 4    | 16          |

The proofs required for the anchor system used must be provided in accordance with the specifications of the respective manufacturer.
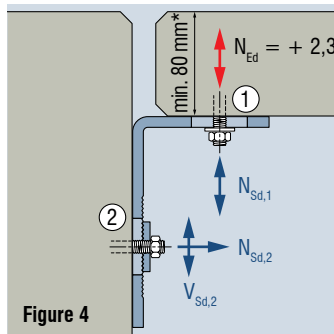
**5**

# Description of standard cases

## LCON 1



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 2,3$ kN
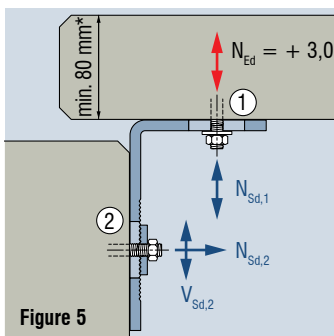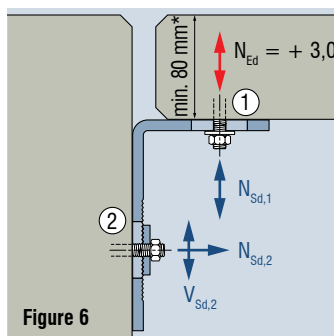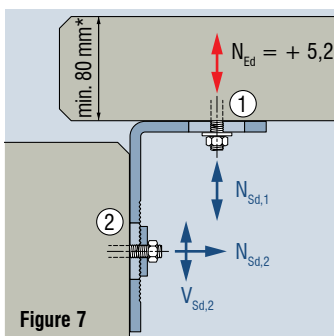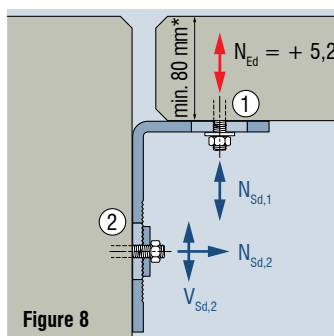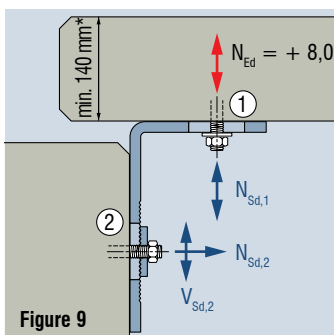Point 2: $N_{Sd,2} = 2,2 \times 2,3 = 5,06$ kN
$V_{Sd,2} = + 2,3$ kN

→ **LCON 1**

→ **UCS concrete screw 8 x 70 or MAX bolt anchor 8/10/75**

Figure 3



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 2,3$ kN
Point 2: $N_{Sd,2} = 2,2 \times 2,3 = 5,06$ kN
$V_{Sd,2} = + 2,3$ kN

→ **LCON 1**

→ **UCS concrete screw 8 x 70 or MAX bolt anchor 8/10/75**

Figure 4

## LCON 2



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 3,0$ kN
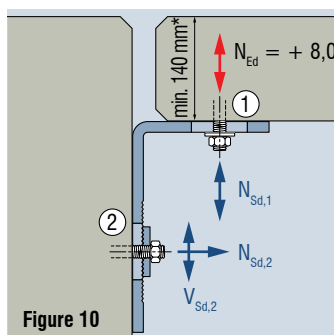Point 2: $N_{Sd,2} = 2,2 \times 3,0 = 6,6$ kN
$V_{Sd,2} = + 3,0$ kN

→ **LCON 2**

→ **UCS concrete screw 10 x 100 or MAX bolt anchor 10/10/95**

Figure 5



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 3,0$ kN
Point 2: $N_{Sd,2} = 2,2 \times 3,0 = 6,6$ kN
$V_{Sd,2} = + 3,0$ kN

→ **LCON 2**

→ **UCS concrete screw 10 x 100 or MAX bolt anchor 10/10/95**

Figure 6

## LCON 3



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 5,2$ kN
Point 2: $N_{Sd,2} = 2,2 \times 5,2 = 11,44$ kN
$V_{Sd,2} = + 5,2$ kN

