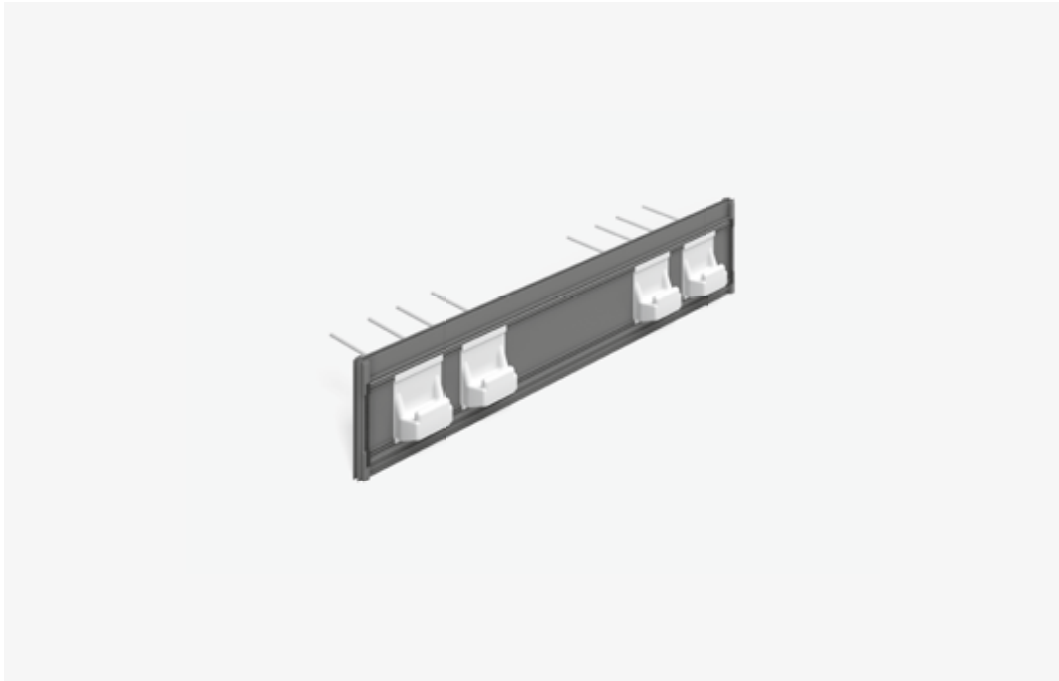


## Schöck Tronsole® type T



T

### **Schöck Tronsole® type T**

Serves the sound insulation of stair flight and landing. The stair flight can be manufactured in in-situ concrete or as fully precast component. The landing can be manufactured both in in-situ concrete as well as in semi-precast construction with screed.

## Product characteristics | Product design

### **i** Product characteristics

- ▶ Impact sound pressure level difference  $\Delta L_{n,w}^* \leq 29$  dB with type T-V8;  $\Delta L_{n,w}^* \geq 33$  dB with type T-V2, tested according to DIN 7396; Test reports Nos. 91386-07 and 91386-08;
- ▶ Elodur® elastomer support in the support corbels for sound insulation
- ▶ With DIBt general building supervisory approval No. Z-15.7-310
- ▶ Fire resistance class R90
- ▶ Simpler, more rapid and safer installation using nail battens enables a straight joint pattern

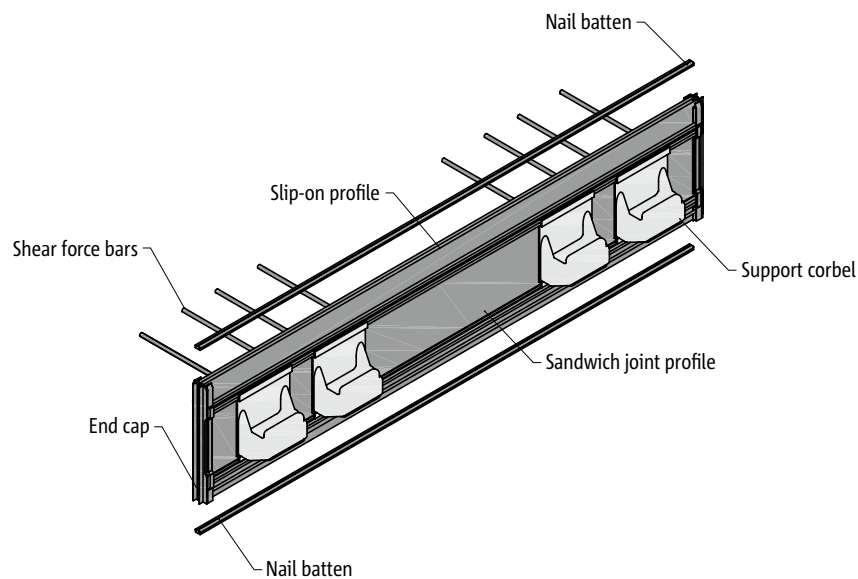


Fig. 13: Schöck Tronsole® type T

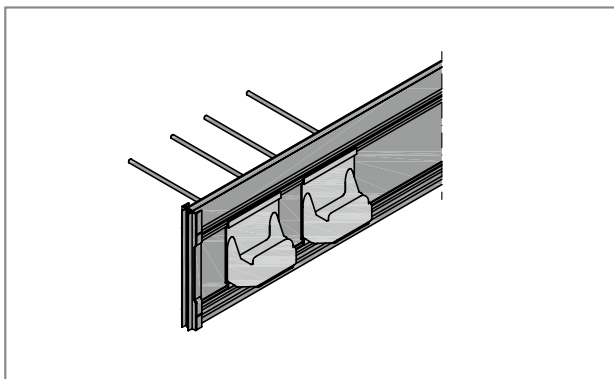


Fig. 14: Schöck Tronsole® type T : Detail support bracket positive fabrication

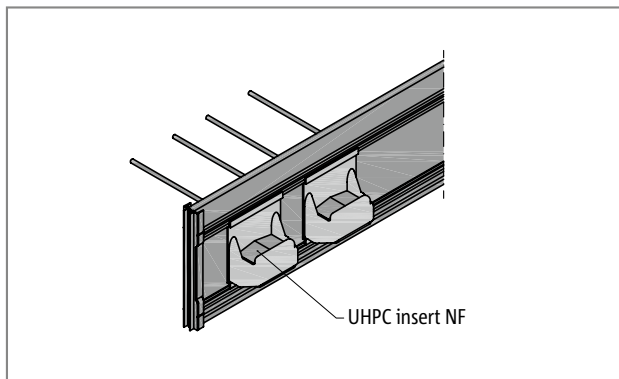


Fig. 15: Schöck Tronsole® type T: Detail support bracket negative fabrication

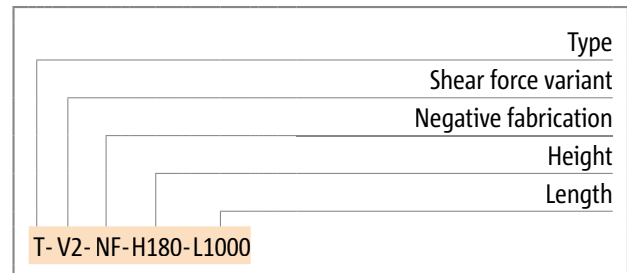
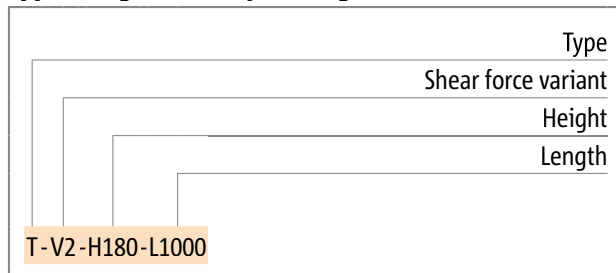
## Product selection | Type designations

### Schöck Tronsole® type T variants

The design of the Schöck Tronsole® type T can vary as follows:

- ▶ Shear force load-bearing level:  
V2 to V8
- ▶ Production type in the prefabricating plant:  
without addition                      positive fabrication and lateral fabrication  
NF    negative fabrication (= reverse fabrication)
- ▶ Height:  
H = 160 - 320 mm
- ▶ Length:  
Shear force load-bearing level V2: L = 700 - 1300 mm  
Shear force load-bearing level V4: L = 700 mm - 2000 mm  
Shear force load-bearing level V6: L = 1000 mm - 2000 mm  
Shear force load-bearing level V7: L = 1150 mm - 1450 mm  
Shear force load-bearing level V8: L = 1300 mm - 2000 mm

### Type designation in planning documents



T

## Installation cross section

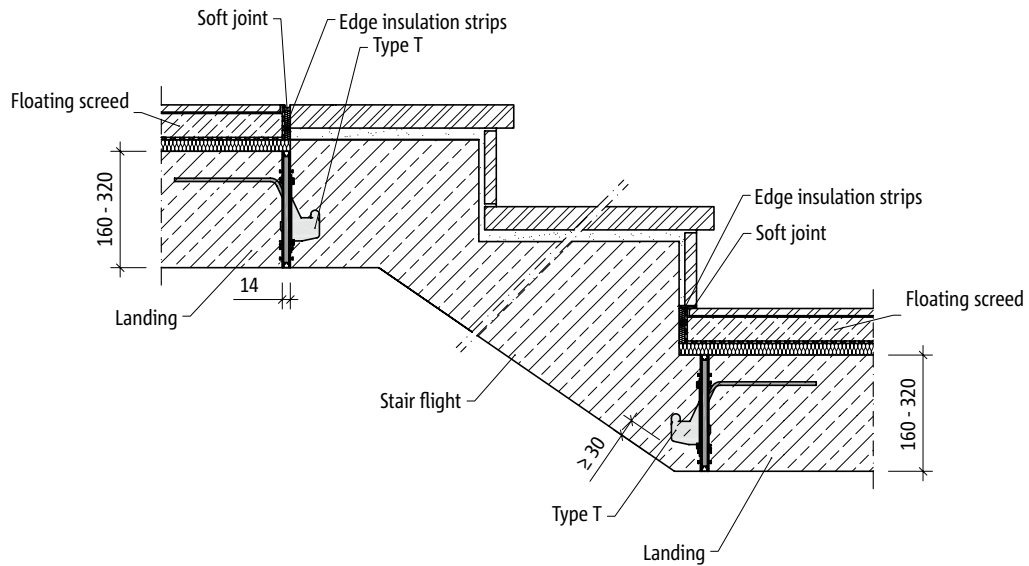


Fig. 16: Schöck Tronsole® type T: Installation cross-section

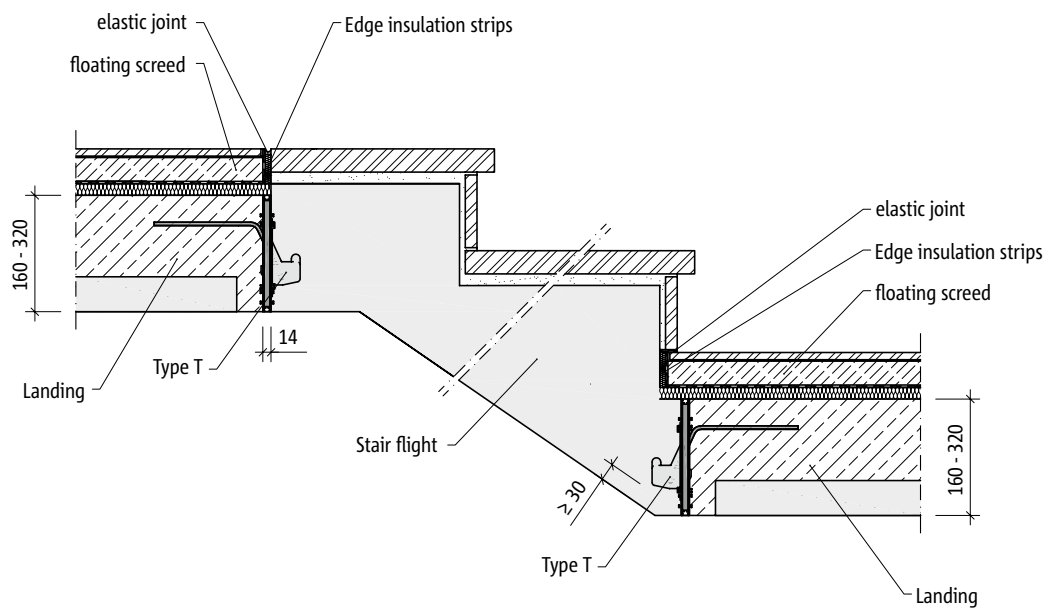


Fig. 17: Schöck Tronsole® type T: Installation cross-section precast stairs with semi-precast landing



