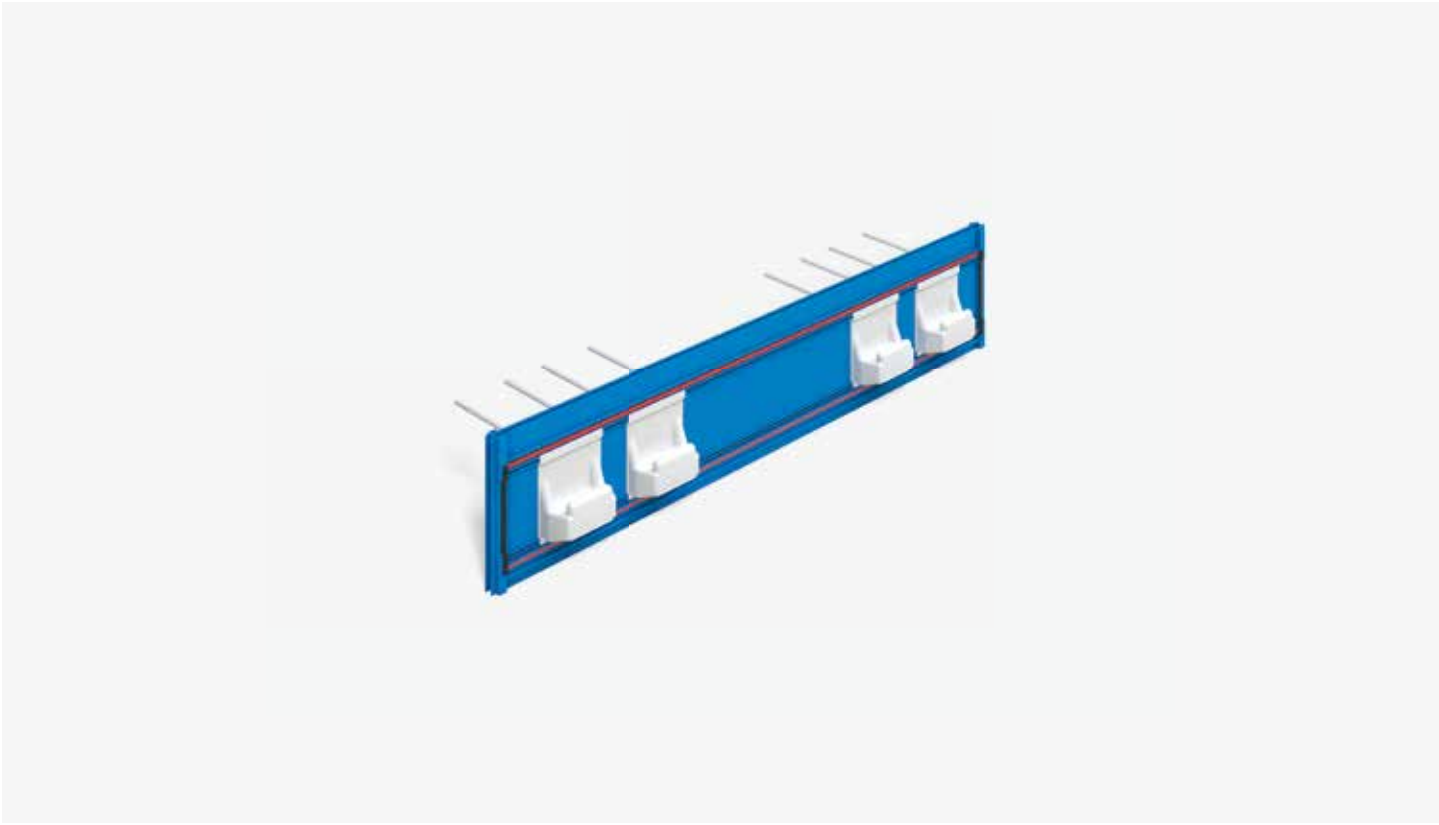
Schöck Tronsole®



Technical Information according to EC2

Schöck Tronsole®

August 2020

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CPD Seminars and on-site consultation
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Planning and consulting service

The engineers of Schöck's application engineering department would be very happy to advise you on static, structural and building-physics questions and will produce for you proposals for your solution with calculations and detailed drawings.
For this please send your planning documentation (general arrangements, sections, static data) with the address of the building project to:

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OX26 4UL

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Notes | Symbols

Technical Information

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Elodur® elastomer support

Depending on the static level of usage a deflection of the Elodur® elastomer support of some 3 mm, but maximum 5 mm, is allowed. In addition, diagrams and notes on the deflection in this Technical Information are to be observed

Tags

Hazard note

The yellow triangle with the exclamation mark indicates a hazard note. This means there is a danger to life and limb if compliance is not observed.

Info

The square with “i” indicates important information which must be read in conjuction with the design.

Check list

The square with tick indicates the check list. Here the essential points of the design are summarised.

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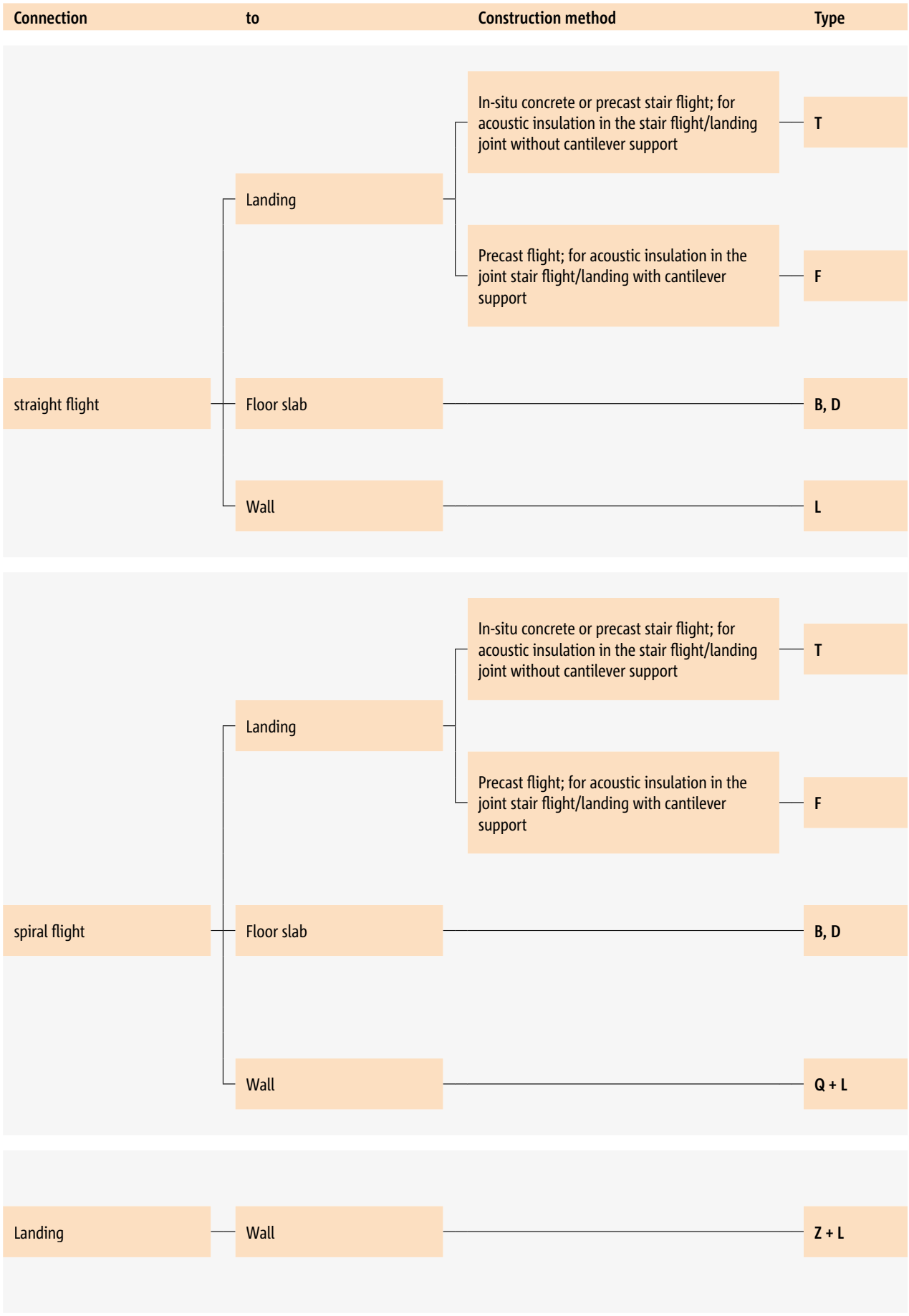
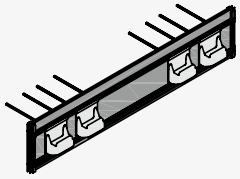
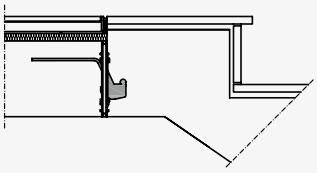
Summary of types



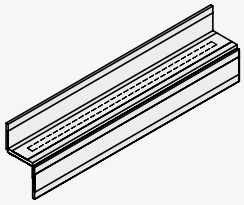
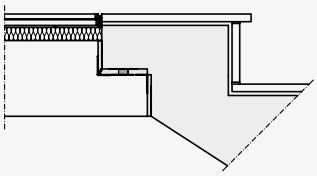
Summary of types

Schöck Tronsole® type T Page 19

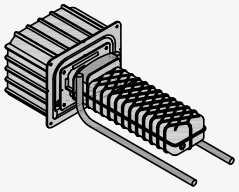
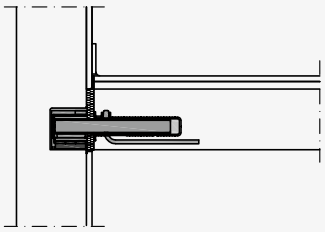
T-V8: $\Delta L^*_{n,w} \leq 29$ dB; T-V2: $\Delta L^*_{n,w} \leq 33$ dB; DIBt (German Institute for Structural Engineering) Approval; Fire Resistance Class R90

Schöck Tronsole® type F Page 49

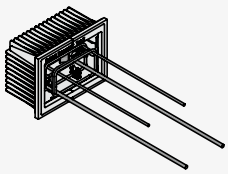
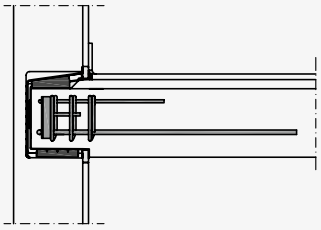
F-V2: $\Delta L^*_{n,w} \leq 30$ dB; F-V1: $\Delta L^*_{n,w} \leq 32$ dB; Fire Resistance Class R90

Schöck Tronsole® type Q Page 71

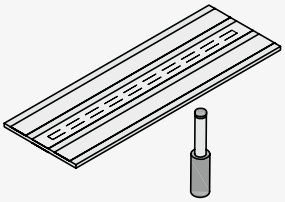
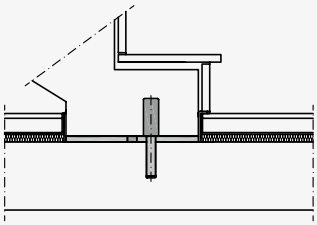
$\Delta L^*_{n,w} \leq 30$ dB; DIBt (German Institute for Structural Engineering) Approval; Fire Resistance Class R90; rotating load-bearing element

Schöck Tronsole® type Z Page 107

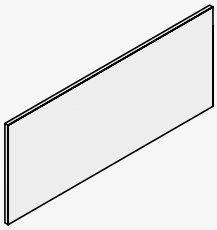
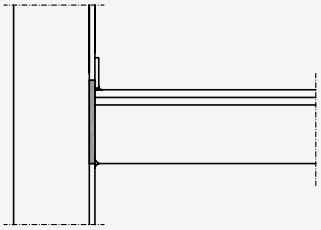
$\Delta L^*_{n,w} \leq 27$ dB; Fire Resistance Class R90