→ **LCON 3**

→ **UCS concrete screw 10 x 100 or MAX bolt anchor 10/10/95**

Figure 7



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 5,2$ kN
Point 2: $N_{Sd,2} = 2,2 \times 5,2 = 11,44$ kN
$V_{Sd,2} = + 5,2$ kN

→ **LCON 3**

→ **UCS concrete screw 10 x 100 or MAX bolt anchor 10/10/95**

Figure 8

## LCON 4



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 8,0$ kN
Point 2: $N_{Sd,2} = 2,2 \times 8,0 = 17,6$ kN
$V_{Sd,2} = + 8,0$ kN

→ **LCON 4**

→ **UCS concrete screw 14 x 125 or MAX bolt anchor 16/25/148**

Figure 9



C20/25
Reactions:
Point 1: $N_{Sd,1} = + 8,0$ kN
Point 2: $N_{Sd,2} = 2,2 \times 8,0 = 17,6$ kN
$V_{Sd,2} = + 8,0$ kN

→ **LCON 4**

→ **UCS concrete screw 14 x 125 or MAX bolt anchor 16/25/148**

Figure 10

**❗ Notice:**

\* Specification of the minimum wall thicknesses in relation to the selected bolt anchor. Further details in the respective ETA: ETA-18/0762 (p. 9) and ETA-10/0170 (p. 10).

# Edge and axis distances

## Distances

The edge distances must be verified with the anchoring elements. The specifications of the respective manufacturer must be observed for this.
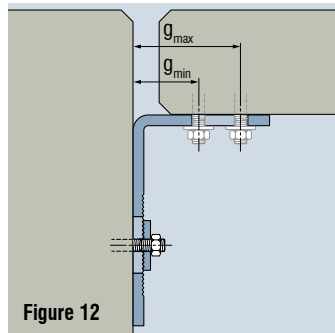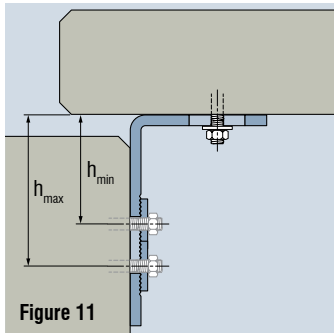


**Figure 11**



**Figure 12**

**Table 3: Edge distances**

| Type/Size | Installation situation 1 | | Installation situation 2 | |
|---|---|---|---|---|
| | $h_{min}$ [mm] | $h_{max}$ [mm] | $g_{min}$ [mm] | $g_{max}$ [mm] |
| LCON T1 | 87,5 | 122,5 | 52,5 | 87,5 |
| LCON T2 | 86,0 | 124,0 | 48,5 | 86,5 |
| LCON T3 | 86,0 | 124,0 | 51,0 | 89,0 |
| LCON T4 | 98,0 | 142,0 | 43,0 | 87,0 |

Values apply when using anchors with a maximum permissible diameter according to table 2 on p. 5.

## Distances when anchoring with PFEIFER-DB anchors

The specified values correspond to the minimum components thickness as well as the minimum axis and edge distance for the PFEIFER-DB base anchor according to ETA-11/0288.



**Figure 13**



**Figure 14**
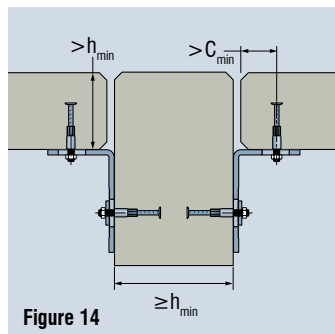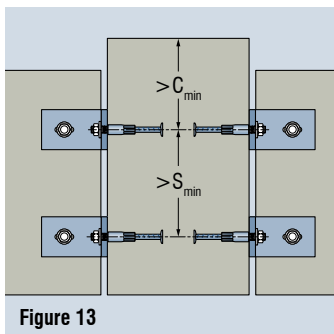
**Table 4: Edge distances**

| Anchor-Ø [mm] | $s_{min}$ [mm] | $c_{min}$ [mm] | $h_{min}$ [mm] |
|---|---|---|---|
| 12 | 120 | 60 | 100 |
| 16 | 150 | 75 | 140 |

For the installation of the anchor in the front side of a component, the axis and edge distances as well as the minimum component thicknesses apply analogously.