## Element arrangement

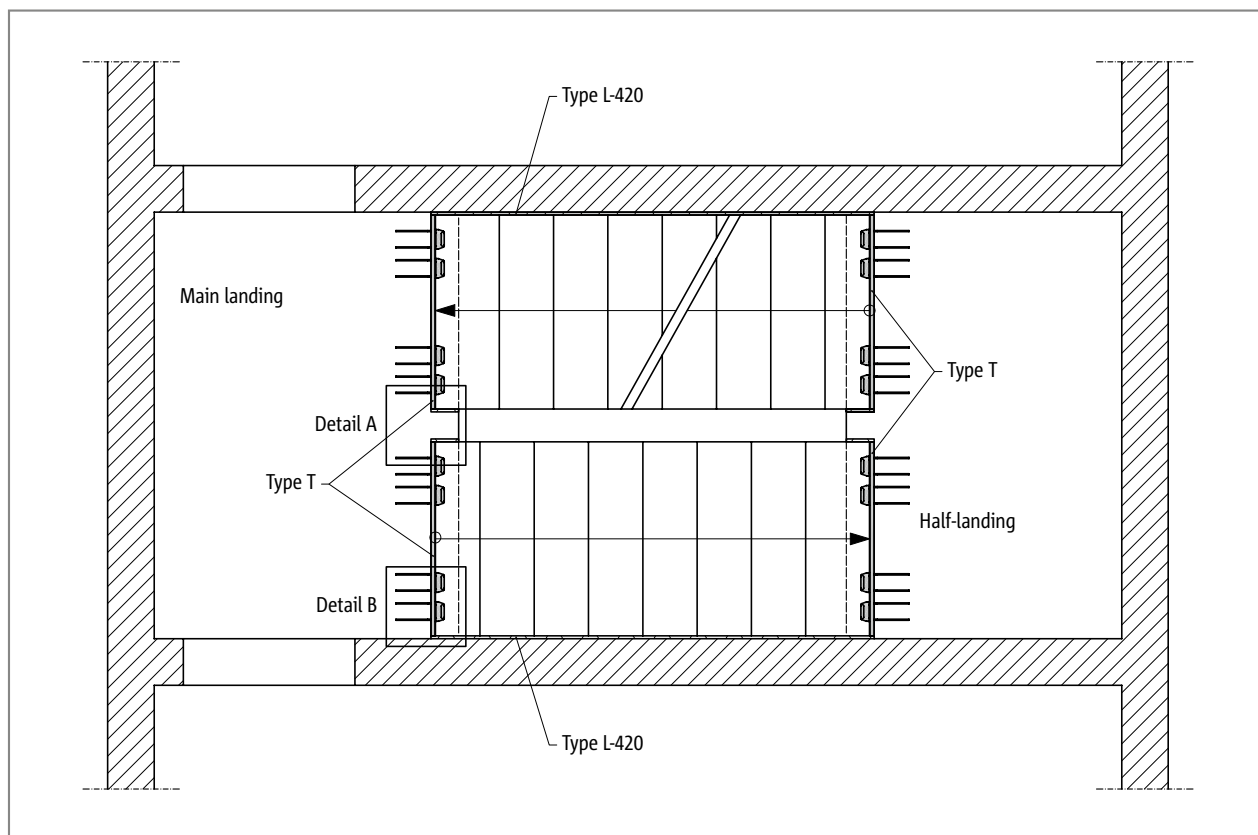


Fig. 18: Schöck Tronsole® type T: Element configuration in plan view

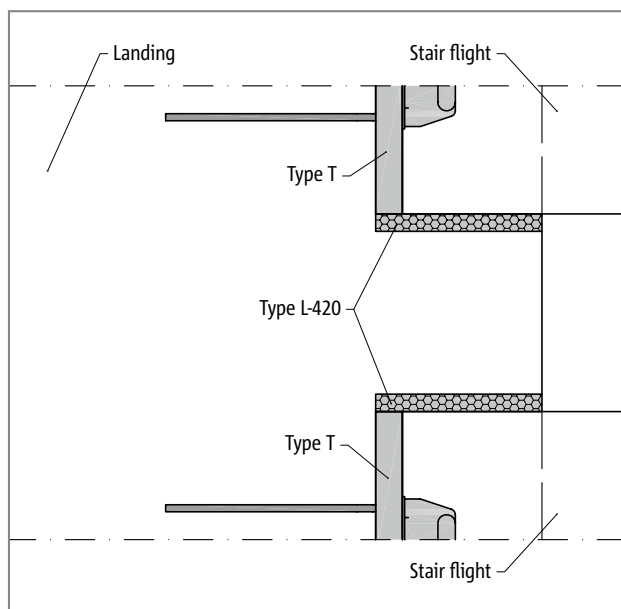


Fig. 19: Schöck Tronsole® type T: Element configuration Detail A

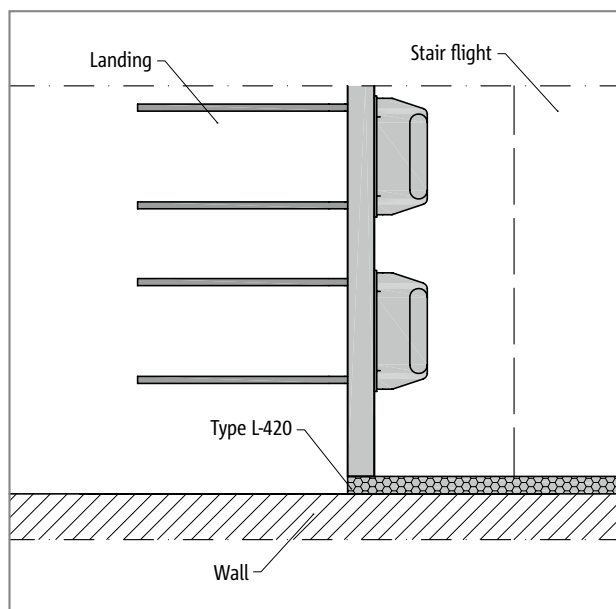


Fig. 20: Schöck Tronsole® type T: Element configuration Detail B

### **i** Notes on combination possibilities

- ▶ The given acoustic insulation values apply in combination with the Tronsole® type L-420 or with a sufficiently wide air joint (50 mm).
- ▶ The connection of the stair flights to the floor slab using the Tronsole® type B.
- ▶ With stair flights, which are wider than 2 m, several elements of the Tronsole® type T can be strung together and, if required, shortened.

## Product description

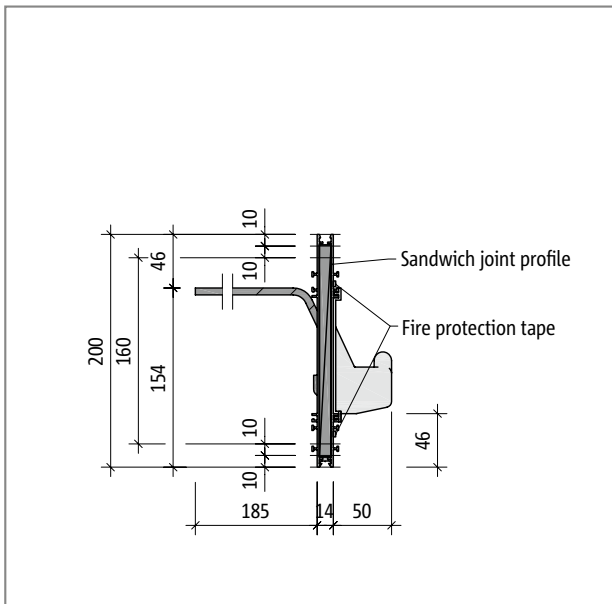


Fig. 21: Schöck Tronsole® type T: Product cross-section with sandwich joint profile in the basic version

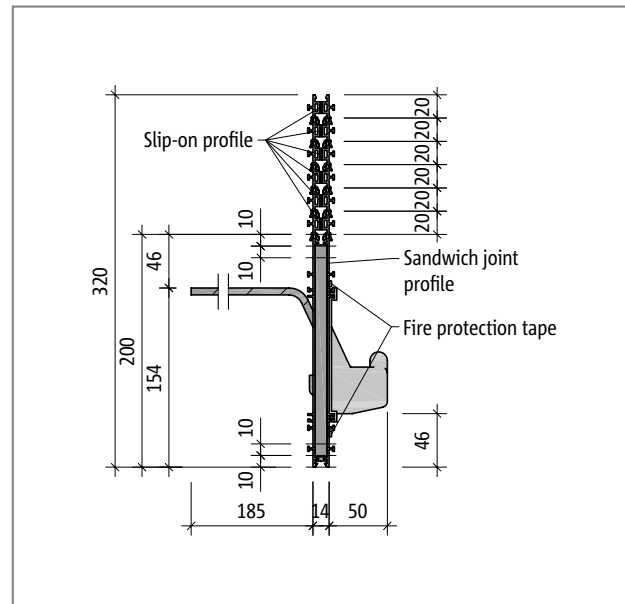


Fig. 22: Schöck Tronsole® type T: Product cross-section with sandwich joint profile and slip-on profiles.

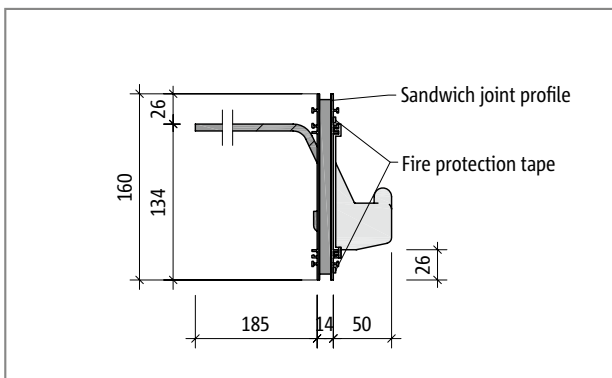


Fig. 23: Schöck Tronsole® type T: Product section T...-H160

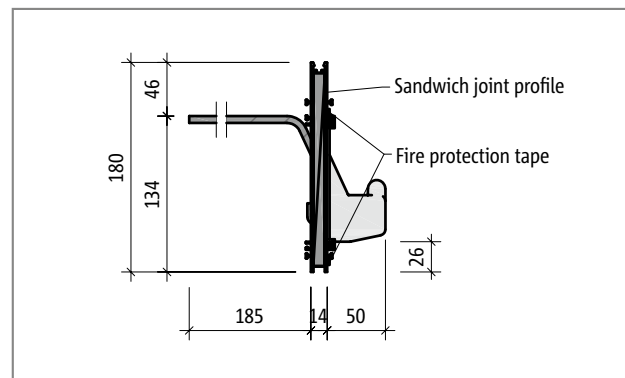


Fig. 24: Schöck Tronsole® type T: Product section T...-H180

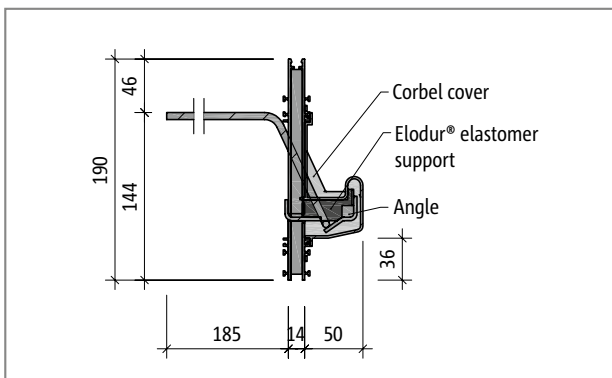


Fig. 25: Schöck Tronsole® type T: Product section T...-H190 through the support bracket

## Product description

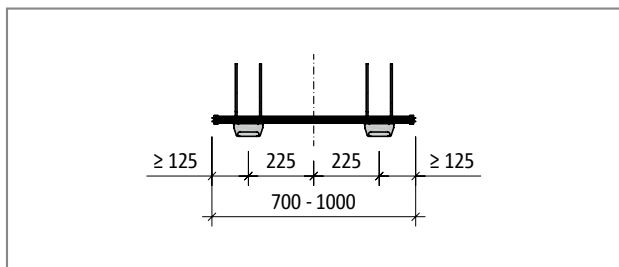


Fig. 26: Schöck Tronsole® type T-V2-H...-L700 to L1000: Product layout

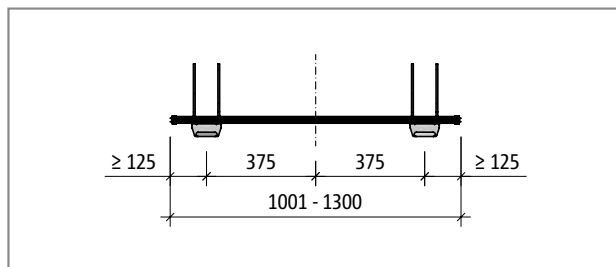


Fig. 27: Schöck Tronsole® type T-V2-H...-L1001 to L1300: Product layout

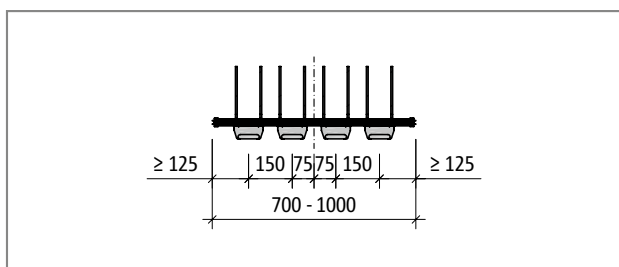


Fig. 28: Schöck Tronsole® type T-V4-H...-L700 to L1000: Product layout

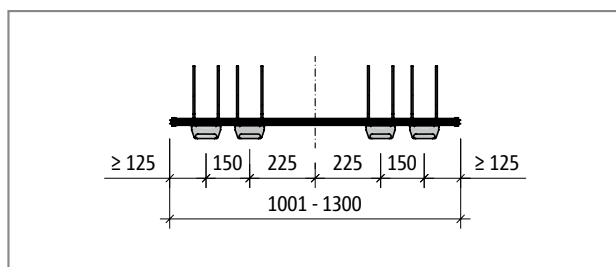


Fig. 29: Schöck Tronsole® type T-V4-H...-L1001 to L1300: Product layout

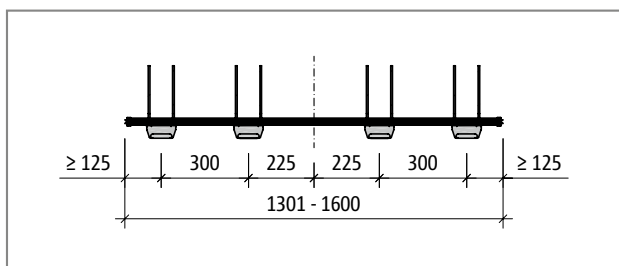


Fig. 30: Schöck Tronsole® type T-V4-H...-L1301 to L1600: Product layout

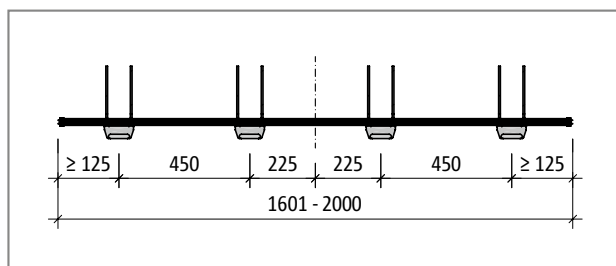


Fig. 31: Schöck Tronsole® type T-V4-H...-L1601 to L2000: Product layout

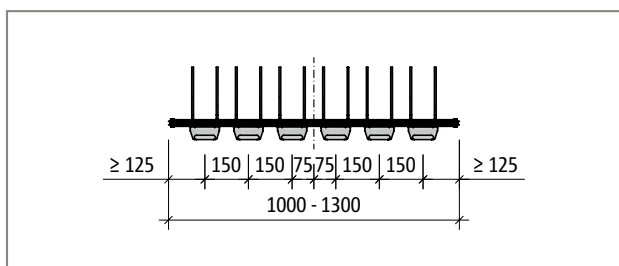


Fig. 32: Schöck Tronsole® type T-V6-H...-L1000 to L1300: Product layout

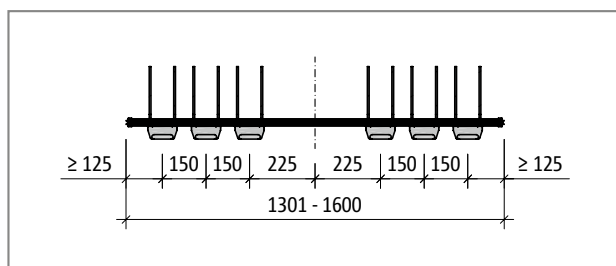


Fig. 33: Schöck Tronsole® type T-V6-H...-L1301 to L1600: Product layout

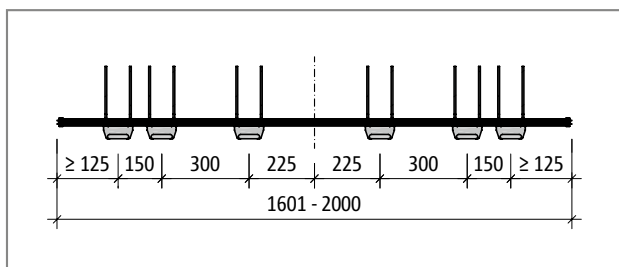


Fig. 34: Schöck Tronsole® type T-V6-H...-L1601 to L2000: Product layout

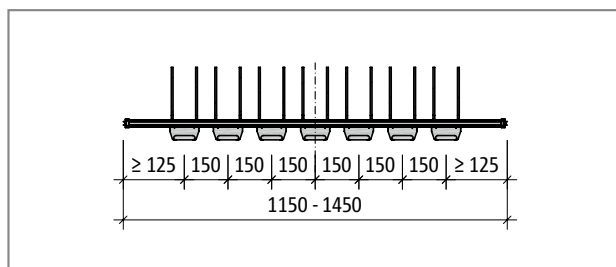


Fig. 35: Schöck Tronsole® type T-V7-H...-L1150 to L1450: Product layout

## Product description

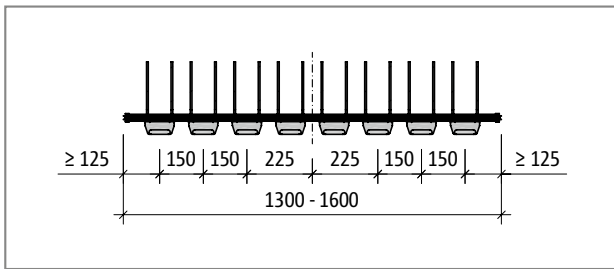


Fig. 36: Schöck Tronsole® type T-V8-H...-L1300 to L1600: Product layout

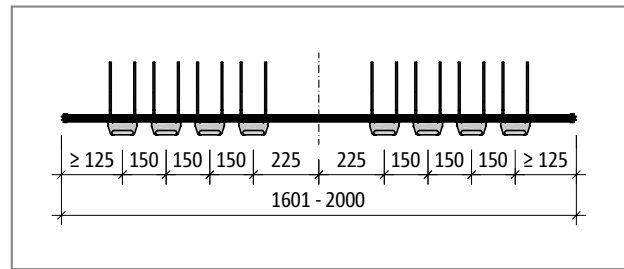


Fig. 37: Schöck Tronsole® type T-V8-H...-L1601 to L2000: Product layout

### **i** Product information

- ▶ The edge distance of the edge of the structural element of the stair flight from the centre to the outer support bracket is  $\geq 125$  mm. Thus a sufficient concrete covering of the on-site reinforcement is ensured.
- ▶ The overall length presented of the Tronsole® includes the end caps.
- ▶ The diameter of the shear force bar is  $d = 6$  mm.