Schöck Tronsole® type B, D Page 131

B-V2: $\Delta L^*_{n,w} \geq 30$ dB; B-V1: $\Delta L^*_{n,w} \geq 32$ dB

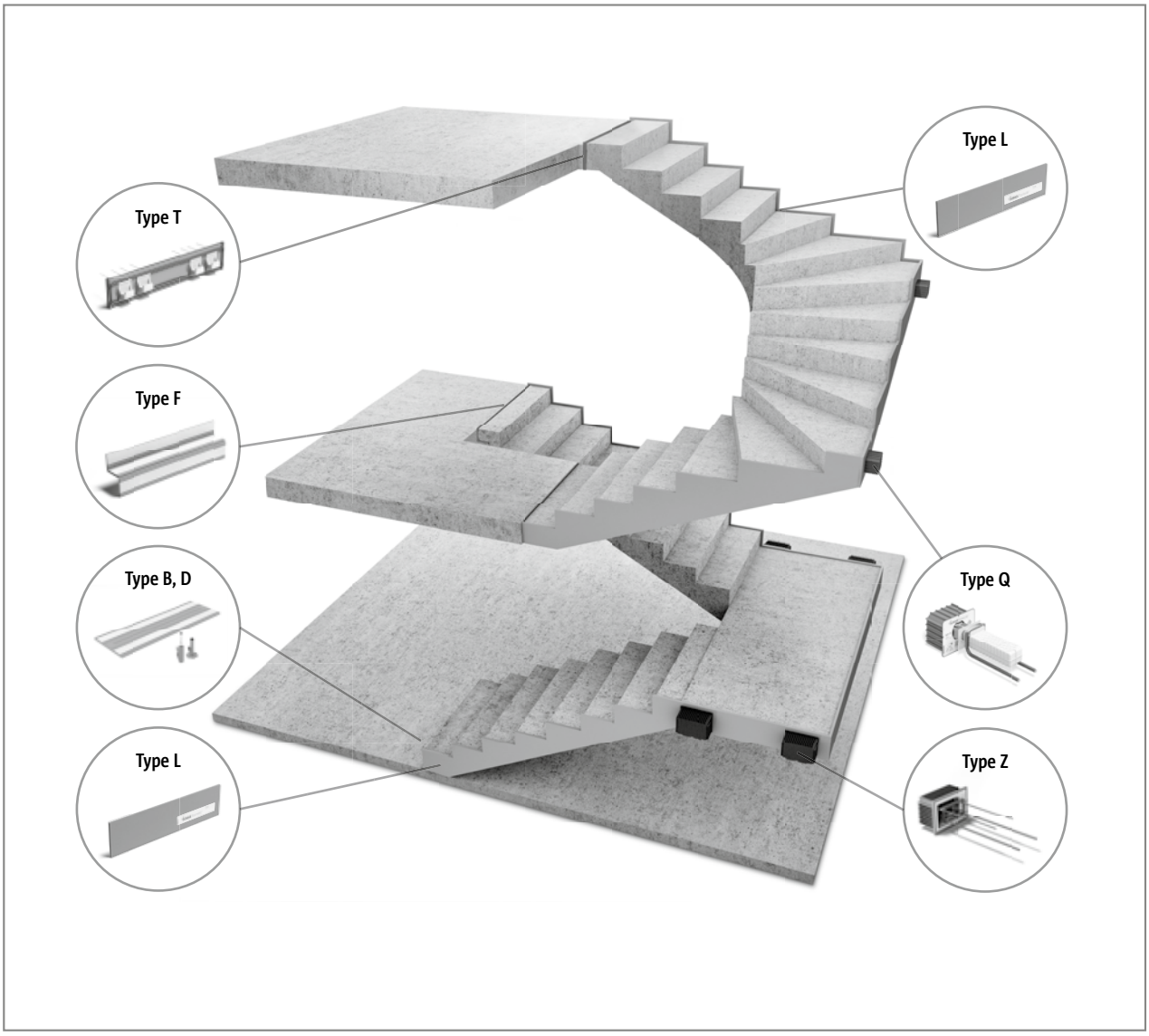
Schöck Tronsole® type L Page 155

Avoidance of acoustic bridges in the joint

Soundproofing systems with Schöck Tronsole®

With the Schöck Tronsole® types, various soundproofing systems can be realised depending on the design requirement. The installation of the Schöck Tronsole® enables freedom from acoustic bridges over all subsections from the shell up to the completion of the building.



Soundproofing system for stair flights using Schöck Tronsole® types T, L and Q

Spiral stairs between the main landings are supplemented through the combination of the Schöck Tronsole® types T, L and Q into a soundproofing system, which realises the sound insulation of the stair flights without intermediate landing. At storey height the Tronsole® type T enables the sound insulation and force transmission in the stairs/main landing joint without concrete cantilever support. With the use of precast stairways and concrete cantilever supports on the main landings, the Tronsole® type T can be replaced by the type F.

A floating floor screed is planned as impact soundproofing measure on the foundation slab and main landings.
Acoustic bridge-free through separation:

- Flight support/wall using type Q
- Flight support/wall using type T

Structure sound bridges in form of small stones, concrete or mortar residues in the joint can be avoided through separation:

- Flight/wall using type L

Soundproofing system for precast flights of stairs using the Schöck Tronsole® types B, D, L, Z and F

The sound insulation of the stair flight and the intermediate landings with this system with straight stairs between main and intermediate landings is realised through the combination of Schöck Tronsole® types B, D, L, Z and F. The flights are connected with the intermediate landings monolithically. At storey height the Tronsole® type F enables the sound insulation and force transmission in the stairs/main landing joint with concrete cantilever support. The Tronsole® type F can be replaced by the type T on the main landings. Through this, the sequence of construction changes because the type F is embedded in concrete in the main landing. The concrete cantilever supports are dispensed with.

A floating floor screed is planned as impact soundproofing measure on the foundation slab and main landings.
Acoustic bridge-free joint formation through separation:

- Stairs/floor slab with type B, optionally with type D.
- Landing support/wall using type Z
- Flight/main landing using type F

Structure sound bridges in form of small stones, concrete or mortar residues in the joint can be avoided through separation:

- Flight/wall respectively landing/wall using type L

Tronsole® building acoustics

Testing according to DIN 7396

Test procedures according to DIN 7396

DIN 7396 describes the test procedure of the “Tests in building acoustics – Test methods for the acoustical characterization of isolating elements for heavy stairs”. In Europe it is the first standard which defines a measurement procedure for impact sound insulation elements and enables a comparability of products. The checks take place using standard building loads and stair geometry. In addition, complete stair flights and landings are checked so that noise transfer via the load-bearing elements and also via the joints is taken into account. With this the system “Stairs” is checked and is comparable with the installed situation in the building. In the system the transmission via the joint panels is also taken into account. If this is forgotten with the check, this can cause an audible deterioration in the building.

In the procedure according to DIN 7396 three characteristic values are determined per impact sound insulation element:

- Landing or flight impact sound pressure difference level $\Delta L^*_{Landing}$ or ΔL^*_{Flight}
- Landing or flight impact sound pressure level reduction $\Delta L_{Landing}$ or ΔL_{Flight}
- Weighted standard impact sound pressure level in the receiving room $L_{n,w}$

The impact sound insulation is determined with various load cases as the sound insulating elastomer support changes its acoustic characteristic under load.

Test setup according to DIN 7396

The test setup is described in DIN 7396. The standard provides for a landing and flight width of 1000 mm ± 10 mm. Thus, according to DIN 7396, the products for the insulation of the flight with a width of 1000 mm are to be tested. For further widths the testing is possible on this basis, under the otherwise same constraints.

Determination of $L_{n,w}$

The weighted standard impact sound pressure level $L_{n,w}$ in the receiving room arises as a result of the stimulation, using a standard tapping machine, of the reference landing respective stairs flight in the source room.

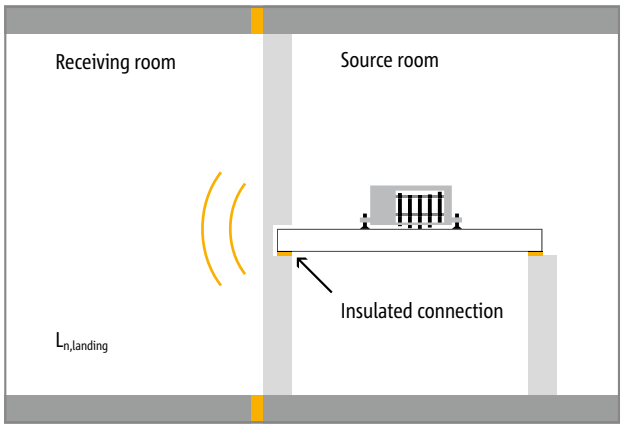


Fig. 1: Determination of the standard landing impact sound pressure level $L_{n,landing}$ of the reference landing with the impact sound insulation element to be checked

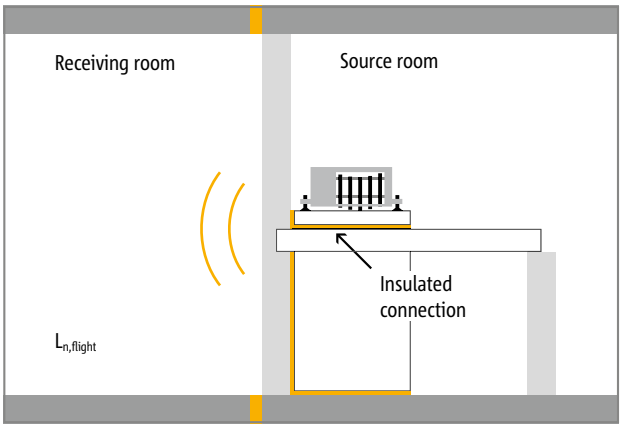


Fig. 2: Determination of the standard flight impact sound pressure level $L_{n,flight}$ of the reference stair flight with the impact sound insulation element to be checked

Test procedures according to DIN 7396

Determination of $\Delta L^*_{Landing}$

$\Delta L^*_{Landing}$ is determined as follows:

$$\Delta L^*_{Landing} = L_{n0,landing} - L_{n,landing}$$

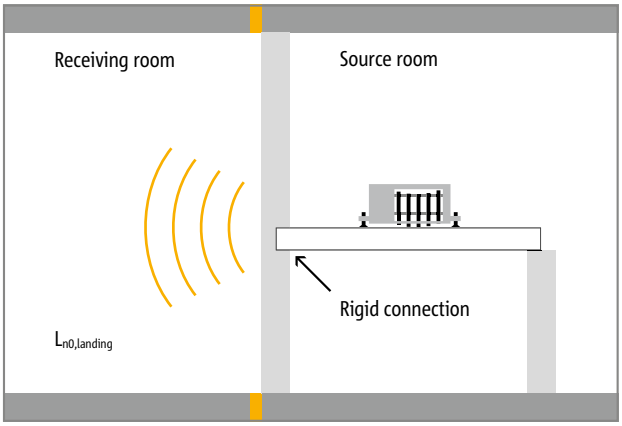


Fig. 3: Determination of the standard landing impact sound pressure level $L_{n0,landing}$ of the reference landing without the impact sound insulation element

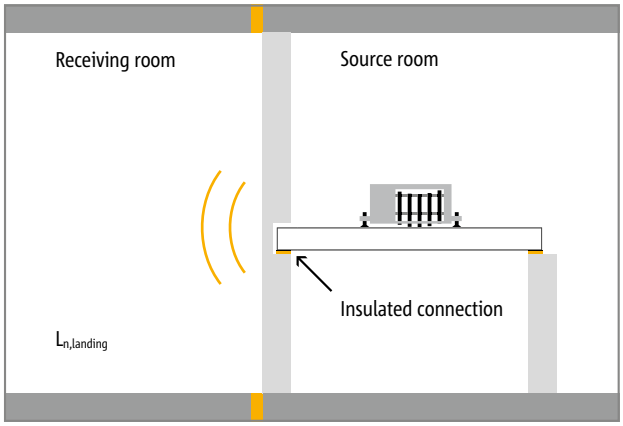


Fig. 4: Determination of the standard landing impact sound pressure level $L_{n,landing}$ of the reference landing with the impact sound insulation element to be checked

Determination of ΔL^*_{Flight}

ΔL^*_{Flight} is determined as follows:

$$\Delta L^*_{Flight} = L_{n0,flight} - L_{n,stairs}$$

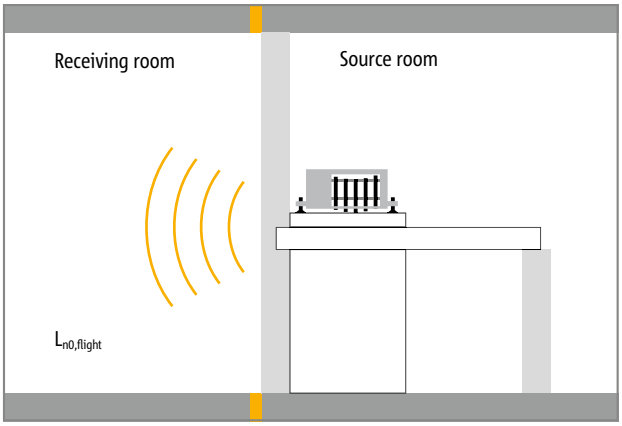


Fig. 5: Determination of the standard flight impact sound pressure level $L_{n0,flight}$ of the reference stair flight without the impact sound insulation element

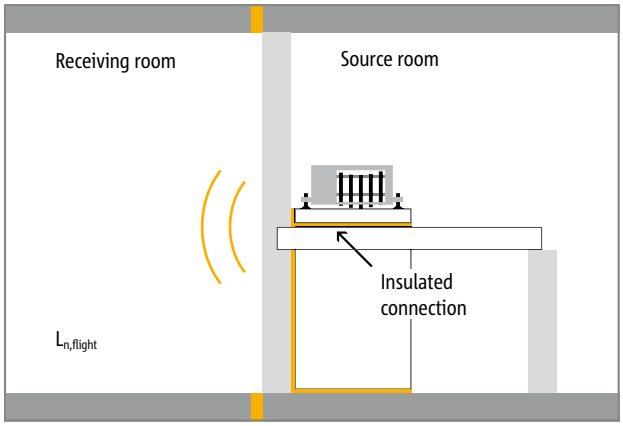


Fig. 6: Determination of the standard flight impact sound pressure level $L_{n,flight}$ of the reference stair flight with the impact sound insulation element to be checked

Determination of $\Delta L^*_{n,w}$

Determination of $\Delta L^*_{w,flight}$ and $\Delta L^*_{w,landing}$ as described above, the differences are formed in third octave manner and finally evaluated according to ISO 717-2 “Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound insulation”.