## Distances when anchoring with rails

The edge and axis distances are to be proven with the anchoring rails. The specifications of the respective manufacturer must be observed for this.
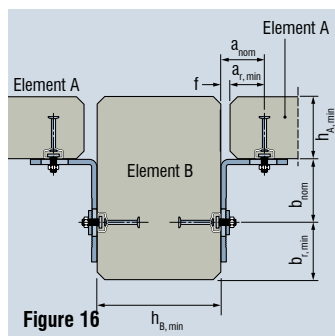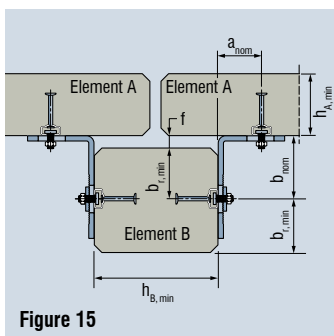By way of example, the values for the use of rails are listed below.



**Figure 15**



**Figure 16**

**Table 5: Edge distances[1]**

| Type/Size | $a_{nom}$ [mm] | $a_{r,min}$ [mm] | $b_{nom}$ [mm] | $b_{r,min}$ [mm] |
|---|---|---|---|---|
| LCON T1 | 70 | 50 | 105 | 85 |
| LCON T2 | 70 | 50 | 105 | 85 |
| LCON T3 | 70 | 50 | 105 | 85 |
| LCON T4 | 70 | 50 | 120 | 100 |

[1] Anchor channels type Jordahl



**Figure 17**



**Figure 18**
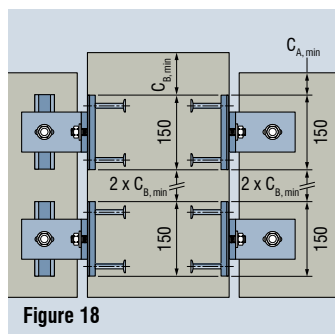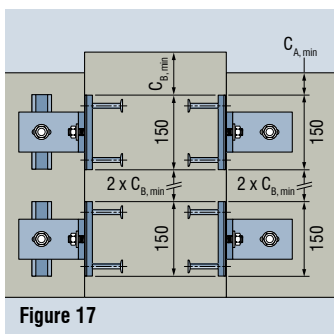
**Table 6: Edge distances for C20/25[1]**

| Type/Size | $c_{A,min}$ [mm] | $c_{B,min}$ [mm] | $h_{A,min}$ [mm] | $h_{B,min}$ [mm] |
|---|---|---|---|---|
| LCON T1 | 25 | 85 | 70 | 150 |
| LCON T2 | 25 | 110 | 70 | 210 |
| LCON T3 | 25 | 150 | 100 | 300 |
| LCON T4 | 90 | – | 100 | – |

[1] Anchor channels type Jordahl

## Distances when anchoring with concrete screws/bolt anchors

The edge and axis distances are to be taken from the European Technical Assessments **ETA-18/0762 (concrete screw)** and **ETA-10/0170 (bolt anchor)**.

**7**

## Product description



**Figure 19**

Toothed washer ZS

LCON fixing bracket
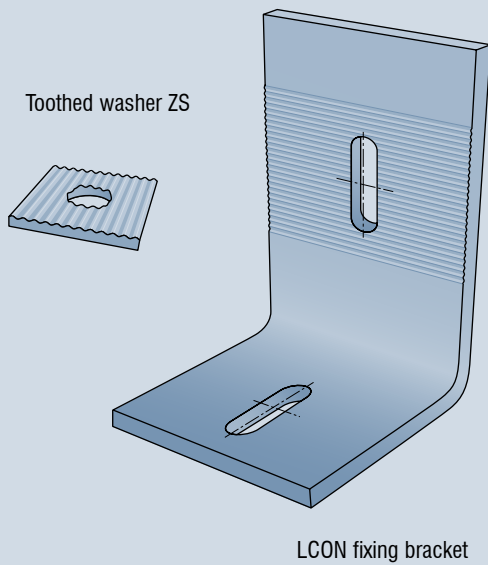
LCON fixing brackets consist of a bent bracket element and an associated matching ZS toothed washer. All components (bracket element and toothed washer) are hot-dip galvanized. **The minimum thickness of the zinc coating is 55 micrometres**.