# Design

## Design positive fabrication

Schöck Tronsole® type	T-V2	T-V4	T-V6	T-V7	T-V8
Design values with	Concrete strength class $\geq C20/25$				
Tronsole® height H [mm]	$V_{Rd,z}$ [kN/element]				
160 - 170	14.3	28.6	42.9	50.1	57.2
180 - 320	17.4	34.8	52.2	60.9	69.6
	$V_{Rd,y}$ [kN/element]				
160 - 320	$\pm 1.6$	$\pm 3.3$	$\pm 5.0$	$\pm 5.8$	$\pm 6.6$

## Design negative fabrication

Schöck Tronsole® type	T-V2-NF	T-V4-NF	T-V6-NF	T-V7-NF	T-V8-NF
Design values with	Concrete strength landing $\geq C20/25$ , stair flight $\geq C30/37$				
Tronsole® height H [mm]	$V_{Rd,z}$ [kN/element]				
160 - 170 ( $h_A \geq 180$ mm )	14.3	28.6	42.9	50.1	57.2
180 - 320	17.4	34.8	52.2	60.9	69.6
	$V_{Rd,y}$ [kN/element]				
160 - 320	$\pm 1.6$	$\pm 3.3$	$\pm 5.0$	$\pm 5.8$	$\pm 6.6$

Schöck Tronsole® type	T-V2	T-V4	T-V6	T-V7	T-V8
Tronsole® height H [mm]	160 - 320				
Tronsole® length L [mm]	700 - 1300	700 - 2000	1000 - 2000	1150 - 1450	1300 - 2000
Thickness t of the Tronsole® [mm]	14				

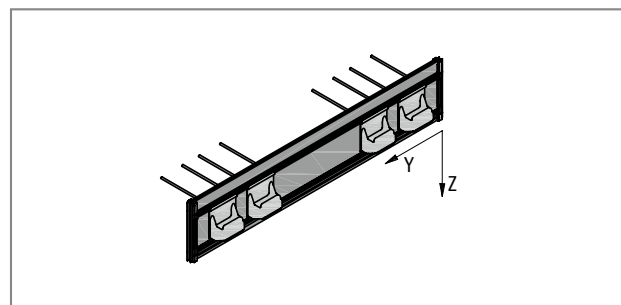


Fig. 38: Schöck Tronsole® type T: Sign rule for the design

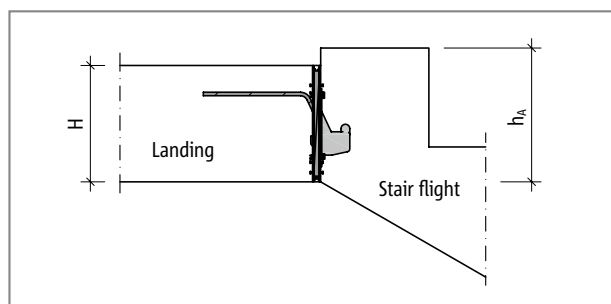


Fig. 39: Schöck Tronsole® type T: Connection height  $h_A$

## **i** Notes on design

- ▶ Area of application of the Schöck Tronsole® type T: Stair flight and landing slabs with mainly quiescent effects
- ▶ A structural calculation is to be produced for the reinforced concrete structural elements adjacent on both sides of the Schöck Isokorb® type T. For the determination of the reinforcement a flexible support is to be assumed as only vertical shear forces and shear forces parallel to the joints can be transmitted through the Tronsole® type T
- ▶ With standard buildings above ground, there are no qualms with regard to the stability as stair support, on the employment of the Schöck Tronsole® type T in earthquake zones of the Federal Republic of Germany. This statement includes buildings in earthquake zone 3 in accordance with DIN 4149.
- ▶ The connection height  $h$  on the flight side  $A$  must be at least as great as the Tronsole® height  $H$ .
- ▶ With the use of the Schöck Tronsole® type T-V-NF, for fabrication the flight side connection  $h_A$  is to be selected  $\geq 180$  mm.

## On-site reinforcement - In-situ concrete construction

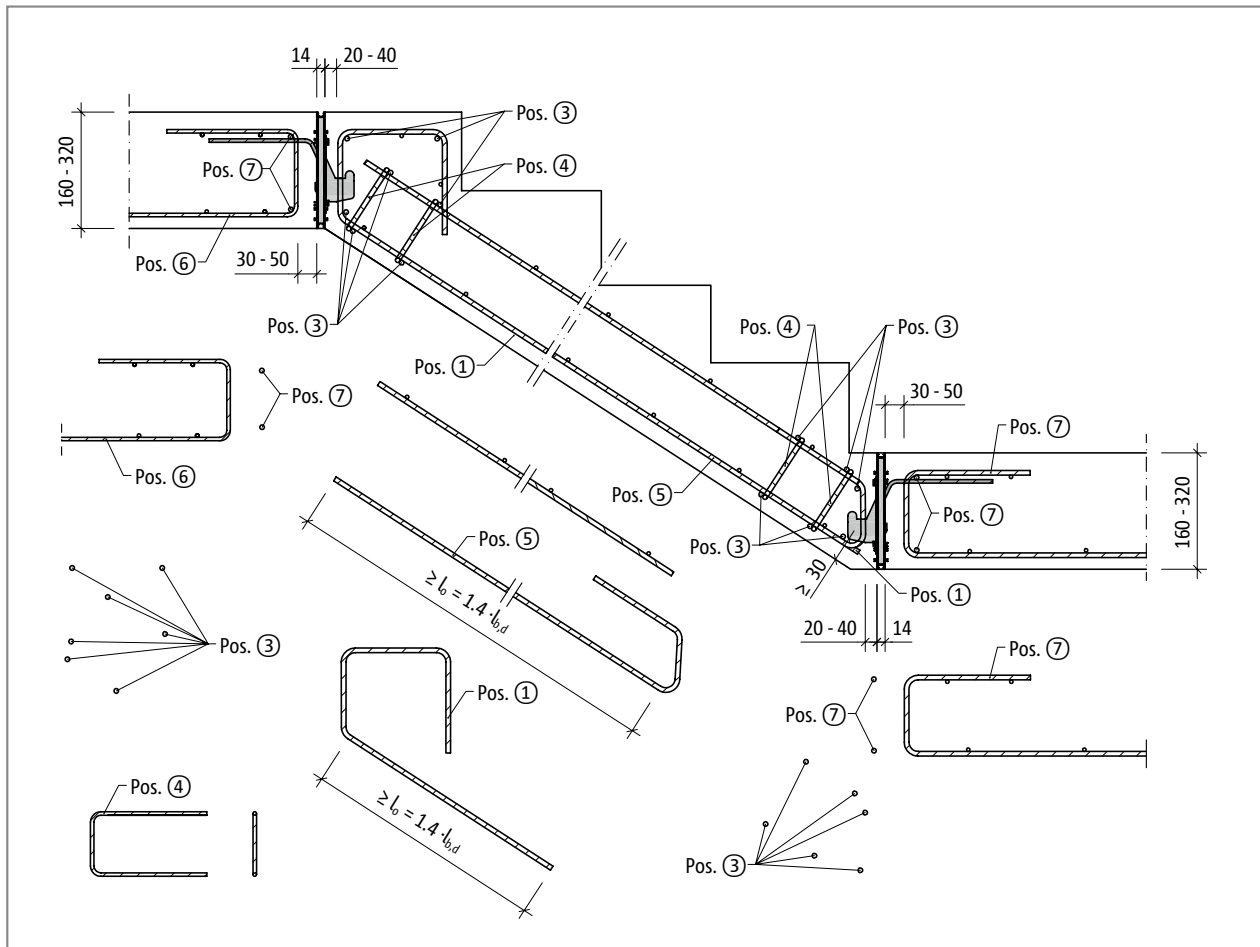


Fig. 40: Schöck Tronsole® type T: On-site reinforcement

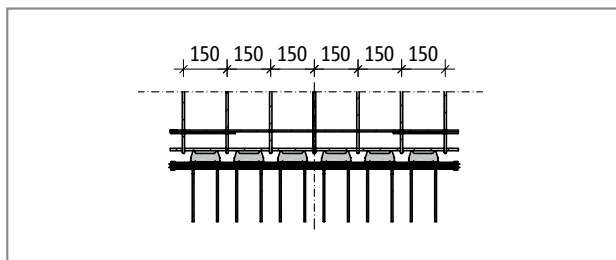


Fig. 41: Schöck Tronsole® type T: Laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

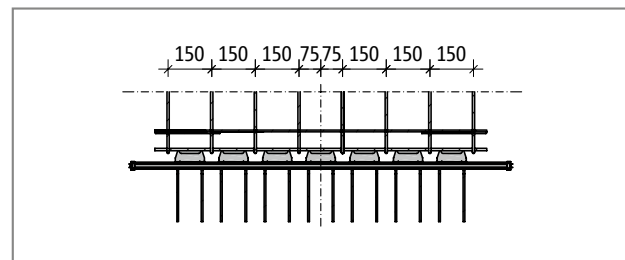


Fig. 42: Schöck Tronsole® type T: Displaced laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

## On-site reinforcement - In-situ concrete construction

Schöck Tronsole® type		T
On-site reinforcement	Location	Concrete strength class $\geq$ C20/25
<b>Pos. 1 slip-in stirrup or stirrup mesh as suspended reinforcement</b>		
Pos. 1	on the flight side	H8@150 mm
<b>Pos. 2 closed stirrups</b>		
Pos. 2	on the flight side	H8@150 mm
<b>Pos. 3 steel rods in transverse direction of the stairs</b>		
Pos. 3	on the flight side	15 · H8
<b>Pos. 4 Ties for the securing of the stair strings</b>		
Pos. 4	on the flight side	2 · 4 · H8
<b>Pos. 5 Ties or stirrup mesh as suspended reinforcement</b>		
Pos. 5	on the flight side	H8@150 mm
<b>Pos. 6 ties or stirrup mesh as edging</b>		
Pos. 6	on the landing side	H8@150 mm
<b>Pos. 7 steel rods in transverse direction of the stairs</b>		
Pos. 7	on the landing side	2 · H8
<b>Pos. 8 Ties or stirrup mesh as edging</b>		
Pos. 8	on the landing side	H8@150 mm
<b>Pos. 9 steel rods in transverse direction of the stairs</b>		
Pos. 9	on the landing side	2 · H8

Schöck Tronsole® type		T
On-site reinforcement	Location	Concrete strength class $\geq$ C20/25
<b>Pos. 1 slip-in stirrup or stirrup mesh as suspended reinforcement</b>		
Pos. 1	on the flight side	H8@150 mm
<b>Pos. 3 steel rods in transverse direction of the stairs</b>		
Pos. 3	on the flight side	13 · H8
<b>Pos. 4 Ties for the securing of the stair strings</b>		
Pos. 4	on the flight side	2 · 4 · H8
<b>Pos. 5 Ties or stirrup mesh as suspended reinforcement</b>		
Pos. 5	on the flight side	H8@150 mm
<b>Pos. 6 ties or stirrup mesh as edging</b>		
Pos. 6	on the landing side	H8@150 mm
<b>Pos. 7 steel rods in transverse direction of the stairs</b>		
Pos. 7	on the landing side	2 · H8
<b>Pos. 8 Ties or stirrup mesh as edging</b>		
Pos. 8	on the landing side	H8@150 mm
<b>Pos. 9 steel rods in transverse direction of the stairs</b>		
Pos. 9	on the landing side	2 · H8

## On-site reinforcement - Precast construction

### **i** Notes

- ▶ The bending tension reinforcement of the stair flight is to be determined by the structural engineer.
- ▶ A suspended reinforcement dimensioned for the maximum shear force is to be positioned at both ends of the stair flight (Pos. 1, Pos. 5). Normally this is achieved by the running up of the lower reinforcement. A sufficient anchoring is to be ensured.
- ▶ The support corbels of the Schöck Tronsole® type T are arranged in a structural module, which is 150 mm resp. a multiple of 150 mm. Due to the even number of support corbels and their centre line symmetrical arrangement the longitudinal axis of the stair flight agrees with the centre of the Tronsole® and with the origin of the laying grid of the longitudinal reinforcement.
- ▶ The odd number of support brackets (7 pc) requires a displacement of the laying grid of the stair reinforcement of 75 mm in the transverse direction, as the centre of the Tronsole® type T-V7 is occupied by a support bracket. The gaps between the support corbels are to be found 75 mm left and right of the centre of this product variant.