For simplification and comparability in practice the product characteristic values $\Delta L^*_{n,w}$ are introduced. With this value one is concerned with the difference of the weighted standard impact sound pressure level of the rigid and insulated connection. It is to be noted that the standard impact sound pressure level of the rigid and insulated connection, measured according to DIN 7396, is assessed first and then the difference is formed from the individual values.
It applies:

$$\Delta L^*_{n,w} = L_{n0,w,flight} - L_{n,w,flight}$$
$$\Delta L^*_{n,w} = L_{n0,w,landing} - L_{n,w,landing}$$

Test procedures according to DIN 7396

Determination of $\Delta L^*_{Landing}$

$\Delta L_{Landing}$ is determined as follows:

$$\Delta L_{Landing} = L_{n0,wall} - L_{n,landing}$$

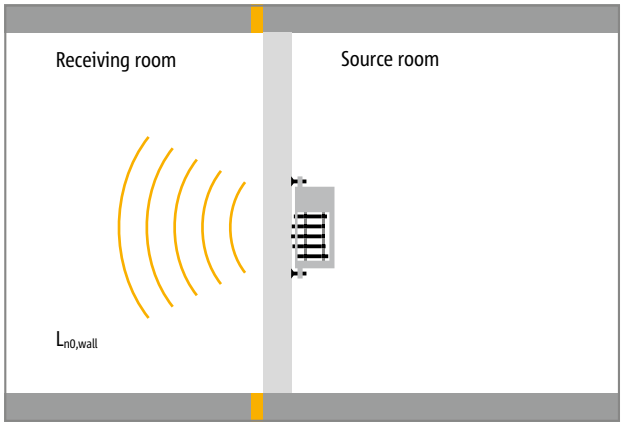


Fig. 7: Determination of the standard wall impact sound pressure level $L_{n0,wall}$ the reference wall on a test bench

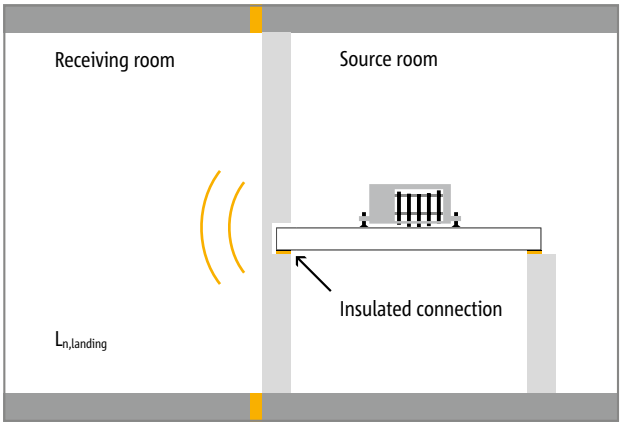


Fig. 8: Determination of the standard landing impact sound pressure level $L_{n,landing}$ of the reference landing with the impact sound insulation element to be checked

Determination of ΔL^*_{Flight}

ΔL_{Flight} is determined as follows:

$$\Delta L_{Flight} = L_{n0,landing} - L_{n,flight}$$

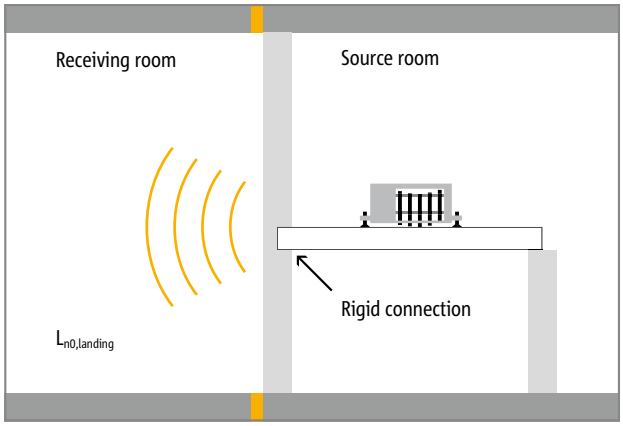


Fig. 9: Determination of the standard landing impact sound pressure level $L_{n0,landing}$ of the reference landing without the impact sound insulation element

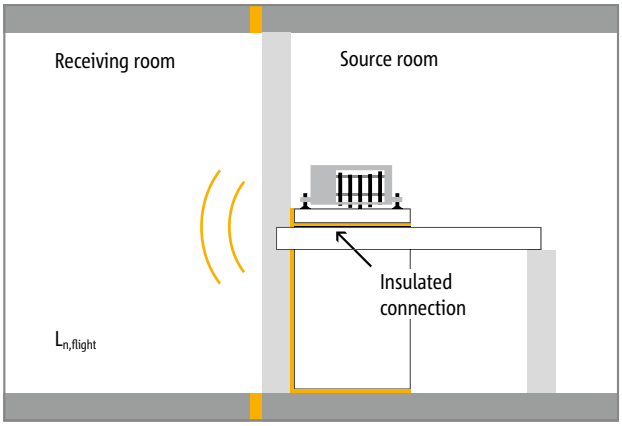


Fig. 10: Determination of the standard flight impact sound pressure level $L_{n,flight}$ of the reference stair flight with the impact sound insulation element to be checked

The impact sound characteristic values determined in this way can be used in the ISO 12354-2, as input data for the determination of the standard impact sound pressure level in the neighbouring room from sound insulated stairway landings and stair flights.

Forecasting method

ISO 12354-2: Simplified procedure

In the ISO 12354-2 a further verification process for solid stairs is explained. This verification takes into account the individual transmission paths via the separating structural component, and also via the flanking structural components. Thus this verification leads to more accurate values. In addition to the detailed process ISO 12354-2 also offers a simplified process.
The impact sound transmission of stair flights and of landings is differentiated.

Soundproofing verification for landings (simplified procedure)

For landings the following applies:

$$L_{n,w,landing} = L_{n0,w,wall} - \Delta L_{w,landing}$$

$L_{n,w,landing}$ weighted standard landing impact sound pressure level of the insulated landing: Impact sound pressure level, which adjusts to a standard measurement in the room requiring soundproofing, if the landing connected with the wall is stimulated

$L_{n0,w,wall}$ weighted standard wall impact sound pressure level of the wall: Impact sound pressure level, which adjusts to a standard measurement in the room requiring soundproofing, if the wall is stimulated

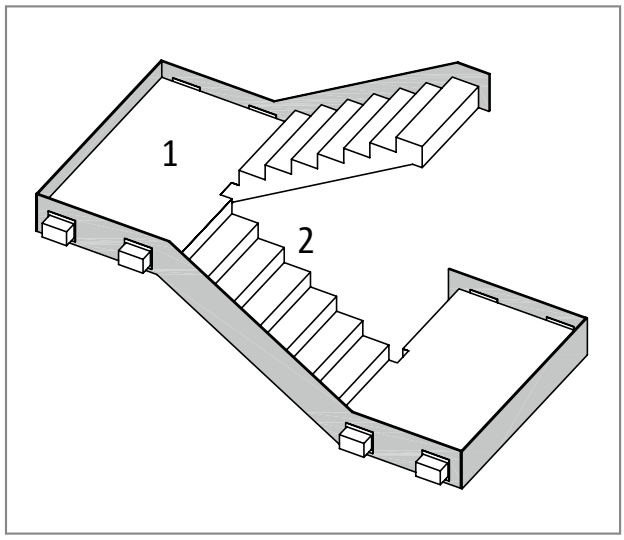


Fig. 11: Representation according to ISO 12354-2 of a landing separated from the walls

Forecasting method

Soundproofing verification for landings (simplified procedure)

For stair flights the following applies:

$$L_{n,w,flight} = L_{n0,w,landing} - \Delta L_{w,flight}$$

$L_{n,w,stairs}$ weighted standard flight impact sound pressure level of the insulated stairway: Impact noise pressure level, which adjusts to a standard measurement in the room requiring soundproofing, if the stairs connected with the landing are stimulated

$L_{n0,w,landing}$ weighted standard landing impact sound pressure level of the landing set in concrete: Impact sound pressure level, which adjusts to a standard measurement in the room requiring soundproofing, if the landing is rigidly concreted in the wall and is stimulated

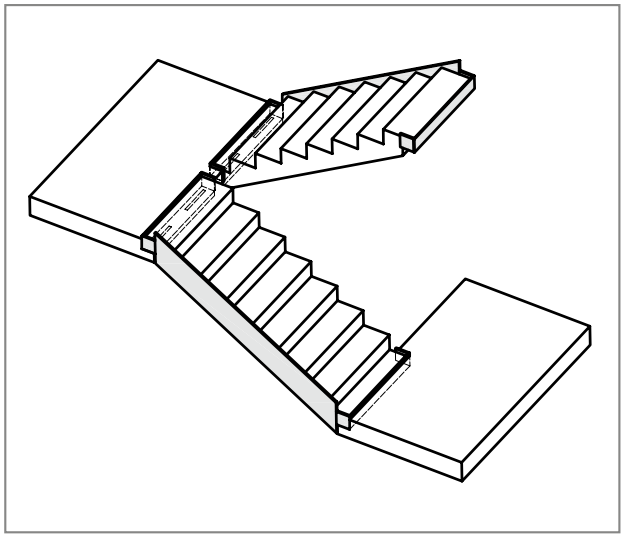


Fig. 12: Representation according to ISO 12354-2 of a flight of stairs separated from the landing and the floor

Characteristic values of the impact soundproofing

The acoustic characteristic values of the Schöck Tronsole® types have been determined in the test facility in accordance with DIN 7396. In addition, the expected weighted standard impact sound pressure level $L'_{n,w}$ for a building with a single-leaf, rigid stairwell wall (e.g. in apartment blocks) has been calculated and arranged in the table below, taking into account the respective Schöck Tronsole using the verification method for stairs according to DIN 4109-2.

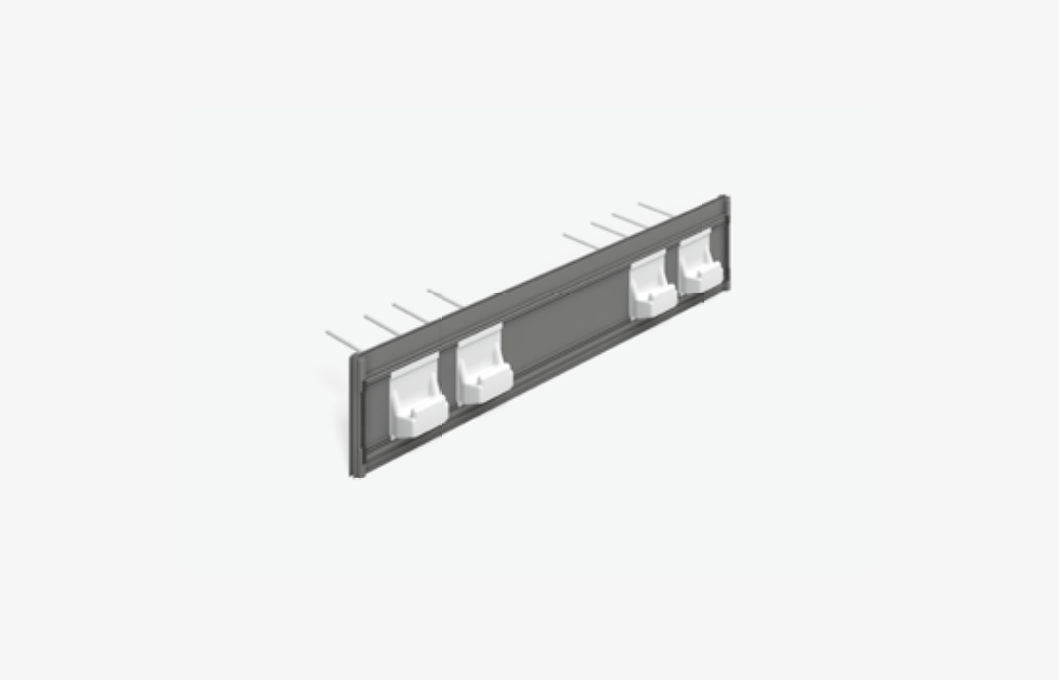
The values of the table have been checked in accordance with DIN 7396 under maximum permitted dead load of the connected stair structural components and thus represent values on the safe side. The acoustic characteristic values of the Schöck Tronsole® types were all measured in combination with the Schöck Tronsole® type L joint panel. If joint materials alien to the system are combined with the Schöck Tronsole® sound insulation element, due to the possibly higher impact sound transmission via the flanking joint material, in general worse impact soundproofing values arise. The given characteristic values are in these cases no longer ensured. The formation of an air joint is possible, if it is larger than 5 cm, so that no acoustic bridges can form either through dirt or through grout.

With this table attention must be paid that $L'_{nT,w}$ represents an impact sound level and thus, with lower value, expresses a better soundproofing capability. The value $\Delta L^*_{n,w}$ on the other hand, describes the direct impact soundproofing effect, therefore a lower value here describes a poorer sound proofing.

Schöck Tronsole®	Load-bearing level	$L_{n,w}$ Test bench measurement according to DIN 7396	$\Delta L^*_{n,w}$ tested in accordance with DIN 7396	$L'_{nT,w}$ Berechnung nach DIN EN ISO 12354-2
Type F	V1	≤ 35 dB [1]	≥ 32 dB [1]	≤ 34 dB
	V2	≤ 37 dB [1]	≥ 30 dB [1]	≤ 36 dB
Type B	V1	≤ 35 dB [1]	≥ 32 dB [1]	≤ 33 dB
	V2	≤ 37 dB [1]	≥ 30 dB [1]	≤ 35 dB
Type T	V2	≤ 34 dB	≤ 33 dB	≤ 33 dB
	V4	≤ 36 dB	≥ 31 dB	≤ 35 dB
	V6	≤ 38 dB	≥ 29 dB	≤ 37 dB
	V7	≤ 38 dB [2]	≥ 29 dB [2]	≤ 37 dB
	V8	≤ 38 dB [1]	≥ 29 dB [1]	≤ 37 dB
Type Q		≤ 38 dB	≥ 30 dB	≤ 36 dB
Type Z		≤ 41 dB	≥ 27 dB	≤ 39 dB

- 1) Characteristic values for element widths > 1000 mm have been checked based on DIN 7396.
- 2) Type T-V7: Characteristic values are adopted from the Tronsole® type T-V8.
- $\Delta L^*_{n,w}$: Applies up to the respective maximum permitted dead load of the connected stair component. Measured in combination with Schöck Tronsole® type L (joint panel).
- $L'_{nT,w}$ determined according to EN ISO 12354-2 for a typical apartment block staircase incl. 3 dB safety margin (stairwell wall 24 cm sand-lime masonry, density range 2.2, flanking walls reception room 17.5 cm sand-lime masonry, density class 2.0).