The design resistances of the fixing brackets have been verified within the scope of a type-static calculation. The calculation was checked by an independent testing body.
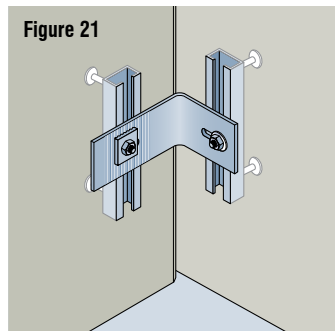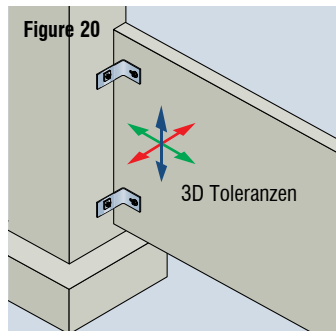
> ⚠️ **Warning:**
>
> changes to or adaptations of the product are not permissible, or may only be carried out by the manufacturer. Any change or adaptation may reduce the carrying capacity to the point of complete product failure.

**LCON T1** CE
Art.-Nr. 320526                    2451
PFEIFER
Seil- und Hebetechnik GmbH         **22-06-2019**
Dr.-Karl-Lenz-Straße 66
D-87700 Memmingen          EN 1090-1:2009+A1:2011

## Intended use



**Figure 20**

3D Toleranzen

**Figure 21**

**Figure 22**

$f_{Fuge}$
$f_{Fase}$

**Figure 23**

$f_{Fuge}$
$f_{Fase}$

PFEIFER LCON fixing brackets are connecting elements which are used for the mechanical connection (screw connection) as planned of precast elements (beams, walls, columns, etc.). The LCON system consists of steel brackets with slots with a partially toothed (profiled) surface and square ZS toothed washers. Transversal shear forces VRd can be transmitted in the region of the toothed slot; tensile and compressive forces NRd can be transmitted via the elongated hole without toothing.

The design resistances specified in the following apply to the proof of forces arising from static and quasi-static loading. They can be used for structural elements made from normal concrete with a strength starting from **at least C20/25**.
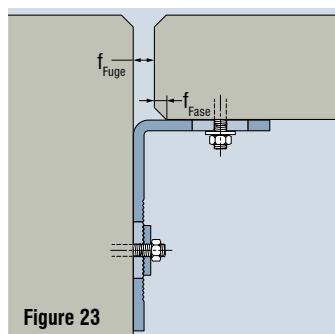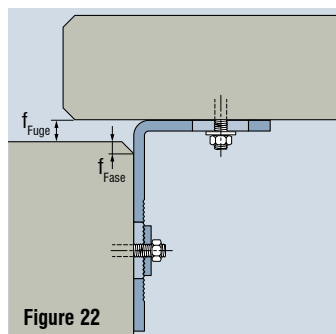
**The width of the joint between the structural elements being connected is:**

$f_{joint} \leq 20$ mm.

**The width of the chamfers on the structural elements in the area of the connection is:**

$f_{chamfer} \leq 10$ mm.

## Installation/assembly

Only standard supplied products and components may be used for assembly. Substitution, change or adaptation of components is not permissible.

The anchorage of the forces in the concrete element is effected by means of PFEIFER-DB anchors or comparable anchor elements. Alternatively, anchor channel systems may be used. Regarding the installation and use of the anchors, it is essential to follow the specific specifications (e.g., tightening torques for the bolts) of the respective manufacturer.
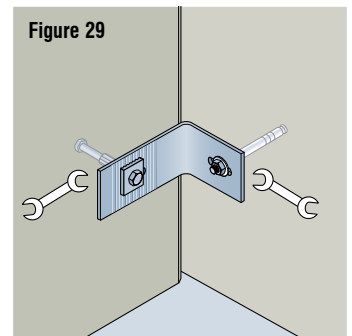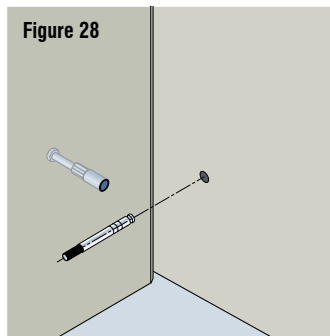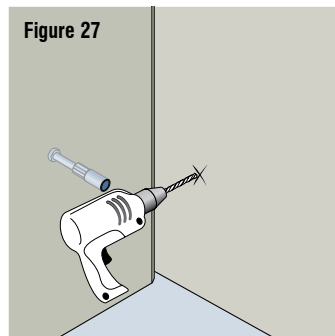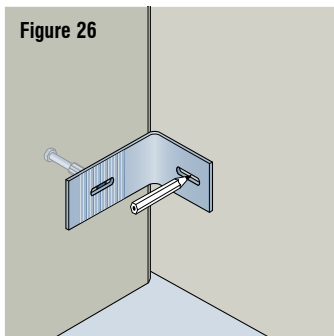
### Assembly with anchor channels