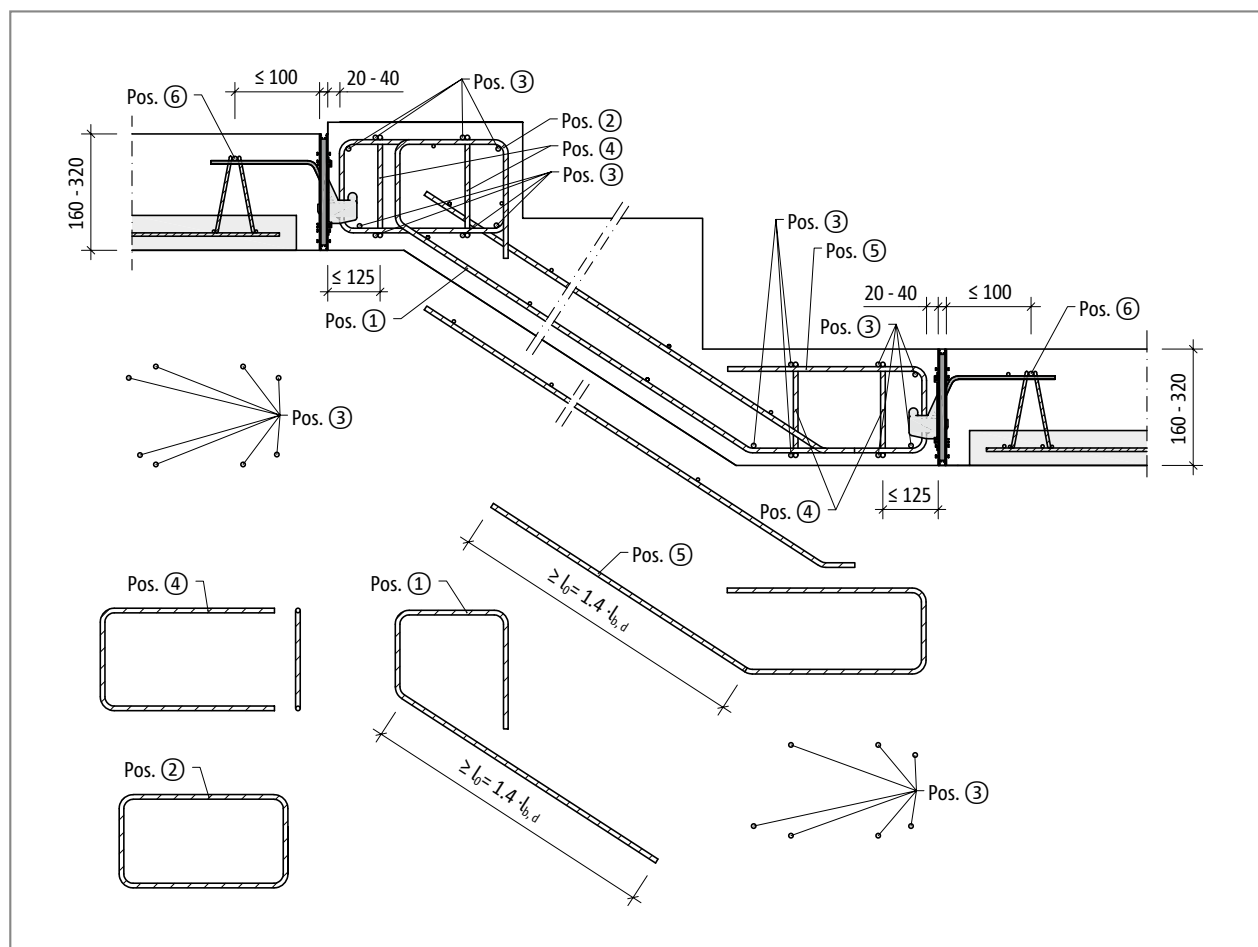


Fig. 43: Schöck Tronsole® type T: On-site reinforcement with precast landing

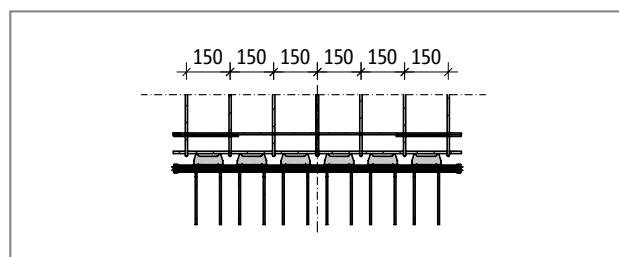


Fig. 44: Schöck Tronsole® type T: Laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

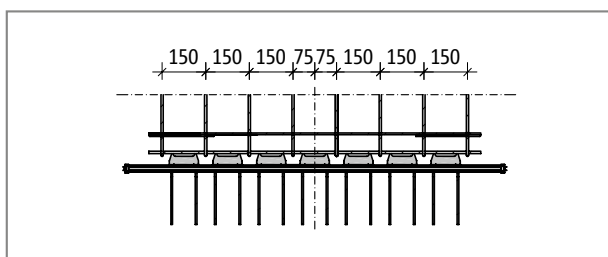


Fig. 45: Schöck Tronsole® type T: Displaced laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®



## On-site reinforcement - Precast construction | Compression joints

Schöck Tronsole® type		T
On-site reinforcement	Location	Concrete strength class $\geq C20/25$
<b>Pos. 1 slip-in stirrup or stirrup mesh as suspended reinforcement</b>		
Pos. 1	on the flight side	H8@150 mm
<b>Pos. 2 closed stirrups</b>		
Pos. 2	on the flight side	H8@150 mm
<b>Pos. 3 steel rods in transverse direction of the stairs</b>		
Pos. 3	on the flight side	15 · H8
<b>Pos. 4 Ties for the securing of the stair strings</b>		
Pos. 4	on the flight side	2 · 4 · H8
<b>Pos. 5 Ties or stirrup mesh as suspended reinforcement</b>		
Pos. 5	on the flight side	H8@150 mm
<b>Pos. 6 Lattice girders as edging</b>		
Pos. 6	on the landing side	equivalent to H8@150 mm = 3.35 cm <sup>2</sup> /m

### **i** Notes

- ▶ The bending tension reinforcement of the stair flight is to be determined by the structural engineer.
- ▶ A suspended reinforcement dimensioned for the maximum shear force is to be positioned at both ends of the stair flight (Pos. 1, Pos. 5). Normally this is achieved by the running up of the lower reinforcement. A sufficient anchoring is to be ensured.
- ▶ The support corbels of the Schöck Tronsole® type T are arranged in a structural module, which is 150 mm resp. a multiple of 150 mm. Due to the even number of support corbels and their centre line symmetrical arrangement the longitudinal axis of the stair flight agrees with the centre of the Tronsole® and with the origin of the laying grid of the longitudinal reinforcement.
- ▶ The odd number of support brackets (7 pc) requires a displacement of the laying grid of the stair reinforcement of 75 mm in the transverse direction, as the centre of the Tronsole® type T-V7 is occupied by a support bracket. The gaps between the support corbels are to be found 75 mm left and right of the centre of this product variant.

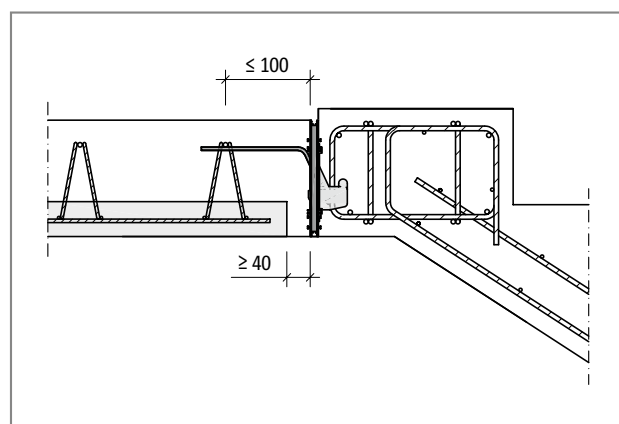


Fig. 46: Schöck Tronsole® type T: Installation in combination with prefabricated floors, compression joint on floor side

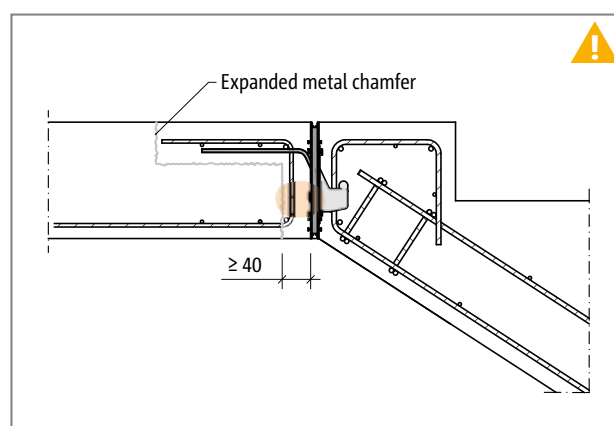


Fig. 47: Schöck Tronsole® type T: Installation in combination with construction joints at floor edge, compression joint on floor side

### **⚠ Hazard note compression joints**

Compression joints are joints which, with unfavourable loading combination, remain completely overpressured (DIN EN 1992-1-1/NA, NCI to 10.9.4.3(1)). The products own stainless steel supporting angle of the Schöck Tronsole® type T transmits a horizontal compression force to the floor front face. With construction joints at the floor edge or with prefabricated floors then the definition in the standard is also effective.

- ▶ Compression joints are to be marked in framework and reinforcement plans.
- ▶ Compression joints between precast elements are always to be grouted using in-situ concrete. This also applies for compression joints with the Schöck Isokorb® type T!
- ▶ For compression joints with the Schöck Isokorb® type T, an in-situ concrete and/or poured strips of  $\geq 40$  mm width must be implemented. This is to be entered in the working drawings.

## Deflection

### Deformation of the Elodur® elastomer support of the Tronsole® type T

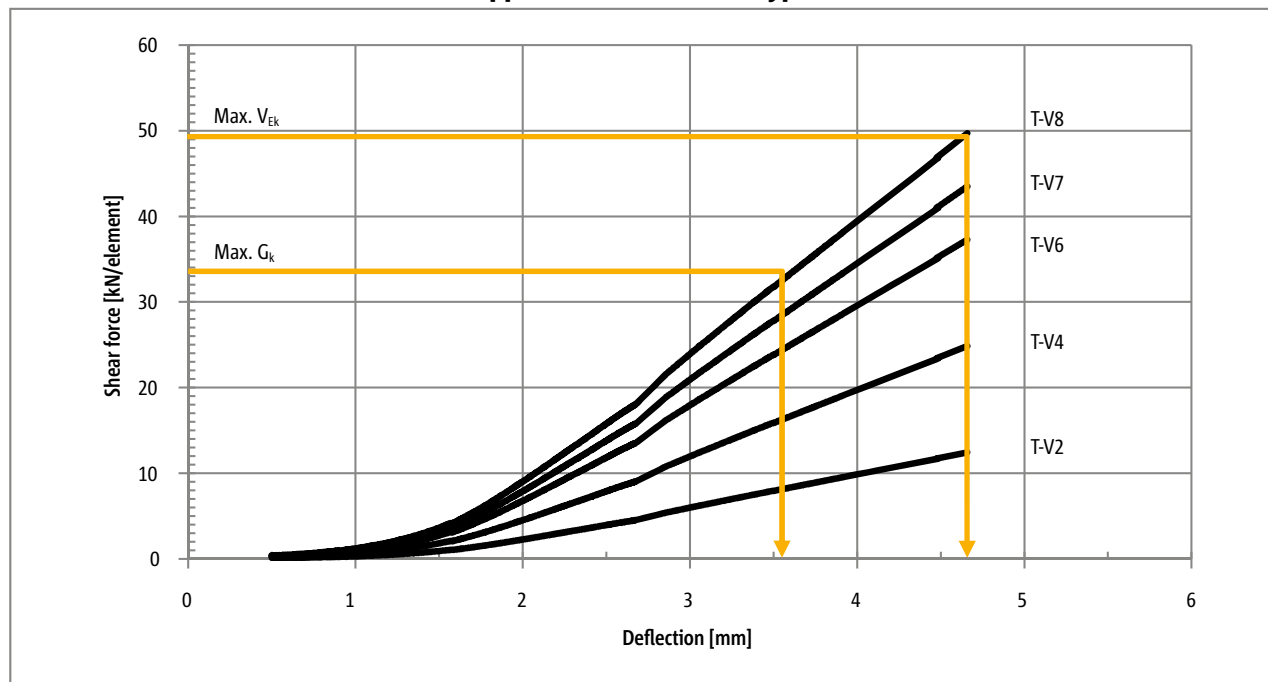


Fig. 48: Schöck Tronsole® type T: Deformation of the Elodur® elastomer support

#### **i** Notes on deformation

- ▶ Deflection is the vertical deformation of the Elodur® elastomer support under vertical shear force load.
- ▶ Creep is additionally to be taken into account with 50 % of the deflection from the constant load  $G_k$ .
- ▶  $\text{Max. } V_{Ek} = \text{Max. } V_{Ed} / \gamma$ , whereby  $\gamma = 1.4$
- ▶  $\gamma = 1.4$  applies under the assumption that  $\text{Max. } V_{Ed}$  is made up of two thirds from own weight and one third from live load.
- ▶ Thus  $\text{Max. } V_{Ek}$  is the maximum service load and the maximum own weight is  $\text{Max. } G_k = 2/3 \cdot \text{Max. } V_{Ek}$ .

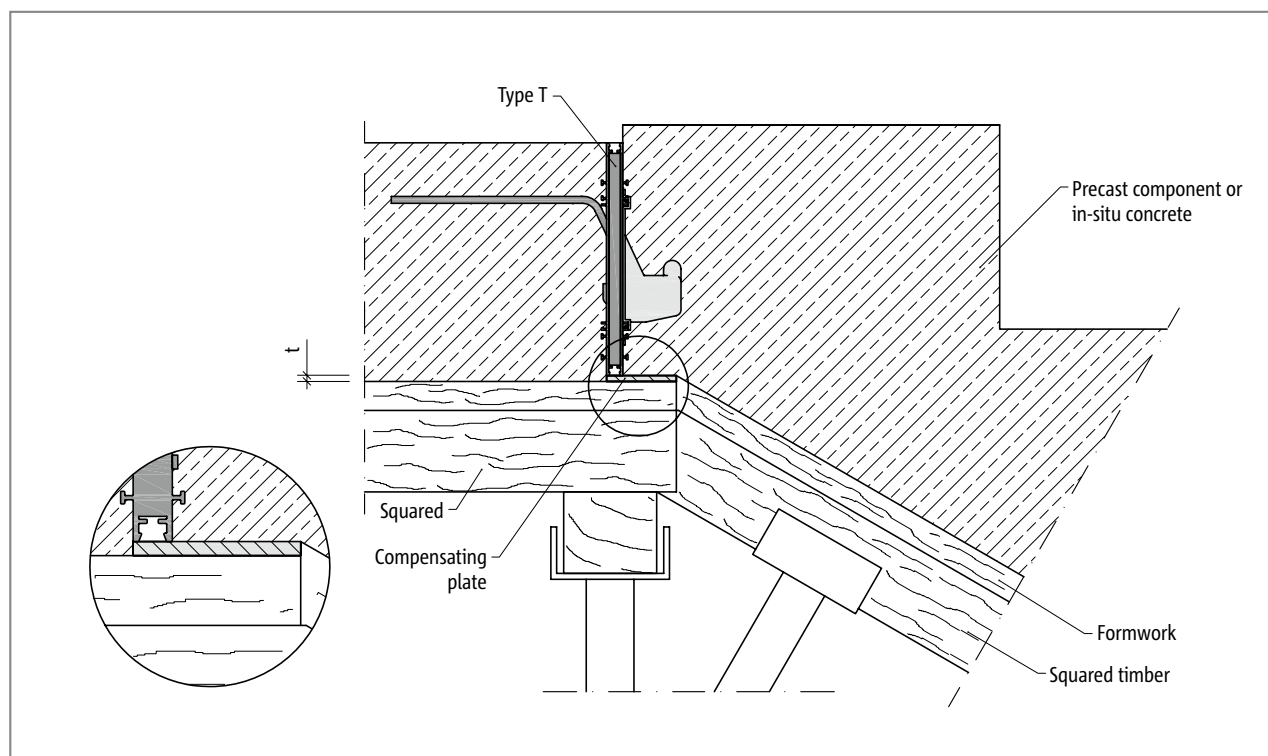


Fig. 49: Schöck Tronsole® type T: Taking into account the deflection of the stair flight by means of on-site compensating plate of thickness  $t$

## Fire protection | Materials | Installation

### Fire protection

- ▶ The neighbouring structural elements must satisfy the same building supervisory requirements on the fire resistance capability as the connection area itself.
- ▶ Schöck Tronsole® type T is equipped with fire protection tapes. They have been classified in the fire resistance class R90 in accordance with DIBt Approval Z-15.7-310.