Schöck Tronsole® type 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

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

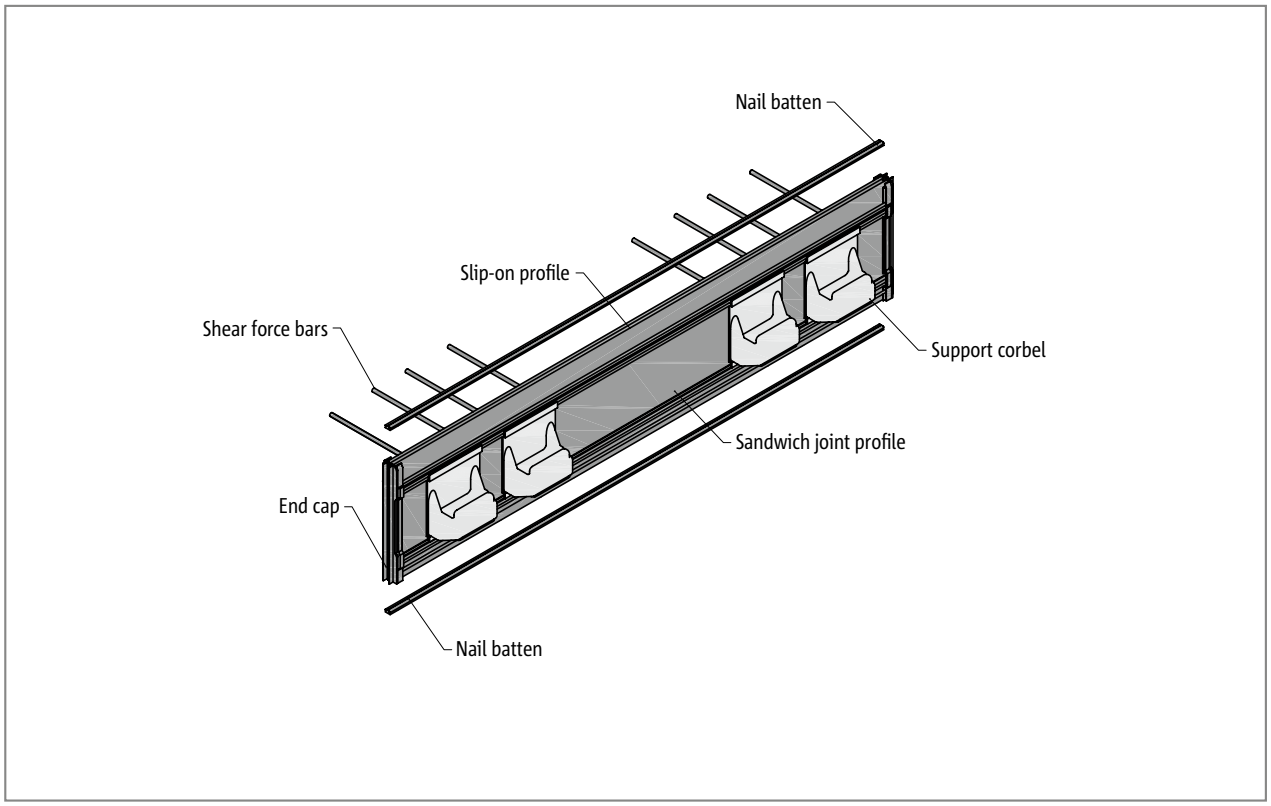


Fig. 13: Schöck Tronsole® type T

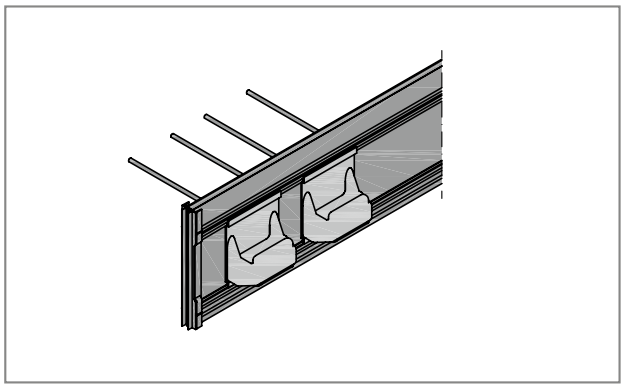


Fig. 14: Schöck Tronsole® type T : Detail support bracket positive fabrication

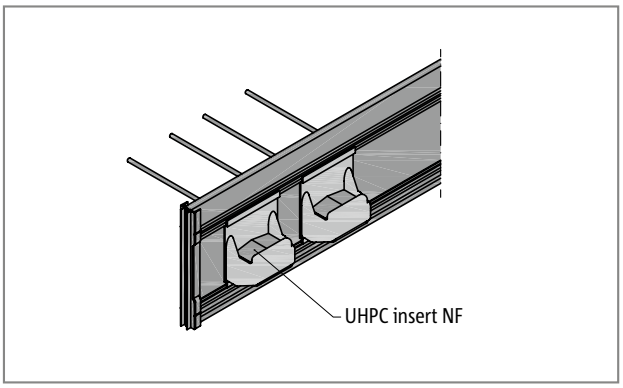


Fig. 15: Schöck Tronsole® type T: Detail support bracket negative fabrication

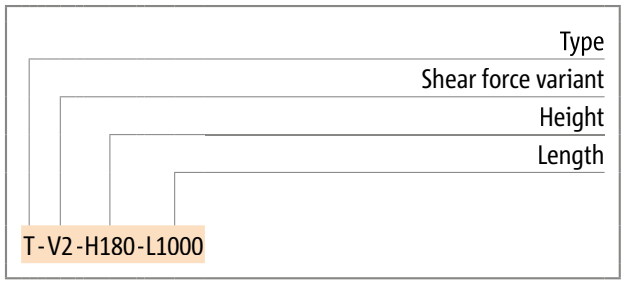
Product selection | Type designations

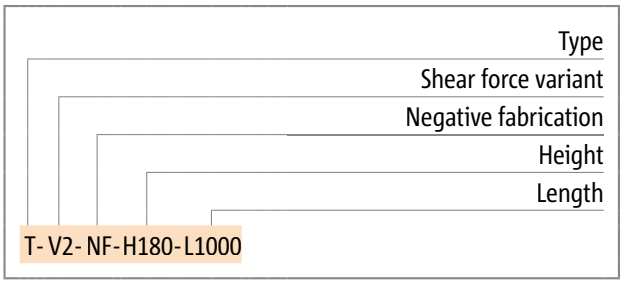
Schöck Tronsole® type T variants

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





Installation cross section

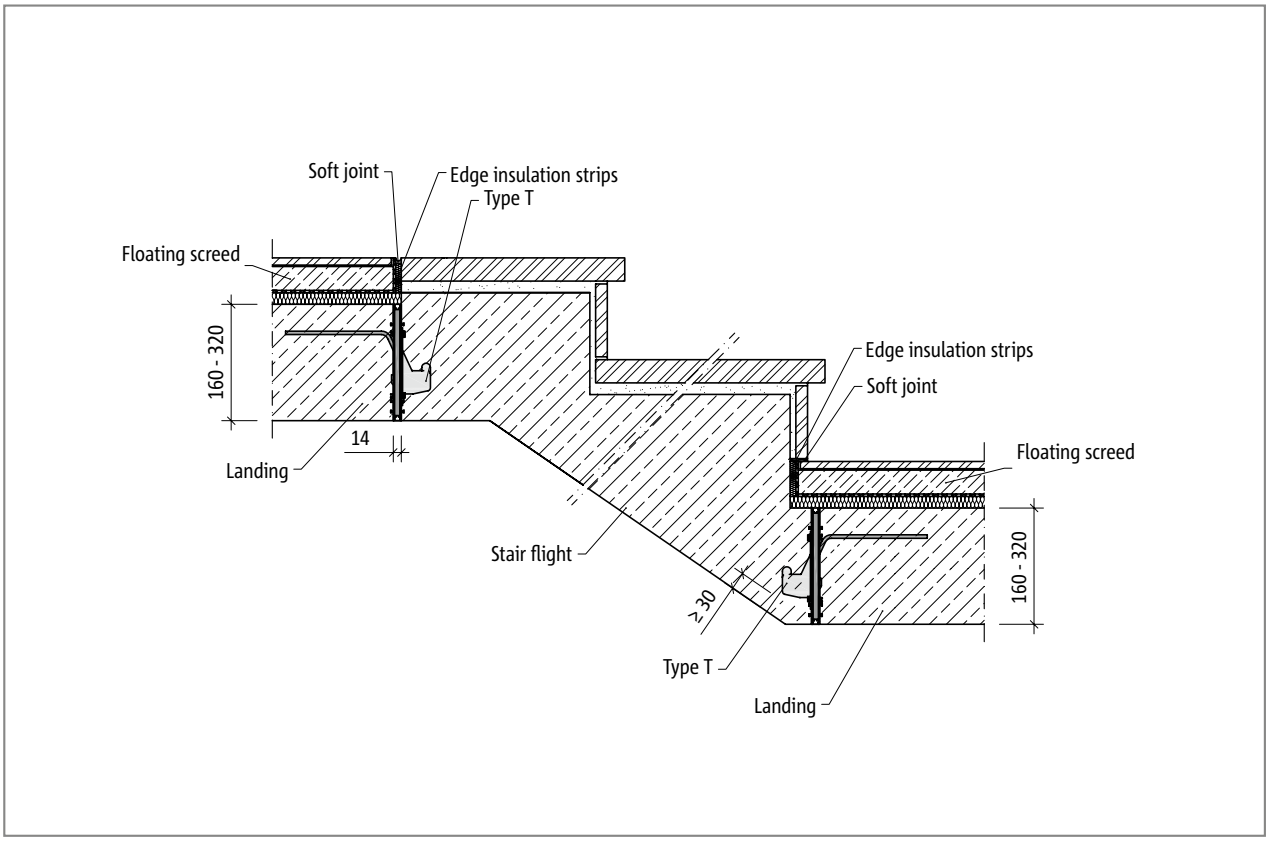


Fig. 16: Schöck Tronsole® type T: Installation cross-section

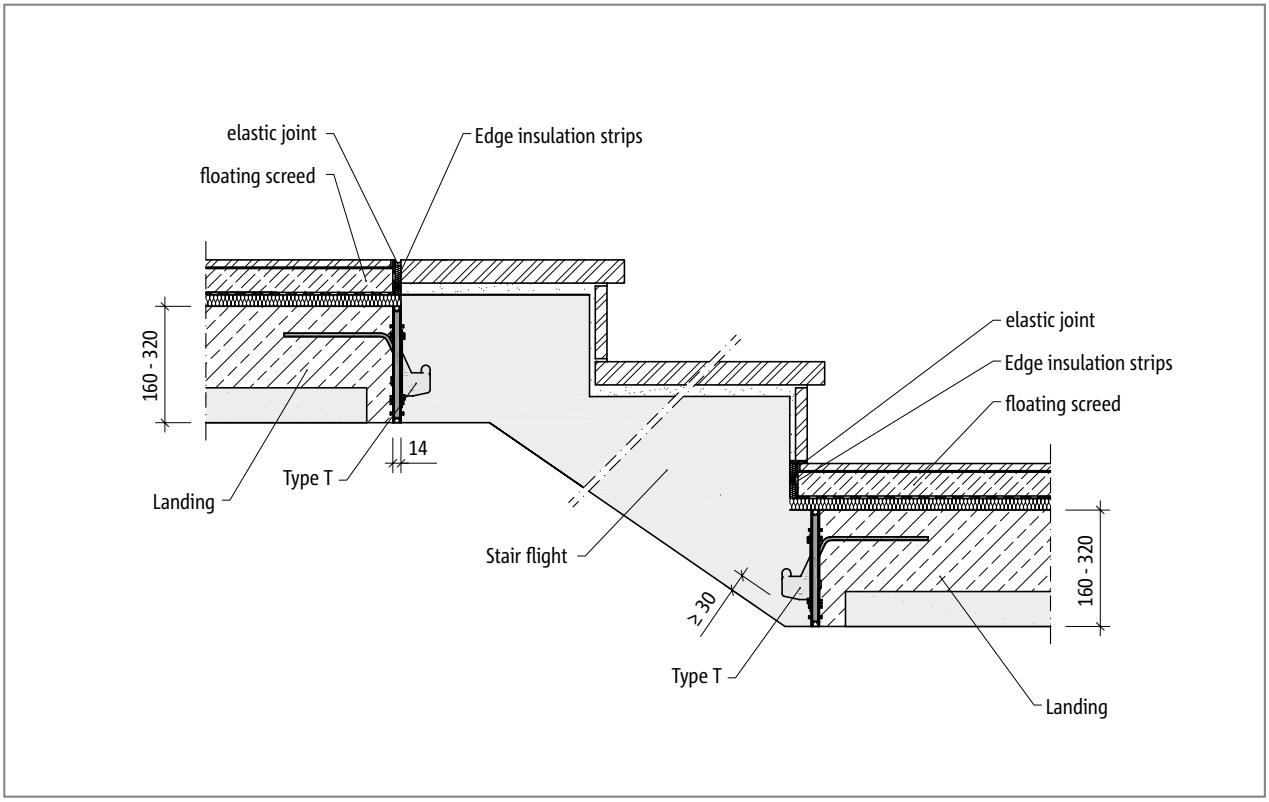


Fig. 17: Schöck Tronsole® type T: Installation cross-section precast stairs with semi-precast landing