Figure 18

Figure 19

Figure 20

Figure 21
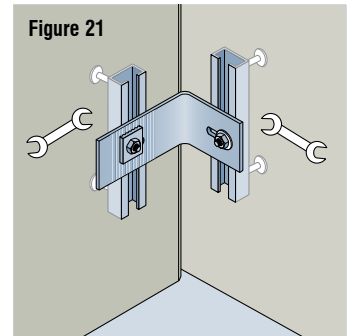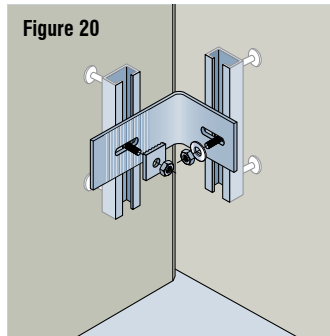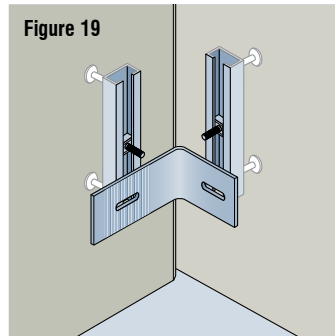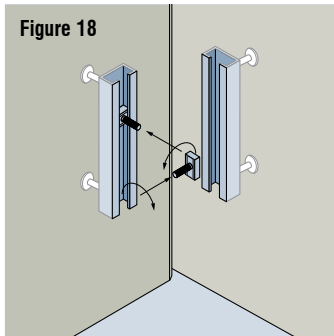
### Assembly with the combination of PFEIFER-DB anchors and anchor channel

Figure 22

Figure 23

Figure 24

Figure 25
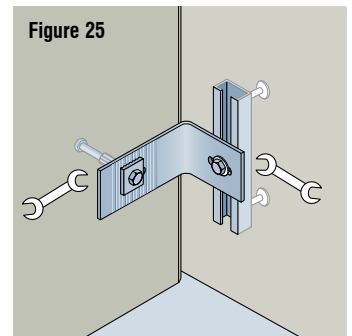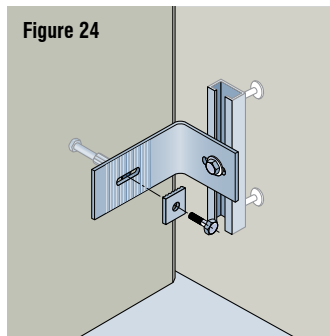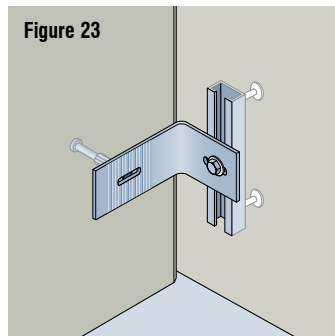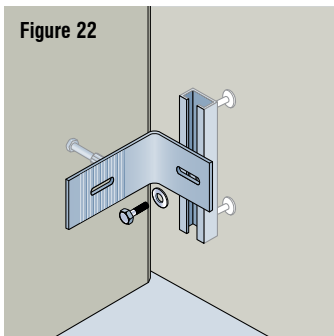
### Assembly with the combination of PFEIFER-DB anchors and subsequently fitted concrete screws/bolt anchors