### Materials and construction materials

Schöck Tronsole® type T	Material
PE foam panel	PE foam according to DIN EN 14313
Plastic profile	PVC-U according to DIN EN 13245-1
Shear force bars	B500A NR, Material No. 1.4362
Angle	Material No. 1.4301 or 1.4404
Elastomer support	Polyurethane according to DIN EN 13165
Corbel cover	Polystyrene
Slip-on profile	PVC-U according to DIN EN 13245-1
Nail batten	PVC (Regrind)

### Installation

- ▶ With the use of in-situ concrete the Tronsole® is secured by means of a nail batten stuck on the base of the formwork and, at the top, with the aid of a second nail batten and a wooden strip. In the case that it is concreted on one side only the Tronsole® must additionally be supported at least three points per linear meter distributed evenly over the length.
- ▶ With prefabricated construction the Tronsole® type T is used in any case as formwork with concreting of the stair flight. With concreting in a lateral position to the stairs, the Tronsole® must be supported along its length, in order to withstand the concreting pressure.
- ▶ With negative fabrication please install the Schöck Tronsole® type T for negative construction (NF.)
- ▶ The nail batten is to be removed after stripping.

### Hazard note

- ▶ The rods of the Schöck Tronsole® type T bent in the factory may not be subsequently bent, bent back or shortened. Otherwise in such cases our warranty ceases.

T

## Customisation options

The Schöck Tronsole® type T can be ordered in centimetre steps. Should it nevertheless be necessary to cut the Schöck Tronsole® type T to length, this is possible. Depending on the initial length it can be trimmed symmetrically. The minimum length is to be taken from the product description (p. 25). After trimming the end caps are to be reassembled

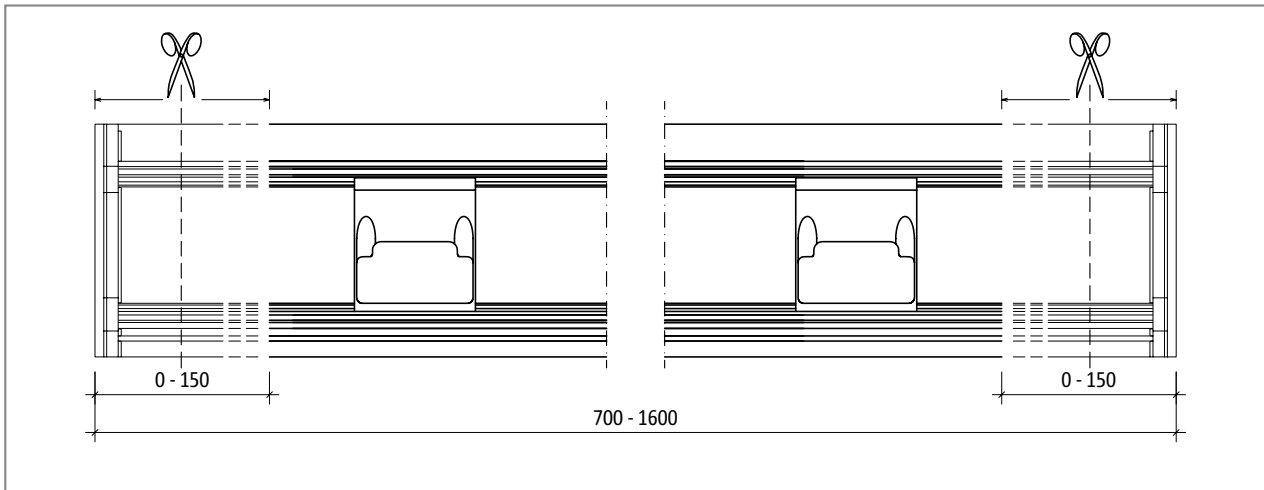


Fig. 50: Schöck Tronsole® type T: Customisation option

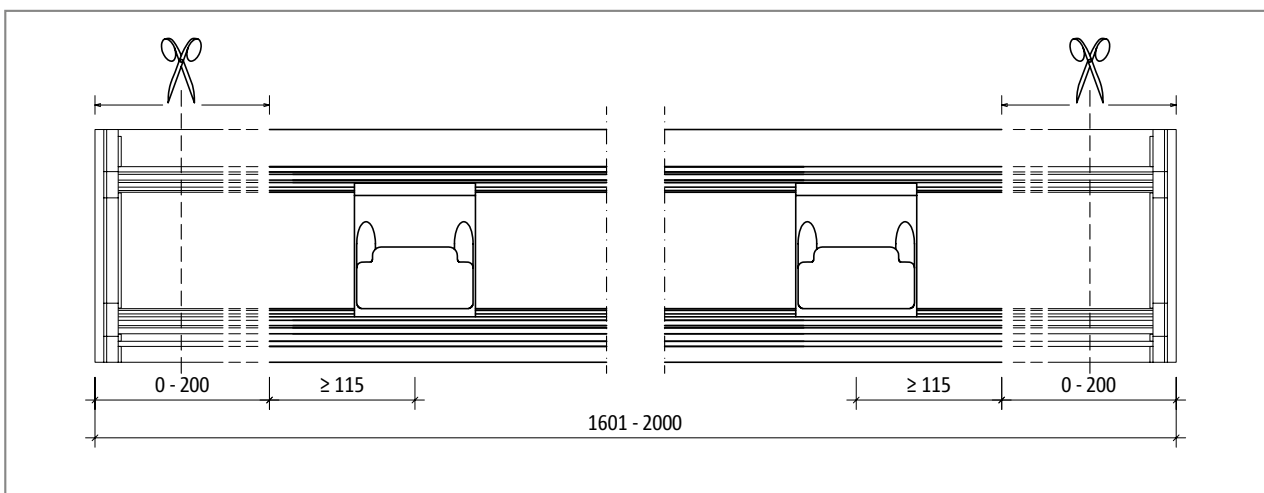


Fig. 51: Schöck Tronsole® type T: Customisation option

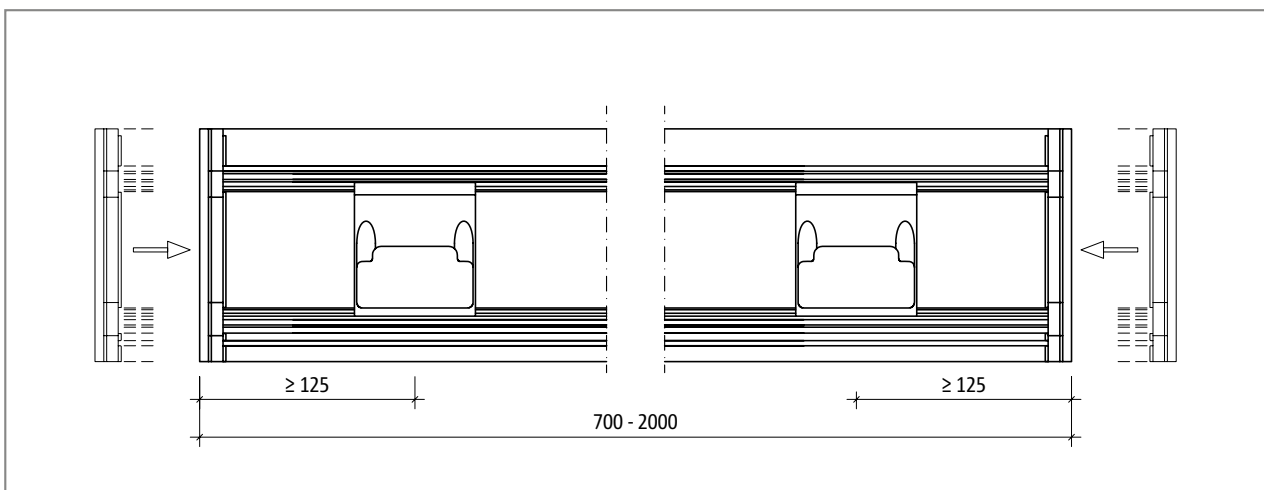
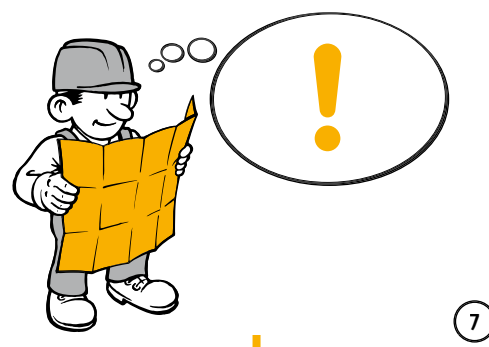
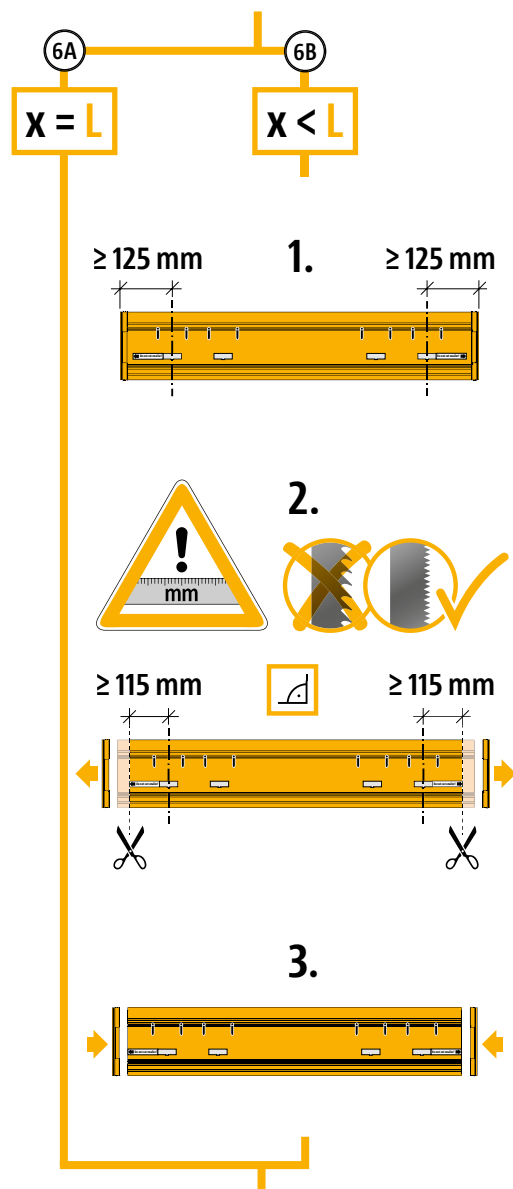
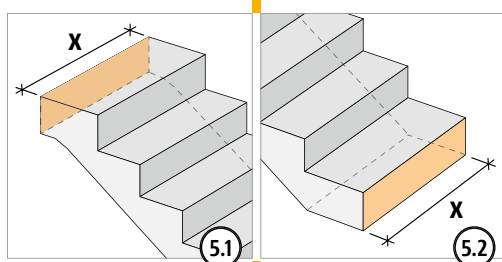
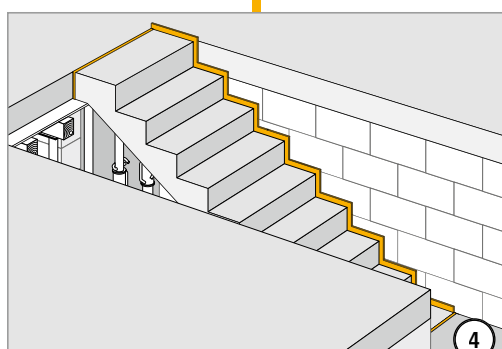
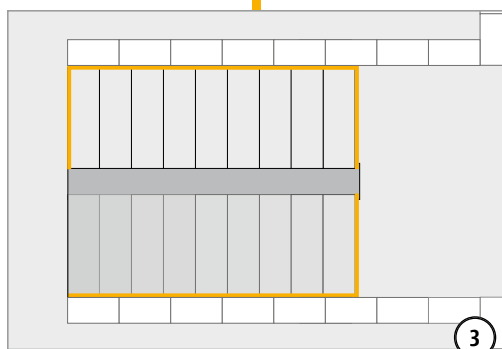
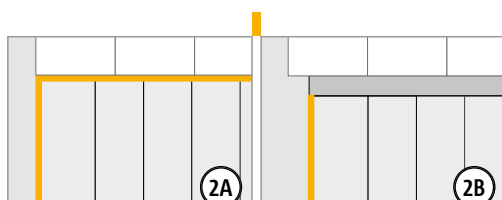
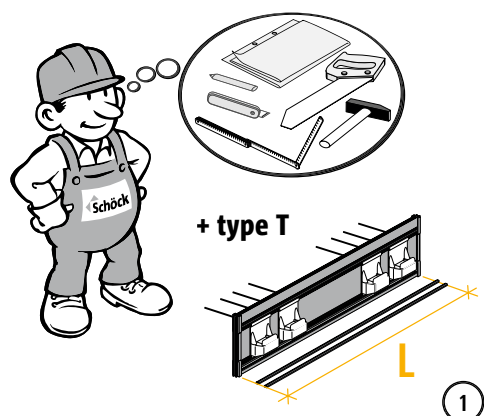
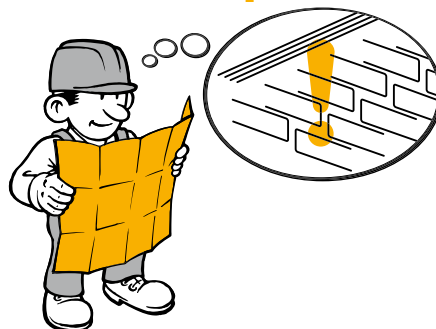
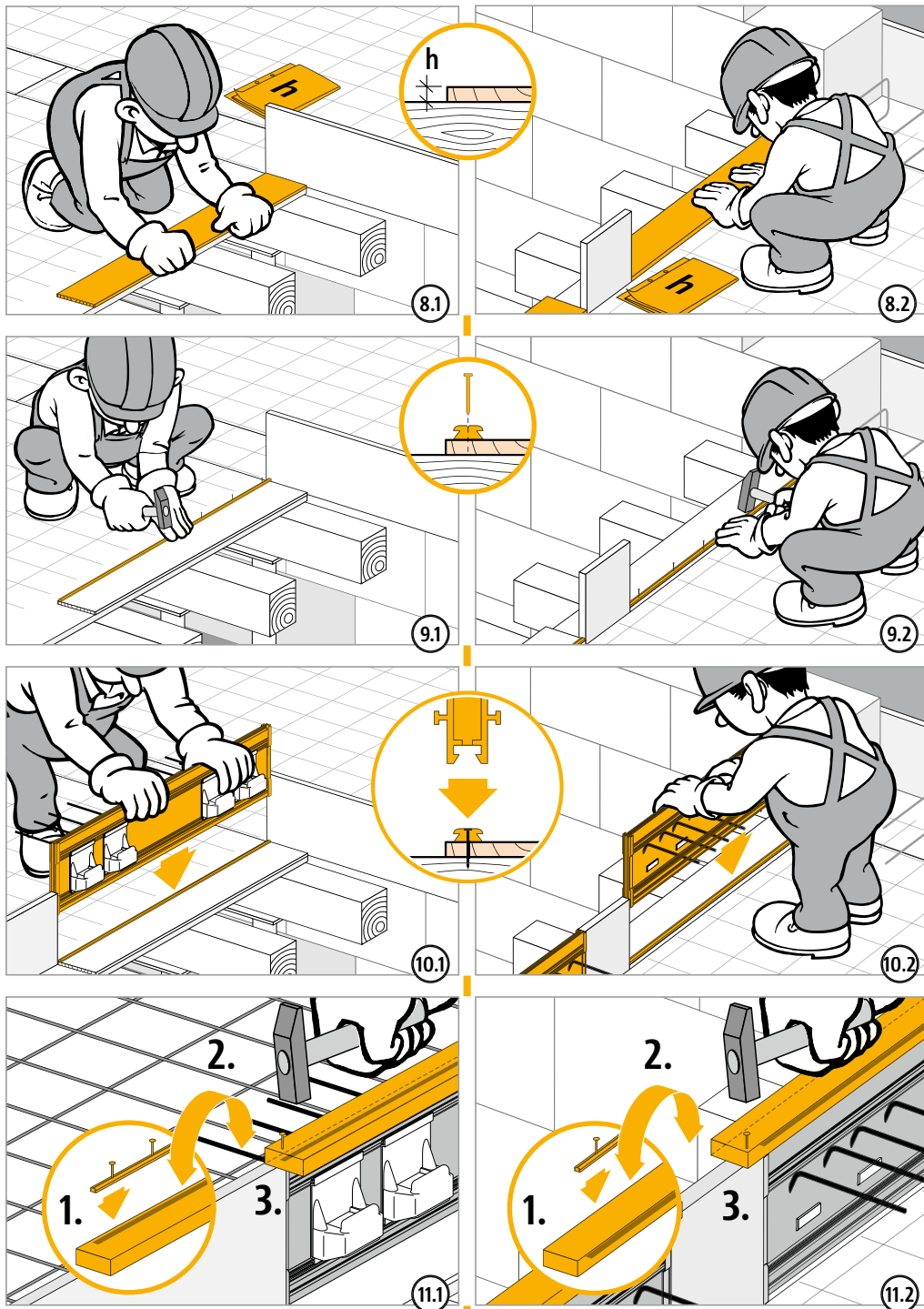