Element arrangement

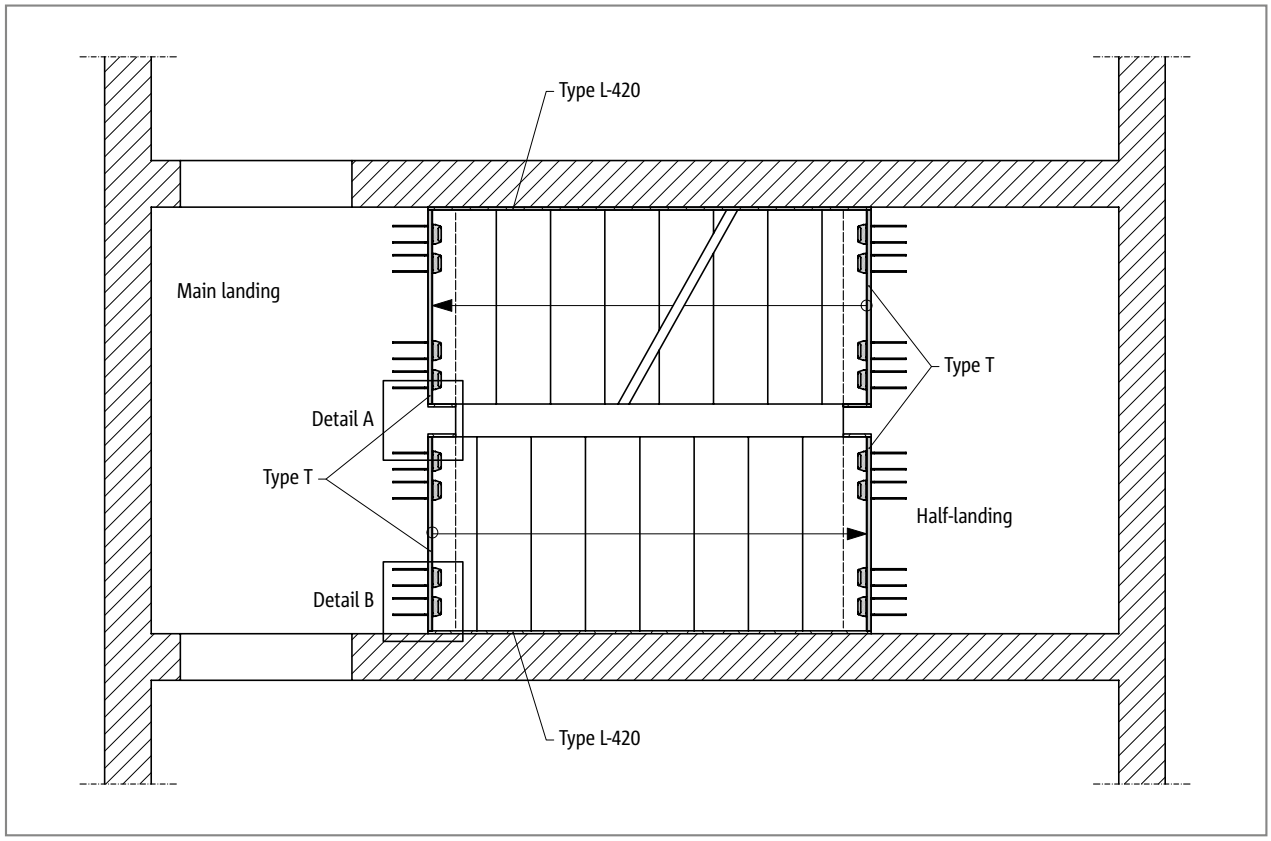


Fig. 18: Schöck Tronsole® type T: Element configuration in plan view

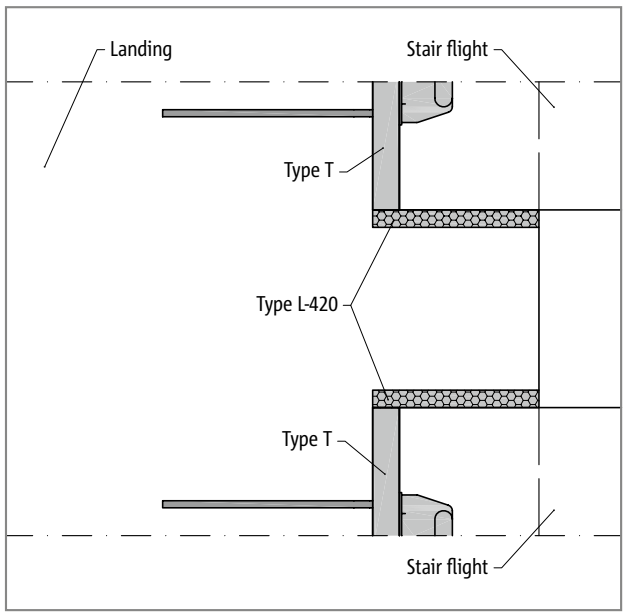


Fig. 19: Schöck Tronsole® type T: Element configuration Detail A

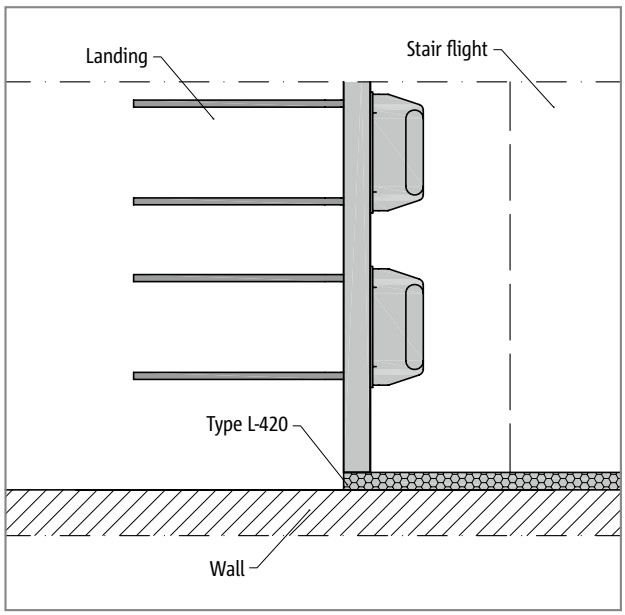


Fig. 20: Schöck Tronsole® type T: Element configuration Detail B

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

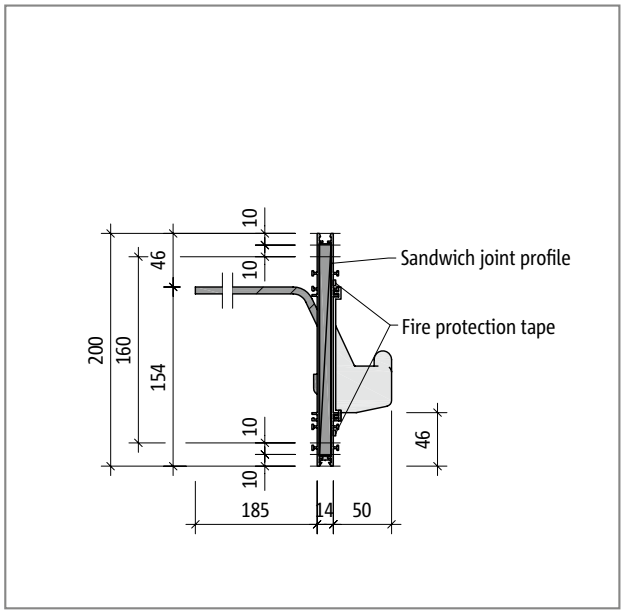


Fig. 21: Schöck Tronsole® type T: Product cross-section with sandwich joint profile in the basic version

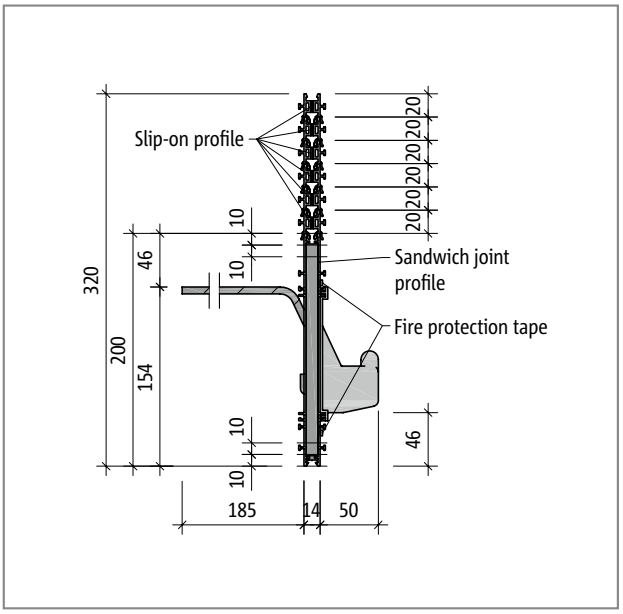


Fig. 22: Schöck Tronsole® type T: Product cross-section with sandwich joint profile and slip-on profiles.

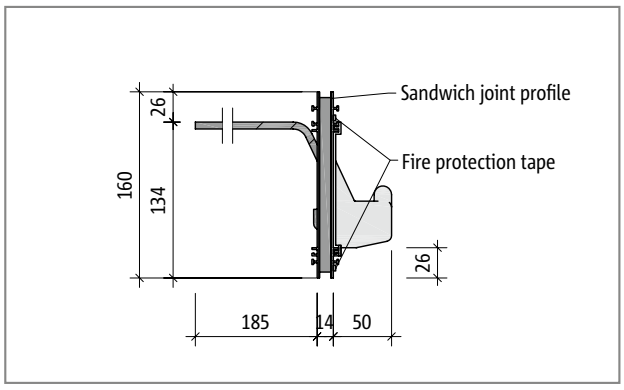


Fig. 23: Schöck Tronsole® type T: Product section T...-H160

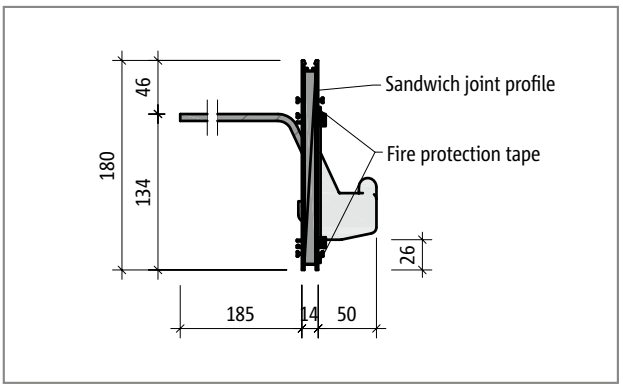


Fig. 24: Schöck Tronsole® type T: Product section T...-H180

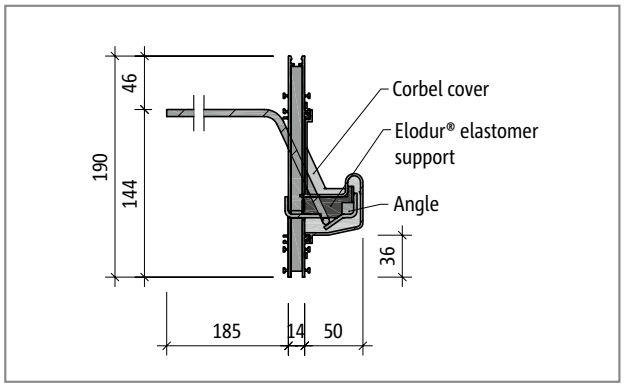


Fig. 25: Schöck Tronsole® type T: Product section T...-H190 through the support bracket