Figure 26

Figure 27

Figure 28

Figure 29

### Assembly with subsequently fitted concrete screws/bolt anchors

Figure 30

Figure 31

Figure 32

Figure 33

**9**
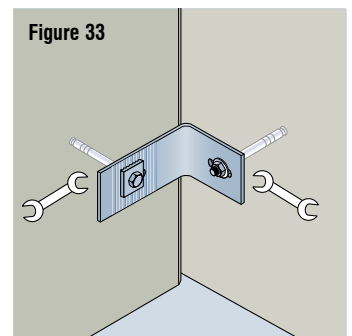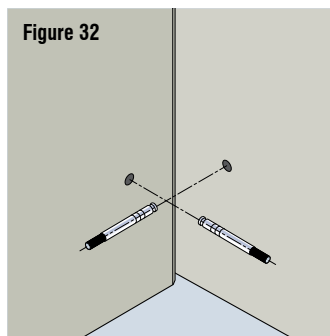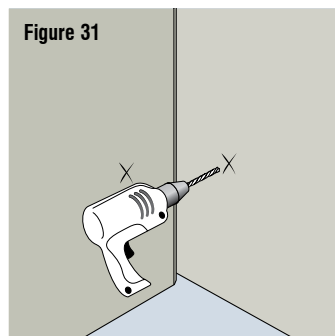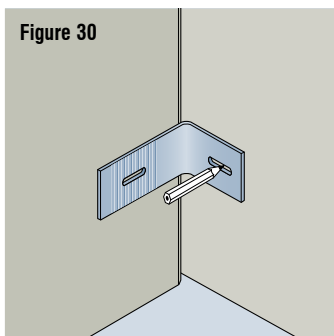
## LCON VS – the special bracket for use with PFEIFER-VS®-ISI  **NEW!**

In the new LCON VS bracket, PFEIFER offers a complete solution for the load-bearing connection of precast panels and columns. The LCON VS bracket serves as an accessory for the PFEIFER-VS®-ISI system and enables both a permanent connection and a temporary securing of the precast concrete elements during the assembly, until the joint has been cast and has cured. Fixing Systems for push-pull props that protrude into the construction section are thus eliminated and a smooth construction process is guaranteed.
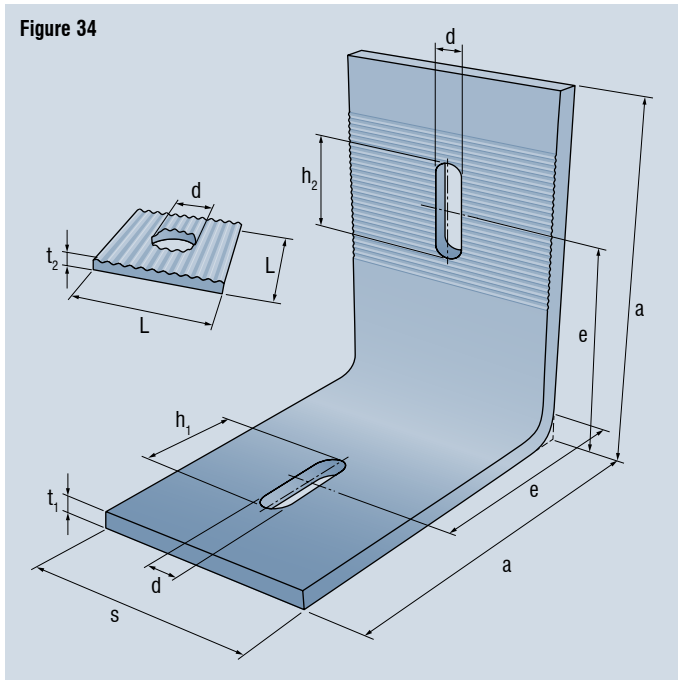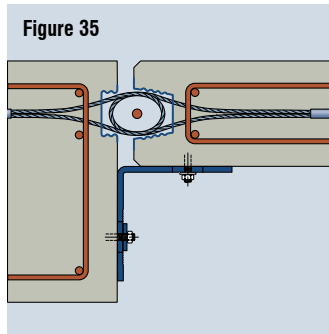
**Figure 34**



**Figure 35**



- Equal-sided bracket
- Use with PFEIFER-VS®-ISI

| Ref. no. | Type/size | a | s | $t_1$ | d | $h_1$ [mm] | e | $t_2$ | L | Packing unit [pieces] | Weight [kg/packing unit] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 374728 | LCON VS + ZS VS | 200 | 80 | 12 | 18 | 60 | 135 | 6 | 45 | 5 | 14,64 |

## Dimensioning of LCON VS

The design resistances specified in the following apply to the proof of forces arising from static and quasi-static stress. They can be used for structural elements made from normal concrete with a strength grade of at least C20/25.