Fig. 52: Schöck Tronsole® type T: Assemble end caps after cutting to length

# Installation instructions building site in-situ concrete

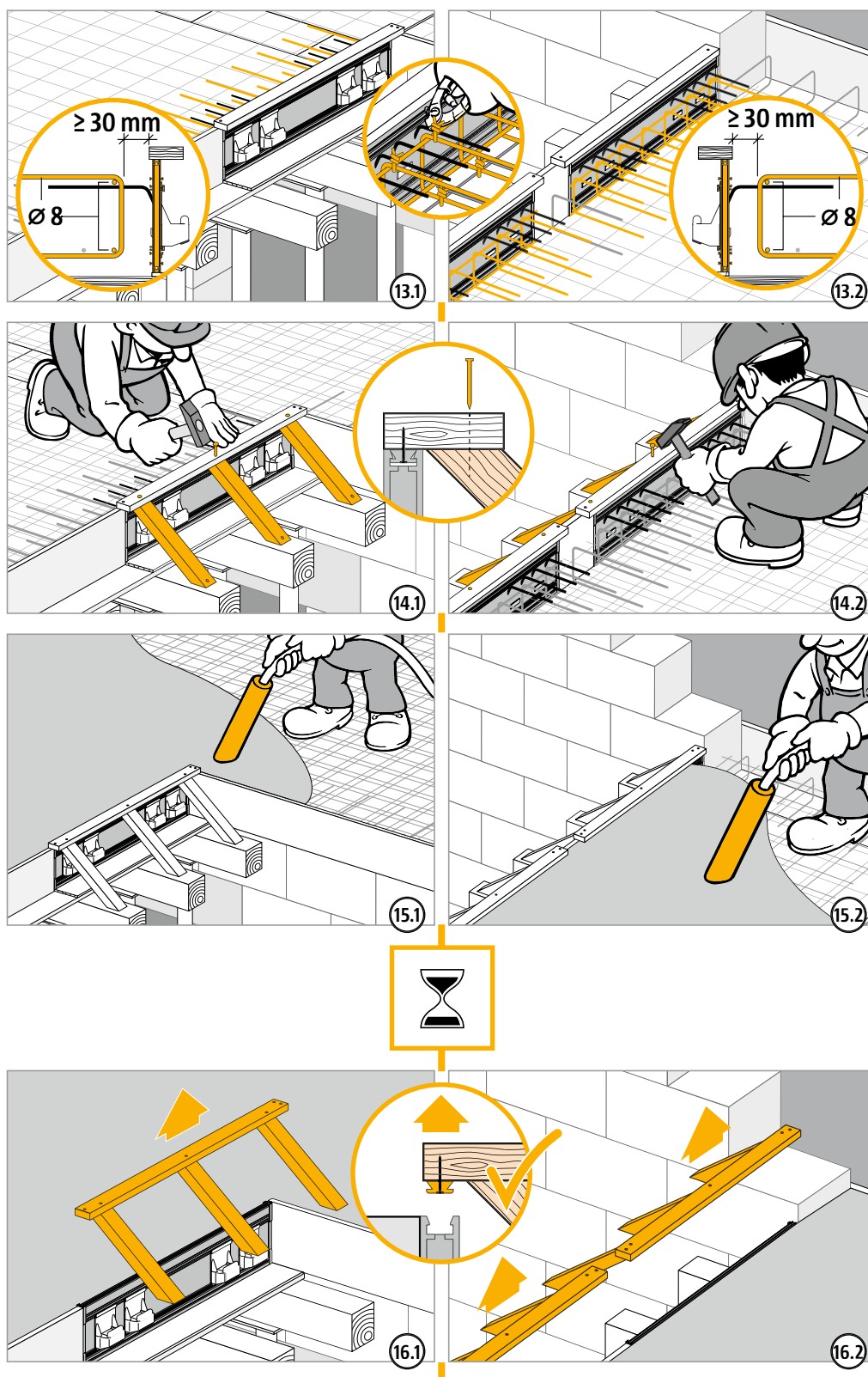


## Installation instructions building site in-situ concrete



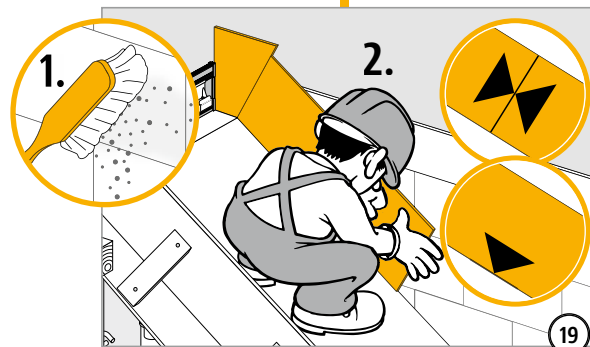
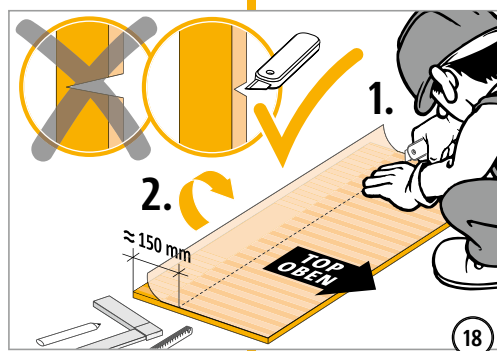
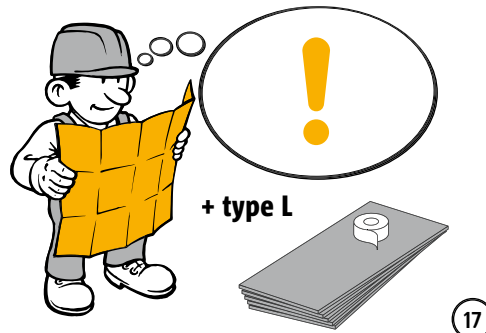
12

## Installation instructions building site in-situ concrete



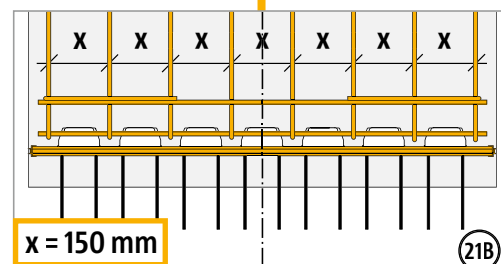
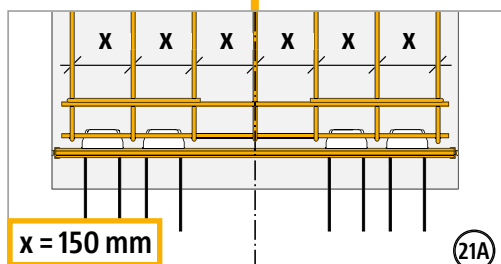
T

## Installation instructions building site in-situ concrete



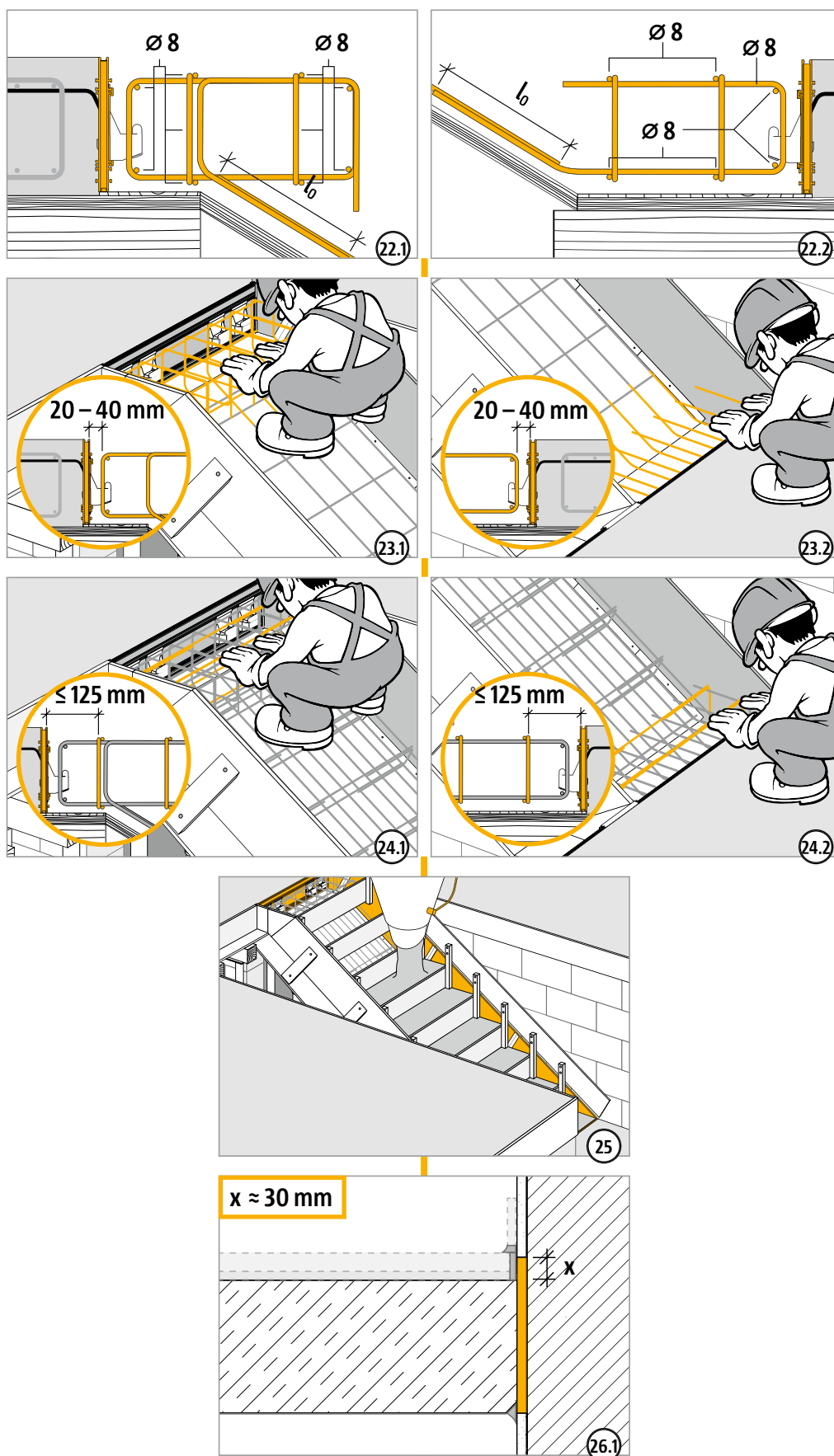
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type T-V7