Product description

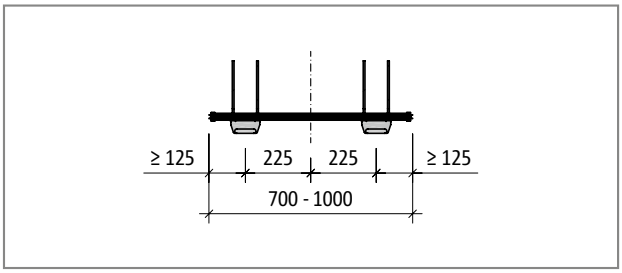


Fig. 26: Schöck Tronsole® type T-V2-H...-L700 to L1000: Product layout

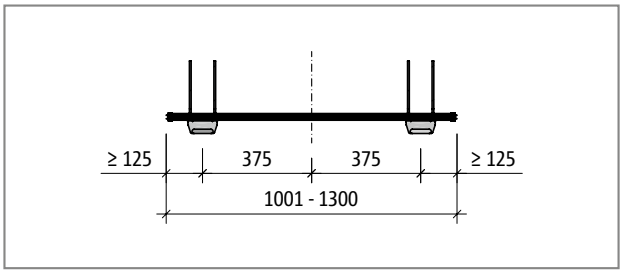


Fig. 27: Schöck Tronsole® type T-V2-H...-L1001 to L1300: Product layout

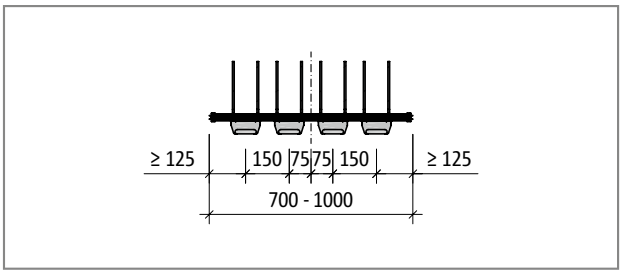


Fig. 28: Schöck Tronsole® type T-V4-H...-L700 to L1000: Product layout

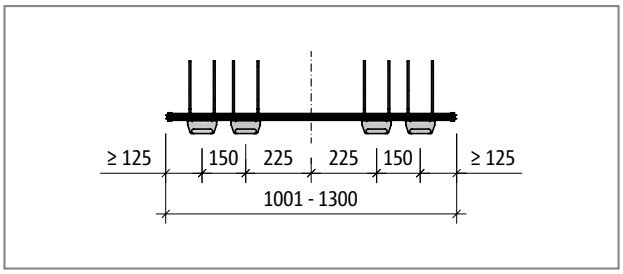


Fig. 29: Schöck Tronsole® type T-V4-H...-L1001 to L1300: Product layout

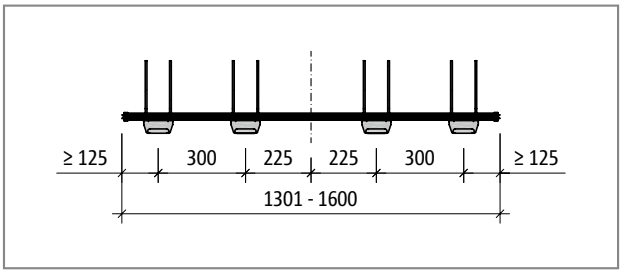


Fig. 30: Schöck Tronsole® type T-V4-H...-L1301 to L1600: Product layout

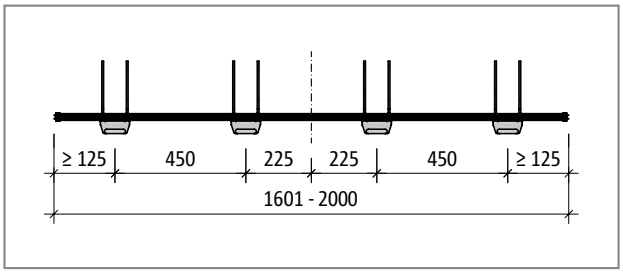


Fig. 31: Schöck Tronsole® type T-V4-H...-L1601 to L2000: Product layout

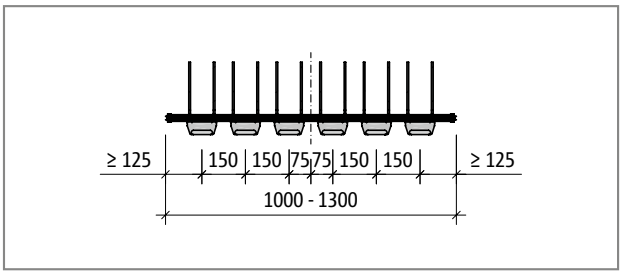


Fig. 32: Schöck Tronsole® type T-V6-H...-L1000 to L1300: Product layout

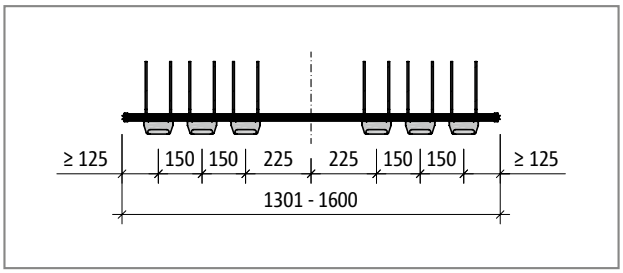


Fig. 33: Schöck Tronsole® type T-V6-H...-L1301 to L1600: Product layout

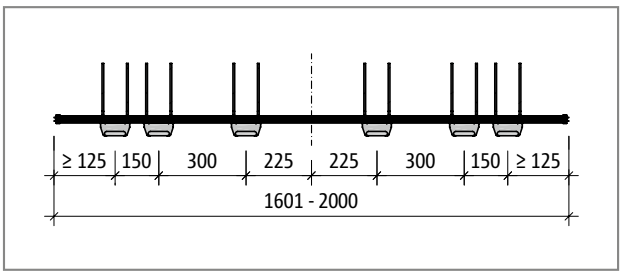


Fig. 34: Schöck Tronsole® type T-V6-H...-L1601 to L2000: Product layout

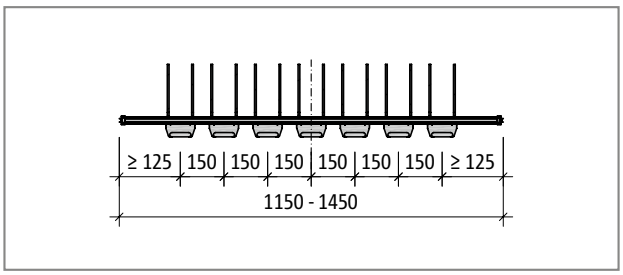


Fig. 35: Schöck Tronsole® type T-V7-H...-L1150 to L1450: Product layout

T

Product description

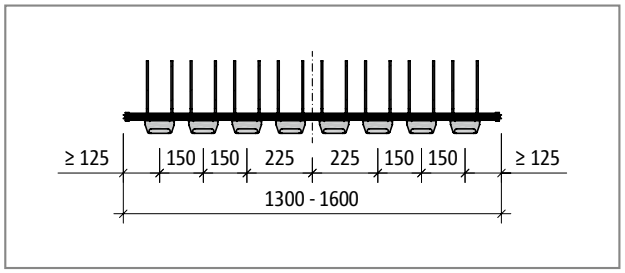


Fig. 36: Schöck Tronsole® type T-V8-H...-L1300 to L1600: Product layout

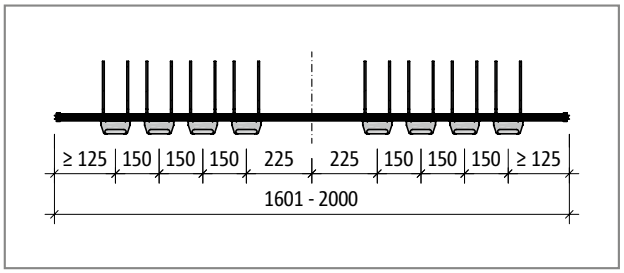


Fig. 37: Schöck Tronsole® type T-V8-H...-L1601 to L2000: Product layout

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 ≥ 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 ≥ 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	±1.6	±3.3	±5.0	±5.8	±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 ≥ C20/25, stair flight ≥ C30/37				
Tronsole® height H [mm]	$V_{Rd,z}$ [kN/element]				
160 - 170 (h_A ≥ 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	±1.6	±3.3	±5.0	±5.8	±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				

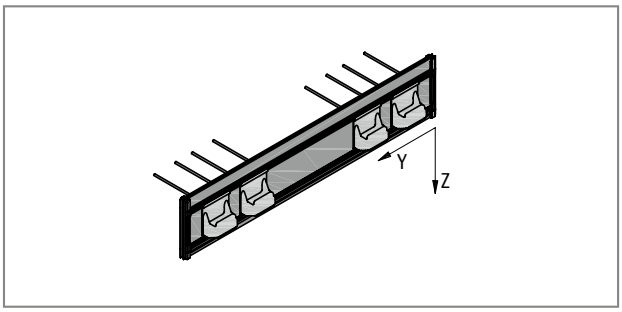


Fig. 38: Schöck Tronsole® type T: Sign rule for the design

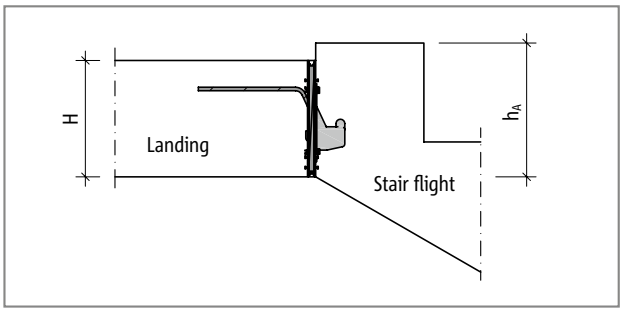


Fig. 39: Schöck Tronsole® type T: Connection height h_A

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 ≥ 180 mm.

On-site reinforcement - In-situ concrete construction

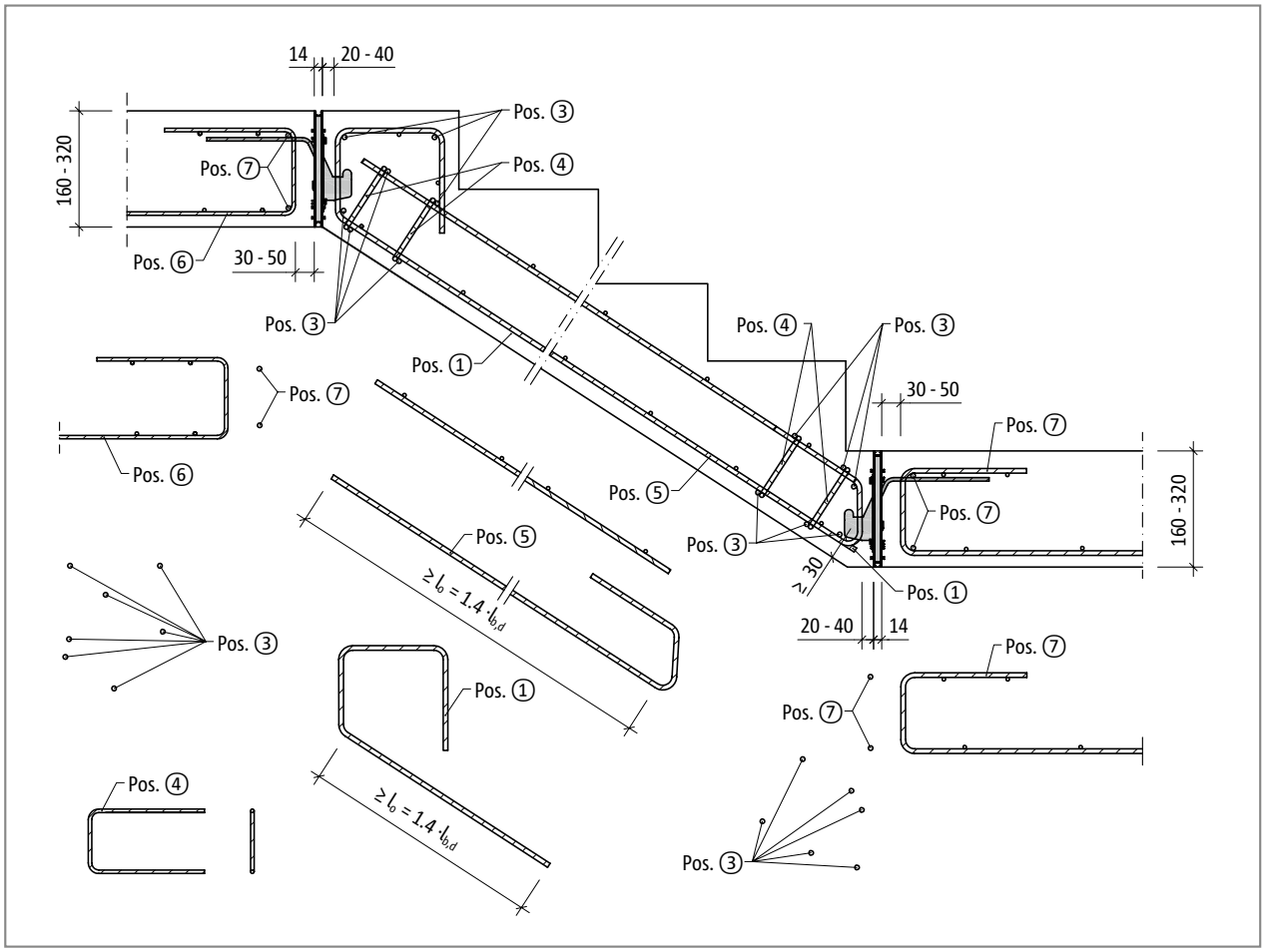


Fig. 40: Schöck Tronsole® type T: On-site reinforcement

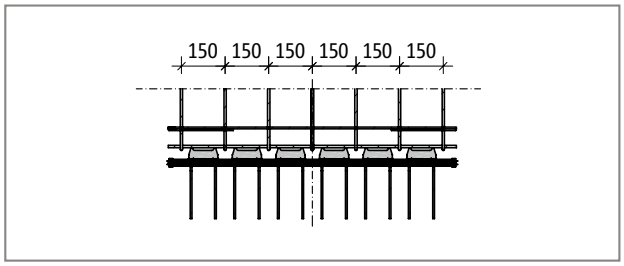


Fig. 41: Schöck Tronsole® type T: Laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

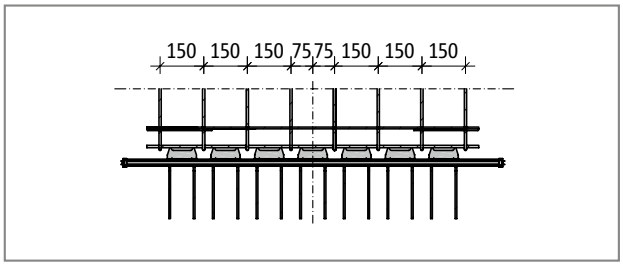


Fig. 42: Schöck Tronsole® type T: Displaced laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

On-site reinforcement - In-situ concrete construction

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

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

On-site reinforcement - Precast construction

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 corbelsare to be found 75 mm left and right of the centre of this product variant.