**Bild 42**



**Bild 43**
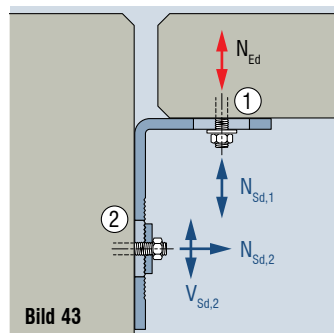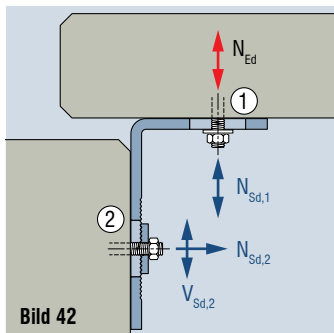
The proof of the anchoring elements is carried out independently of the LCON fixing brackets. Consideration must be given to the fact that the transmission of loads by means of toothed washers gives rise to additional force components $N_{Sd,2}$ (spreading forces). These must be verified within the framework of the dimensioning (interaction).

**Table 7: Design resistances for LCON VS**

| Type/size | Design resistances $N_{Rd}$ [kN] |
|---|---|
| LCON VS | ± 6,5 |

| | |
|---|---|
| **Loads at anchoring point 1:** | $N_{Sd,1} = N_{Ed}$ |
| **Loads at anchoring point 2:** | $N_{Sd,2} = 3,0 \cdot N_{Ed}$ |
| | $V_{Sd,2} = N_{Ed}$ |

**Proof:** $\dfrac{N_{Ed}}{N_{Rd}} \leq 1$

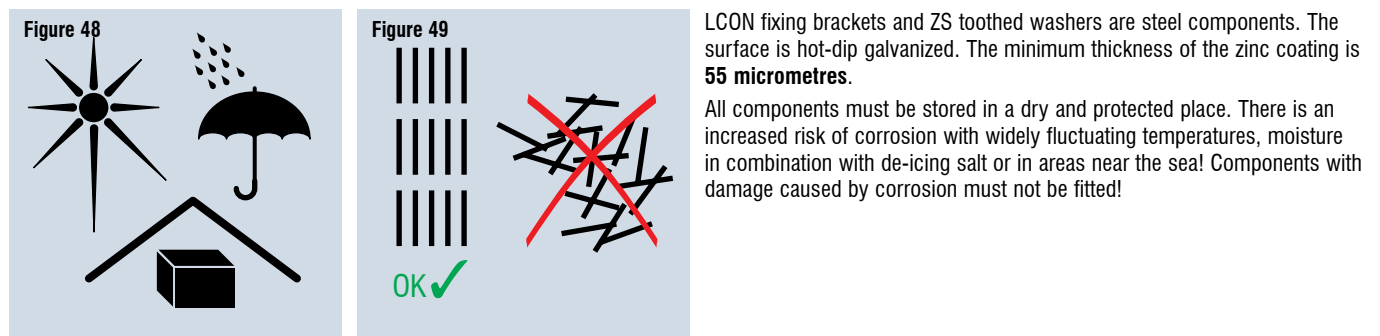**Table 8: Maximum diameter of the anchoring elements**

| Type/size | Anchor –ø [mm] |
|---|---|
| LCON VS | 16 |

The selection is made by the responsible planner.

## Edge and axis distances for LCON VS

**Figure 44**
Column/wall connection

**Figure 45**
T-joint

**Figure 46**
Corner joint

**Figure 47**

200 mm
135 mm
120 – 95 mm
15 – 40 mm

**Notice:**

The LCON VS bracket serves as an accessory for the PFEIFER-VS-ISI® system.

## Storage

**Figure 48**

**Figure 49**

OK ✓

LCON fixing brackets and ZS toothed washers are steel components. The surface is hot-dip galvanized. The minimum thickness of the zinc coating is **55 micrometres**.

All components must be stored in a dry and protected place. There is an increased risk of corrosion with widely fluctuating temperatures, moisture in combination with de-icing salt or in areas near the sea! Components with damage caused by corrosion must not be fitted!

**Further information and downloads at:**

**www.pfeifer.info/lcon-winkel**

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