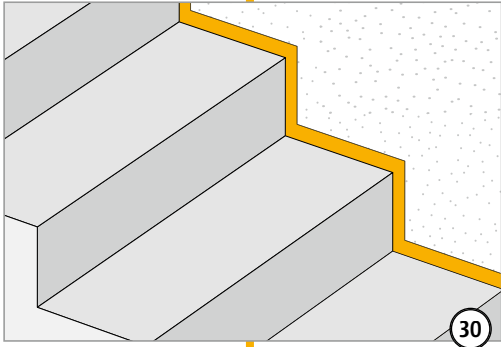
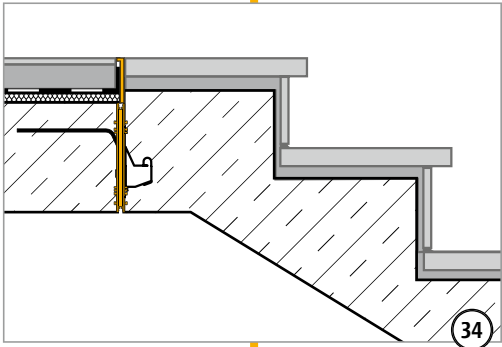
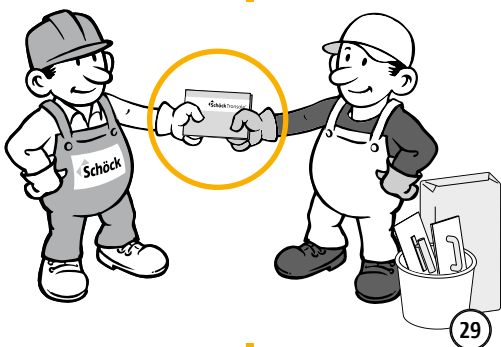
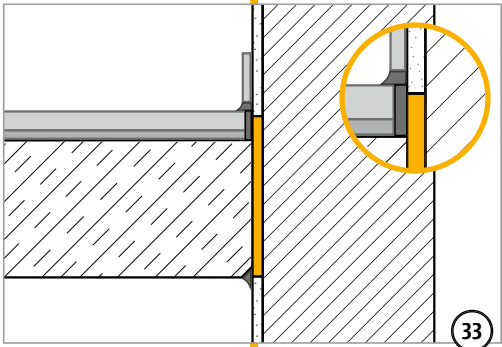
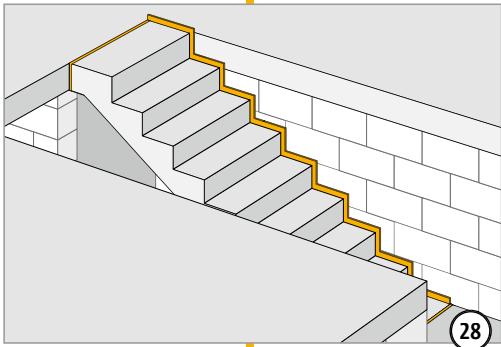
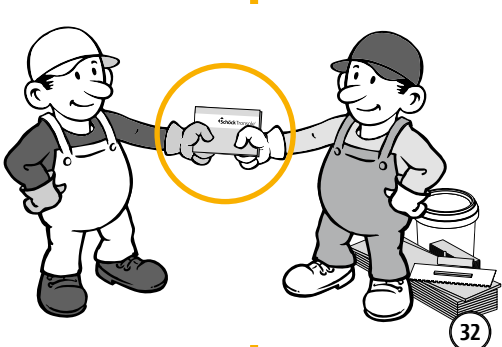
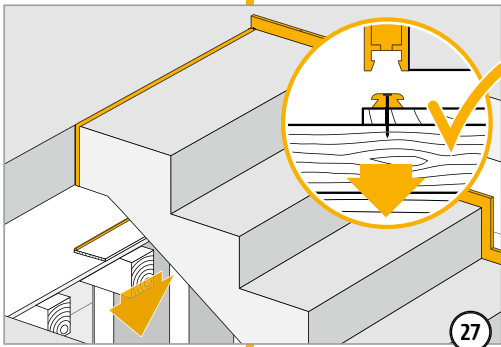
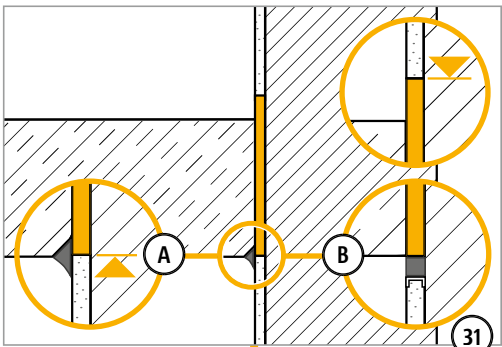
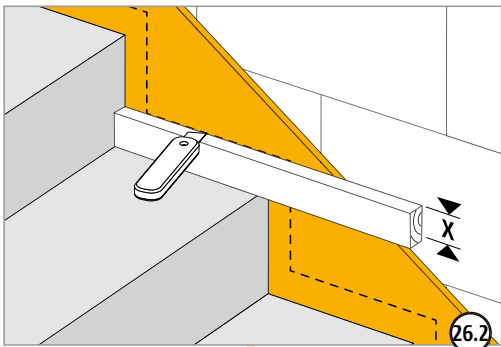




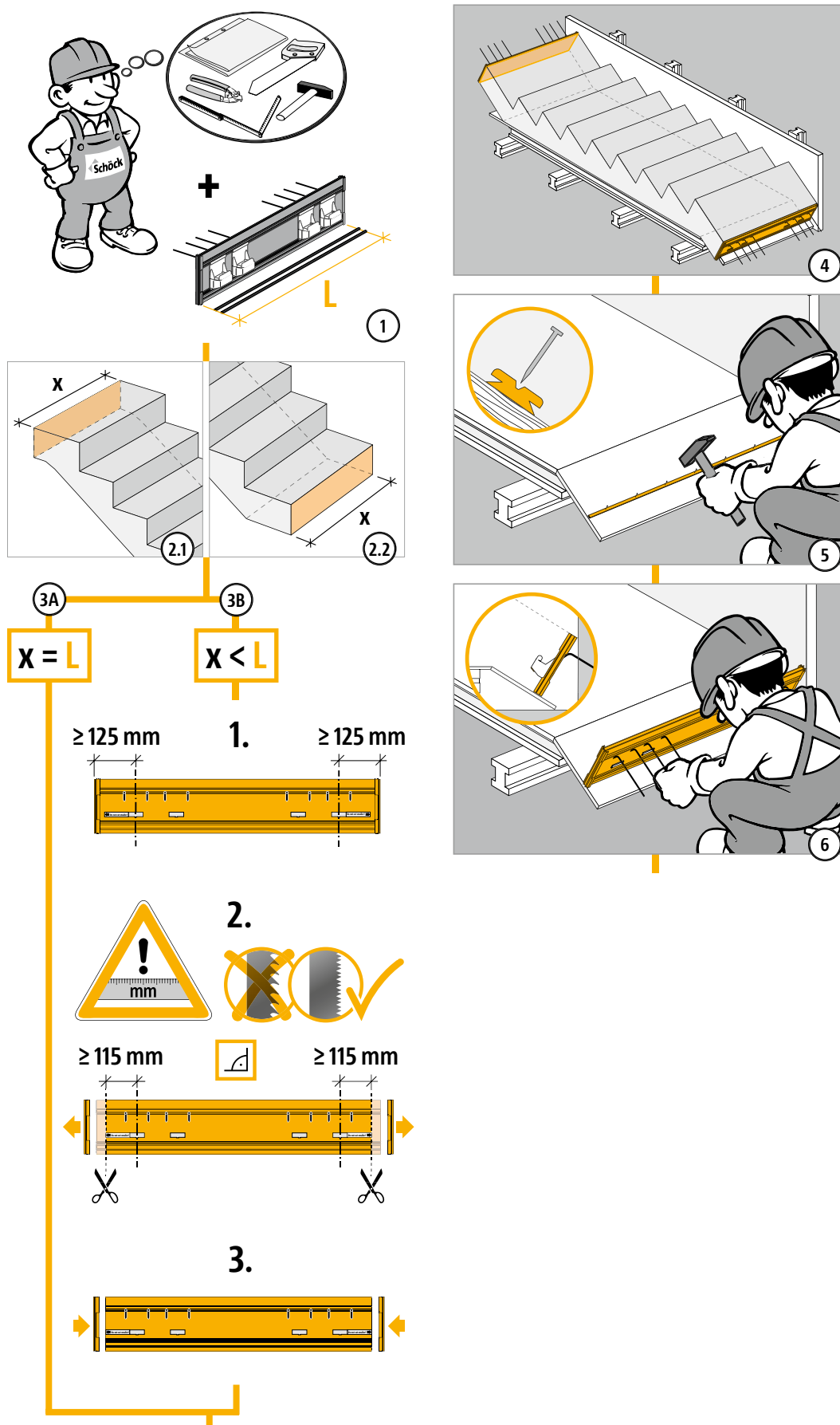
## Installation instructions building site in-situ concrete



# Installation instructions building site in-situ concrete



# Installation instructions for prefabricating plant

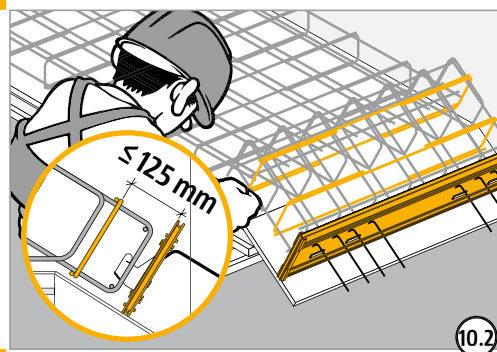
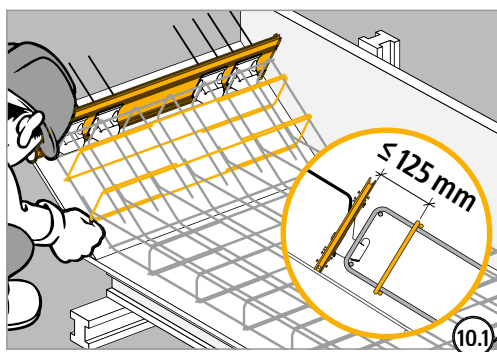
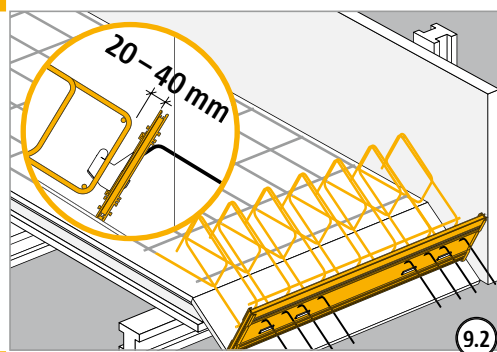
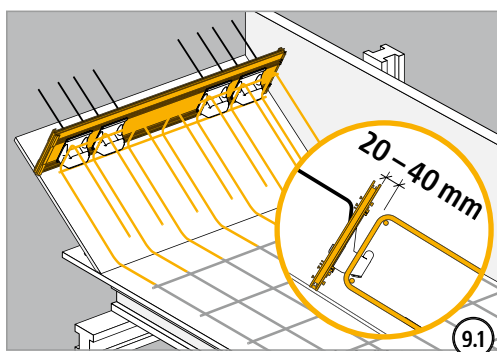
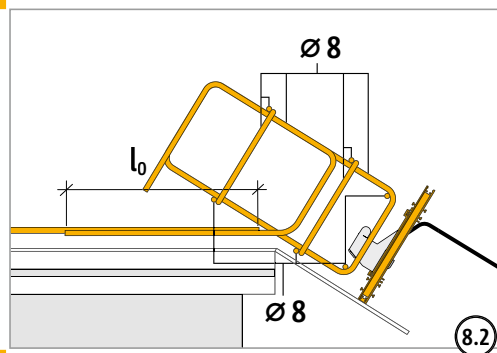
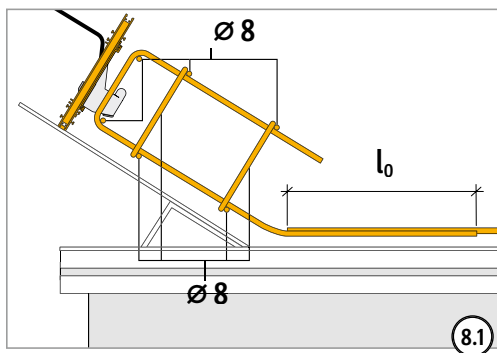
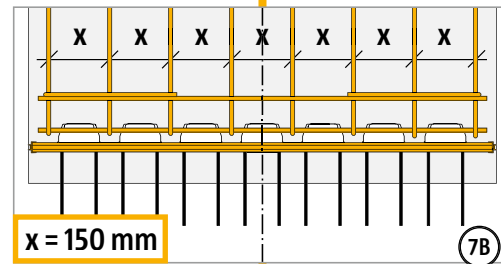
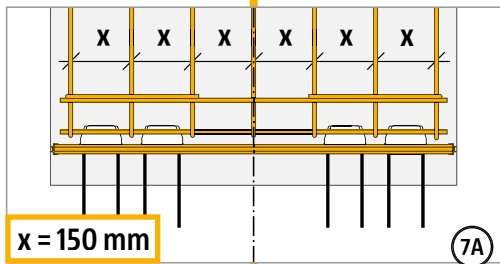


## Installation instructions for prefabricating plant

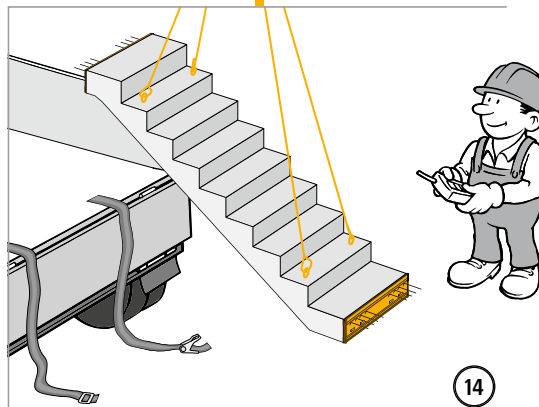
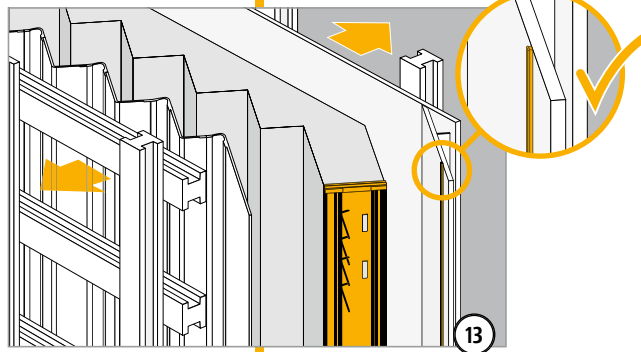
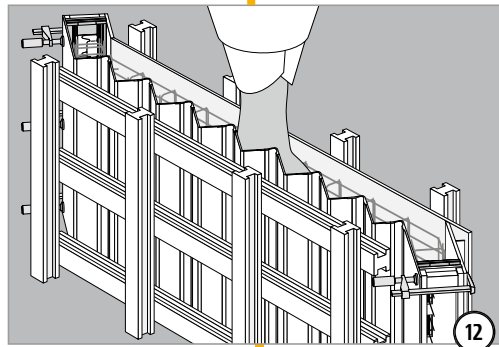
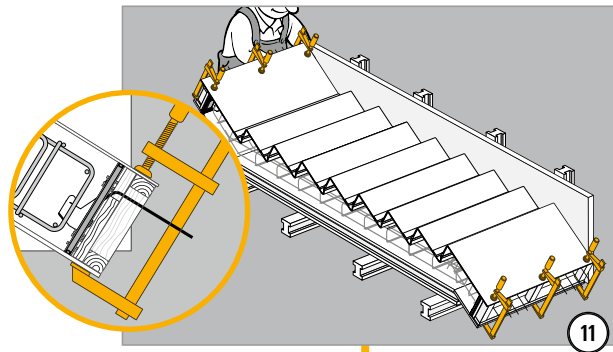


type T-V2, V4, V6, V8, ...