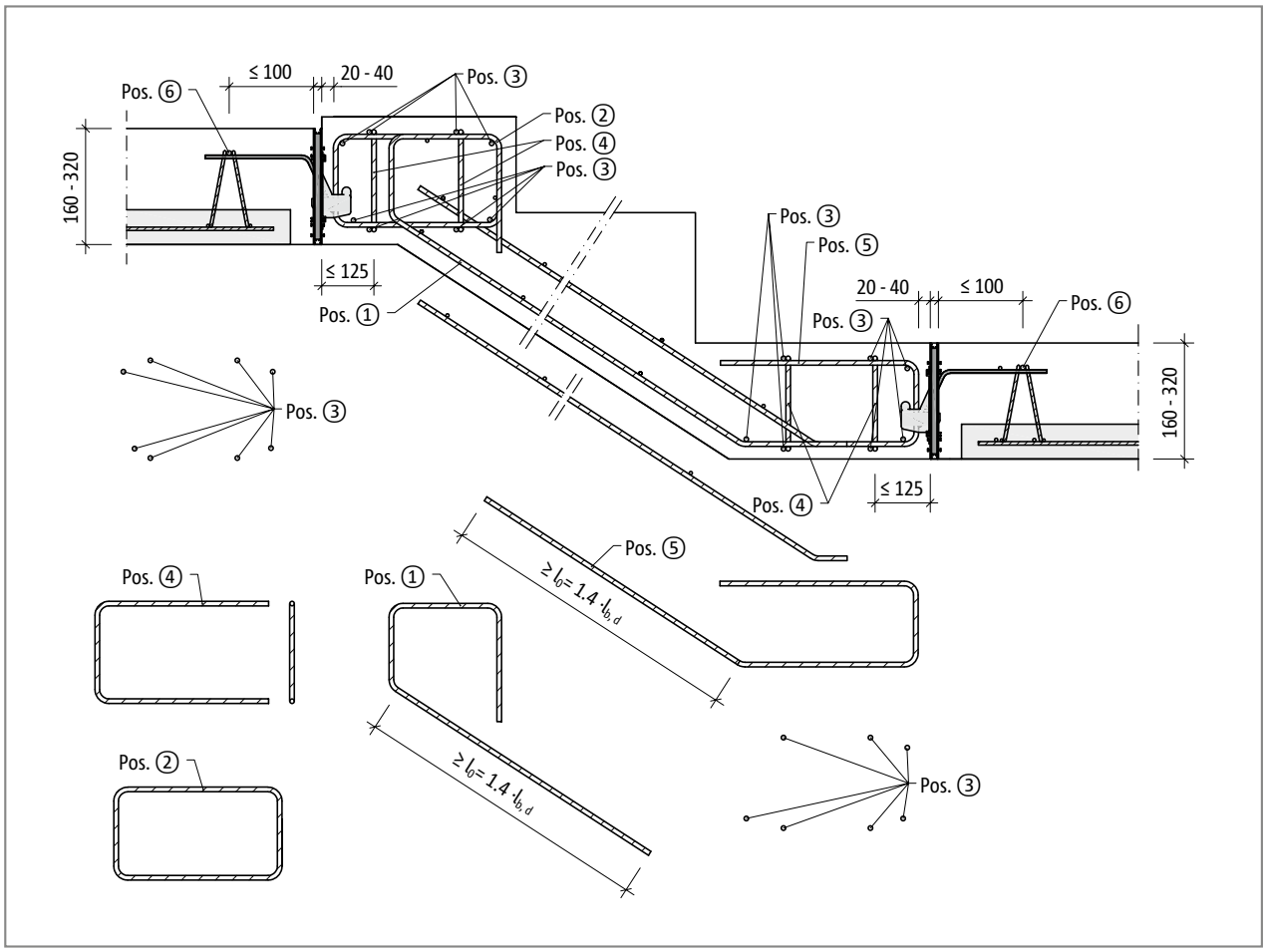


Fig. 43: Schöck Tronsole® type T: On-site reinforcement with precast landing

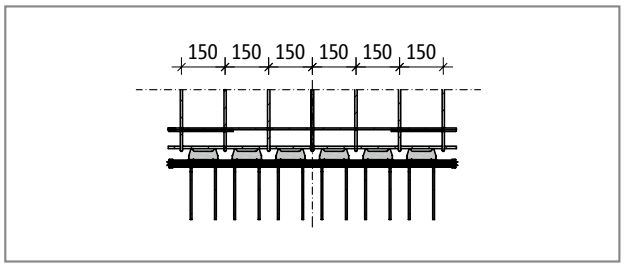


Fig. 44: Schöck Tronsole® type T: Laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

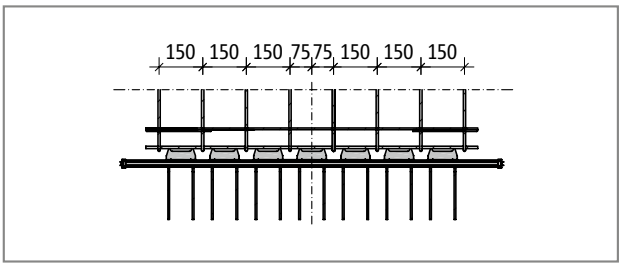


Fig. 45: Schöck Tronsole® type T: Displaced laying pattern of the reinforcement with uneven number of support corbels on the Tronsole®

On-site reinforcement - Precast construction | Compresssion joints

Schöck Tronsole® type		T
On-site reinforcement	Location	Concrete strength class ≥ C20/25
Pos. 1 slip-in stirrup or stirrup mesh as suspended reinforcement		
Pos. 1	on the flight side	H8@150 mm
Pos. 2 closed stirrups		
Pos. 2	on the flight side	H8@150 mm
Pos. 3 steel rods in transverse direction of the stairs		
Pos. 3	on the flight side	15 • H8
Pos. 4 Ties for the securing of the stair strings		
Pos. 4	on the flight side	2 • 4 • H8
Pos. 5 Ties or stirrup mesh as suspended reinforcement		
Pos. 5	on the flight side	H8@150 mm
Pos. 6 Lattice girders as edging		
Pos. 6	on the landing side	equivalent to H8@150 mm = 3.35 cm²/m

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 corbelsare to be found 75 mm left and right of the centre of this product variant.

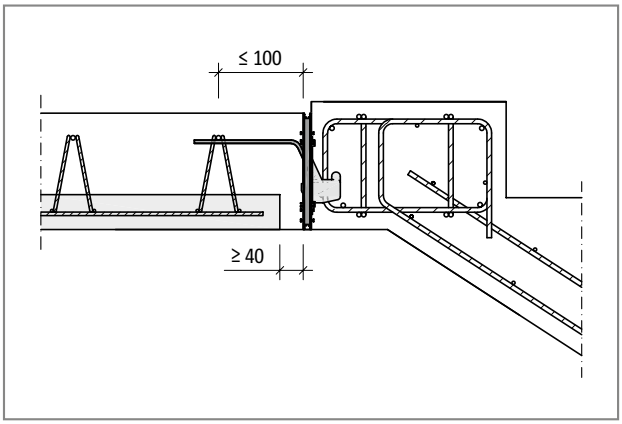


Fig. 46: Schöck Tronsole® type T: Installation in combination with prefabricated floors, compression joint on floor side

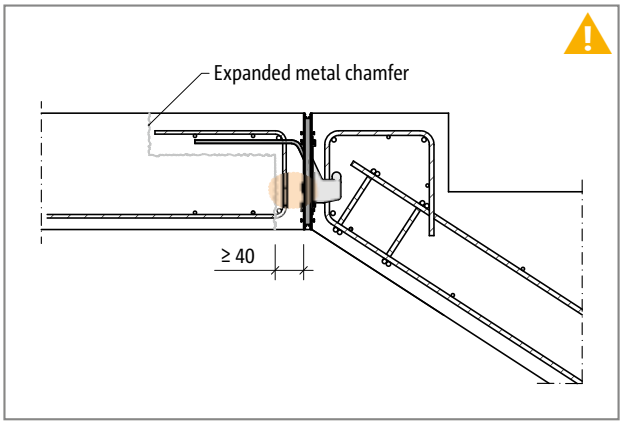


Fig. 47: Schöck Tronsole® type T: Installation in combination with construction joints at floor edge, compression joint on floor side

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 ≥ 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

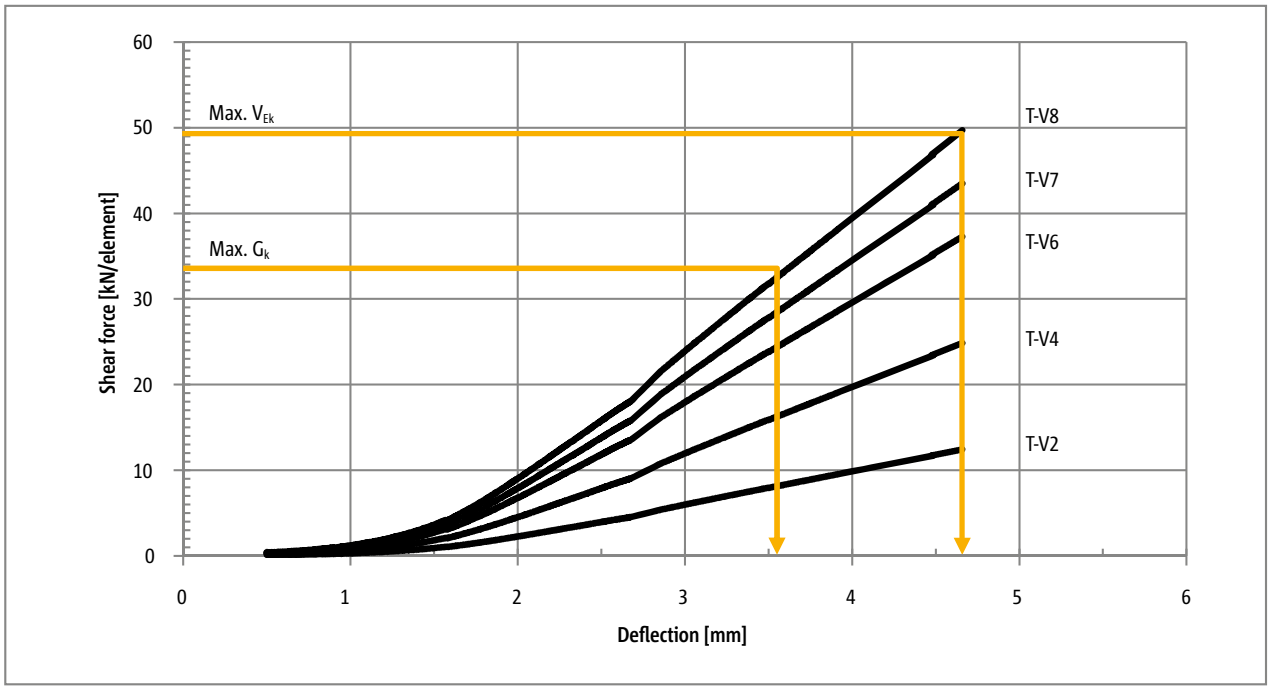


Fig. 48: Schöck Tronsole® type T: Deformation of the Elodur® elastomer support

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 .
- Max. V_{Ek} = Max. V_{Ed}/γ, whereby γ = 1.4
- γ = 1.4 applies under the assumption that Max. V_{Ed} is made up of two thirds from own weight and one third from live load.
- Thus Max. is V_{Ek} the maximum service load and the maximum own weight is Max. G_k = 2/3 • Max. V_{Ek}.