type T-V7

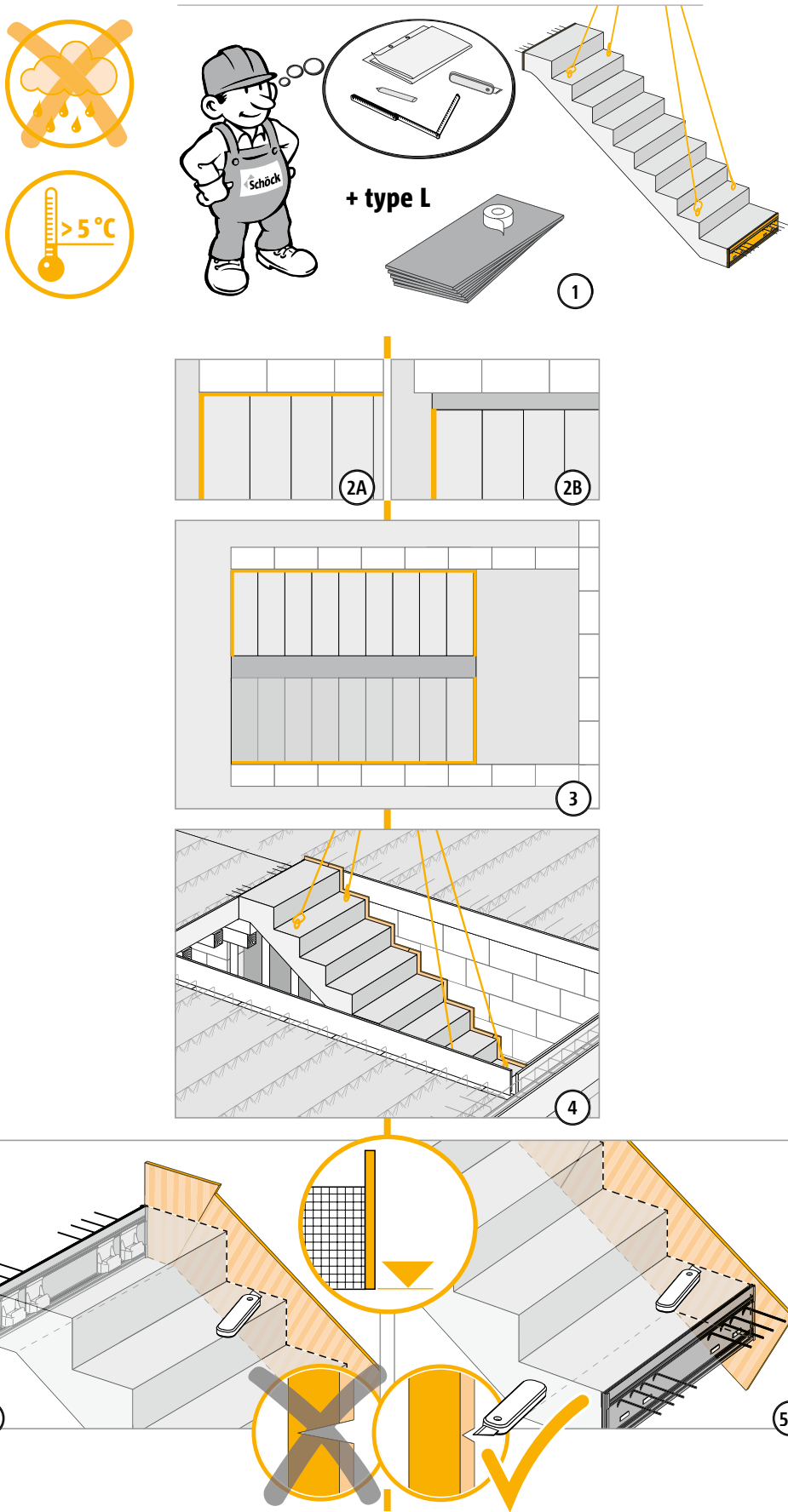


## Installation instructions for prefabricating plant

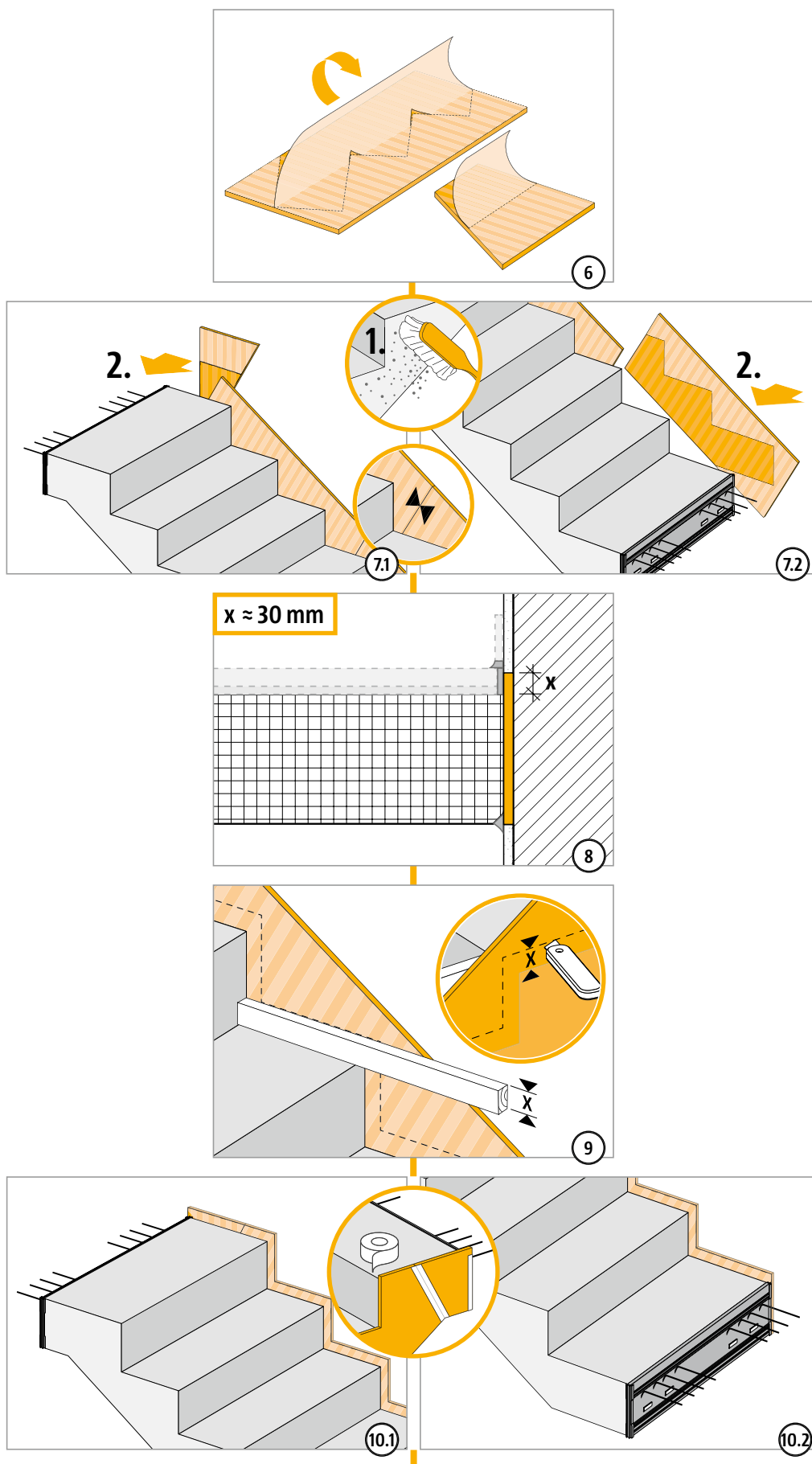


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# Installation instructions building site precast components

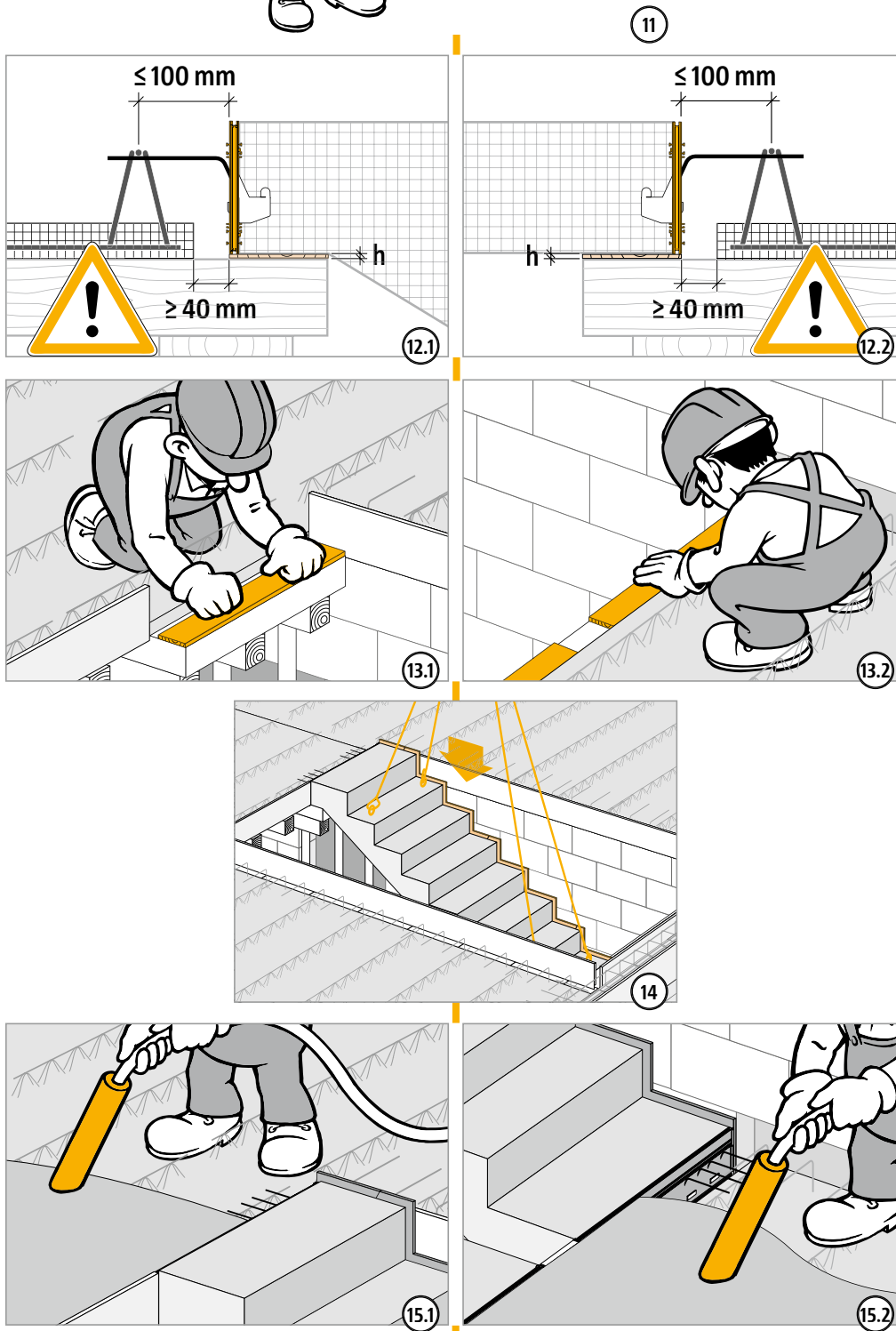
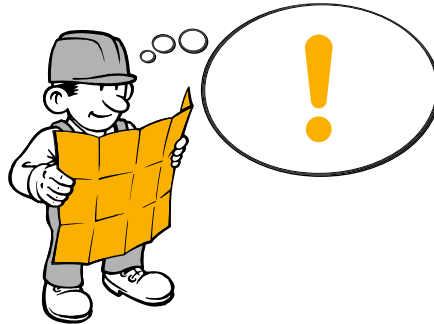


## Installation instructions building site precast components



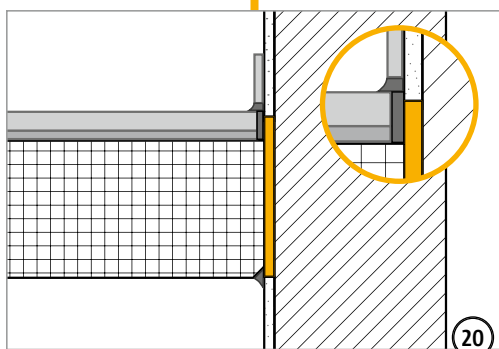
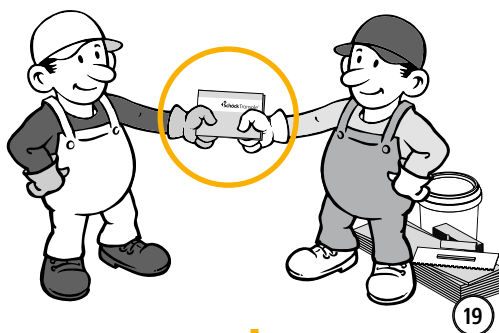
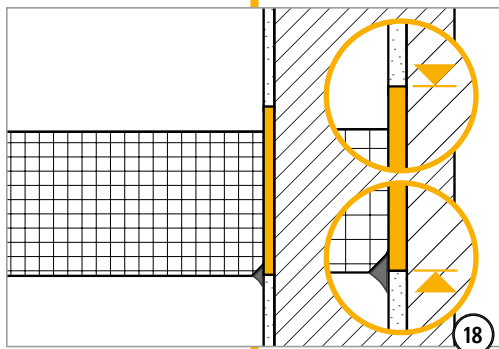
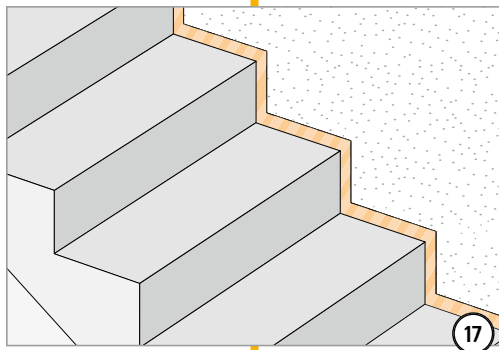
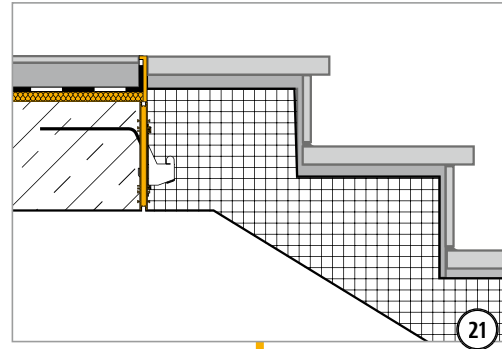
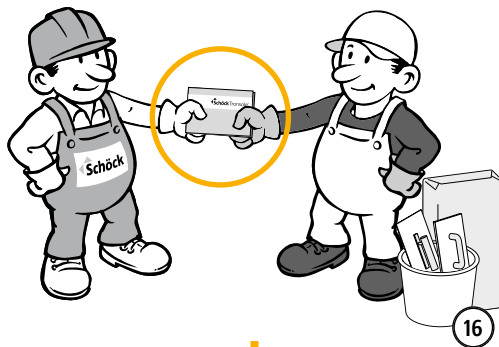


## Installation instructions building site precast components





## Installation instructions building site precast components



## Check list

- ☐ Are the dimensions of the Schöck Tronsole® type T adjusted to the structural components which are to be insulated?
- ☐ Have the effects on the Schöck Isokorb® connection been specified at design level?
- ☐ Is the minimum concrete strength  $\geq$  C20/25 taken into account with the Schöck Tronsole® type T (C30/37 with prefabricated flights of stairs with negative fabrication)?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ Are planned existing horizontal loads, which can be conducted away via the Schöck Tronsole® type T, taken into account?
- ☐ Is the Schöck Tronsole® type T-NF scheduled with a planned negative fabrication in the prefabrication plant?