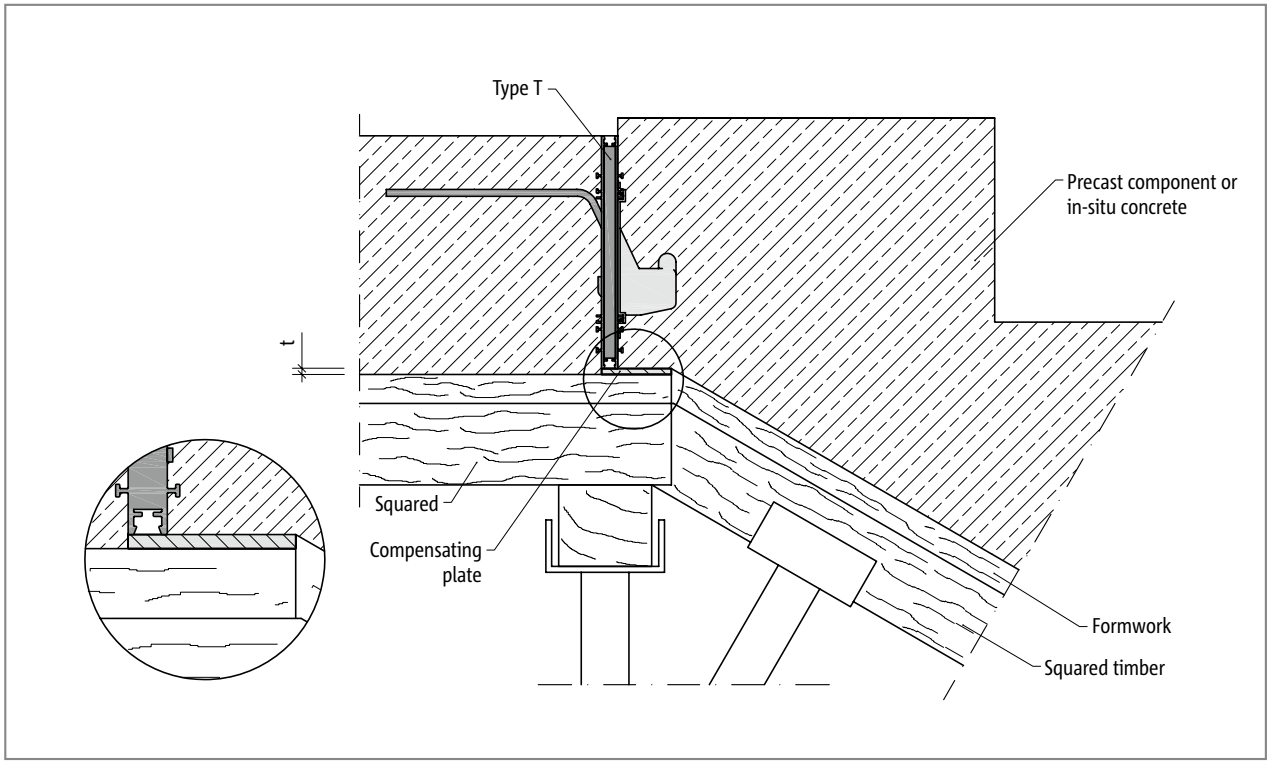


Fig. 49: Schöck Tronsole® type T: Taking into account the deflection of the stair flight by means of on-site compensating plate of thickness t

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.

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

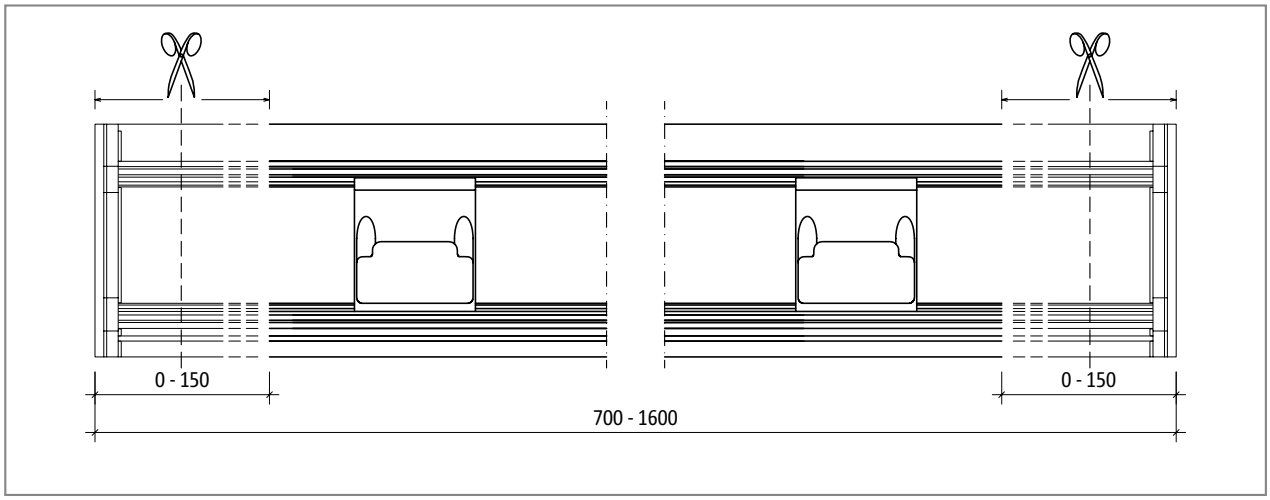


Fig. 50: Schöck Tronsole® type T: Customisation option

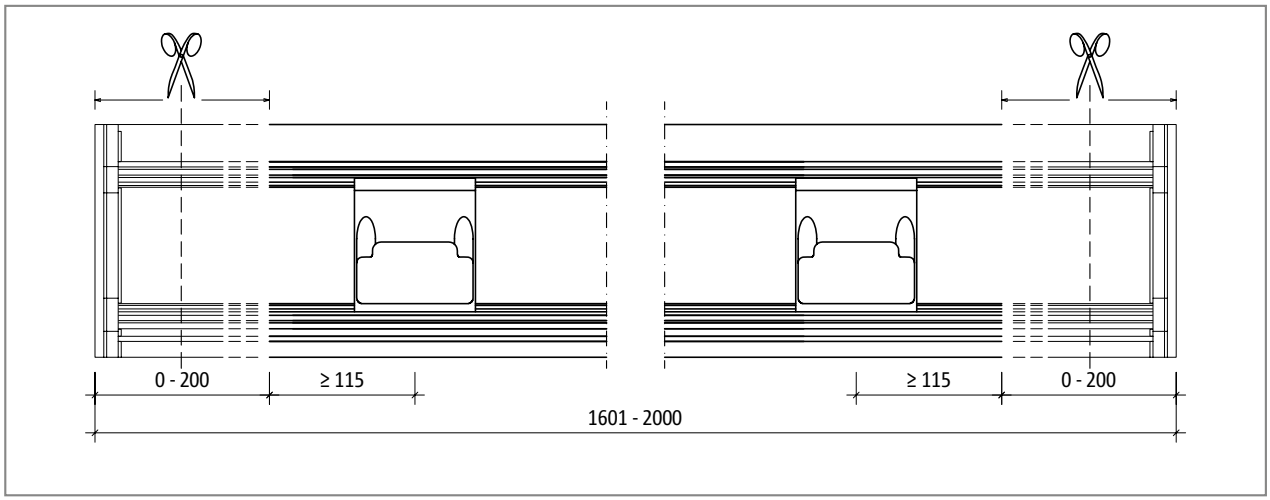


Fig. 51: Schöck Tronsole® type T: Customisation option

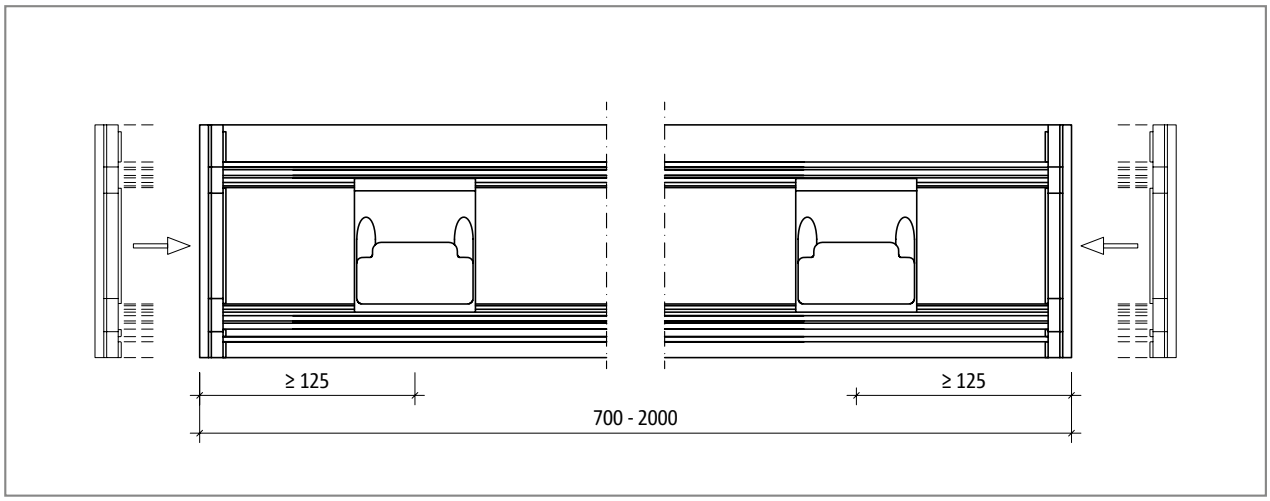
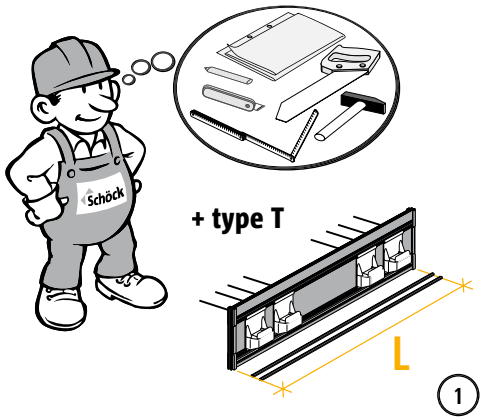
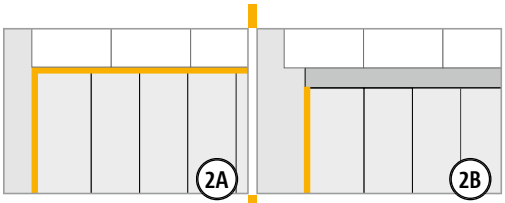
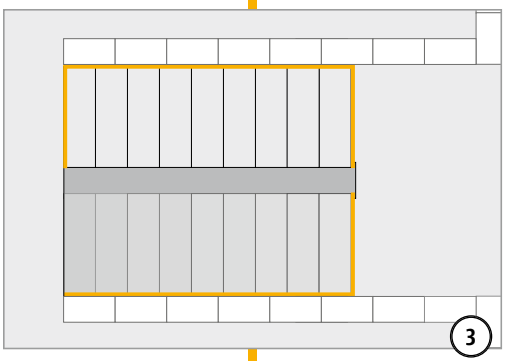


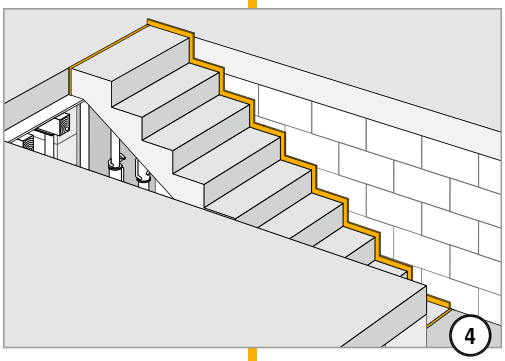
Fig. 52: Schöck Tronsole® type T: Assemble end caps after cutting to length

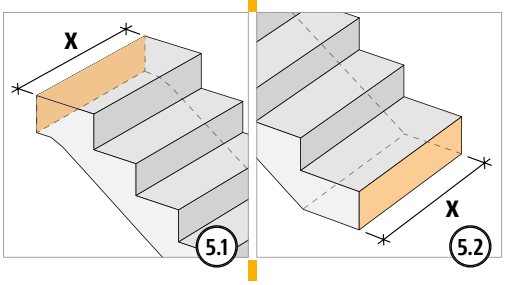
Installation instructions building site in-situ concrete

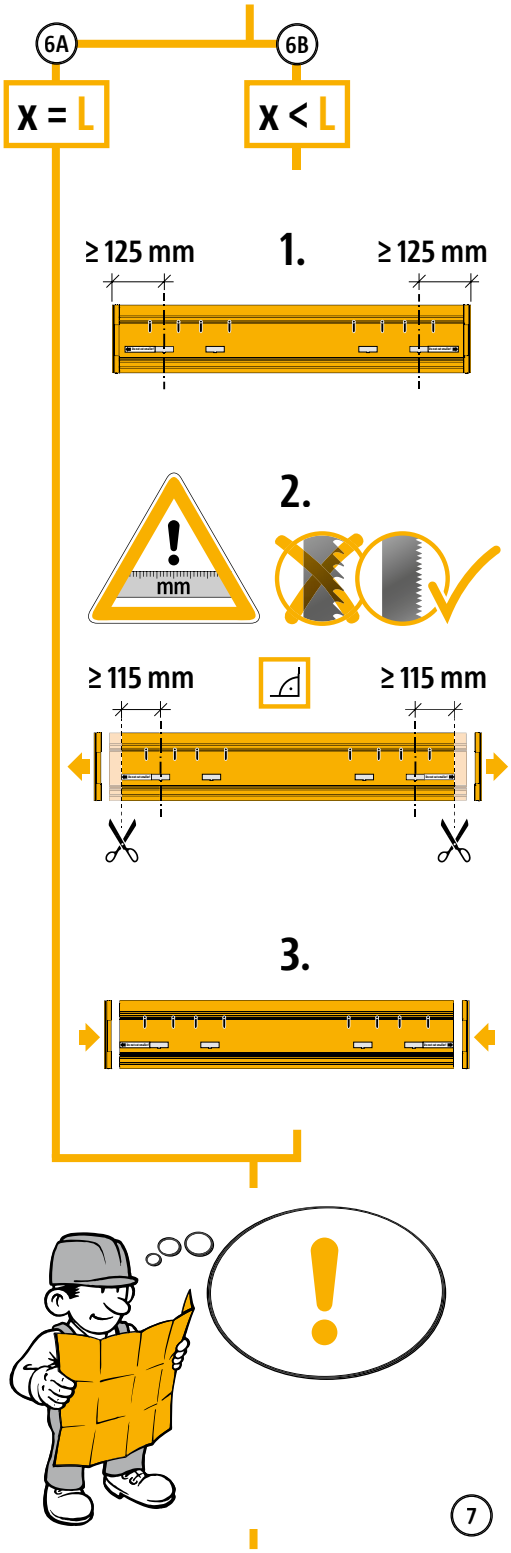












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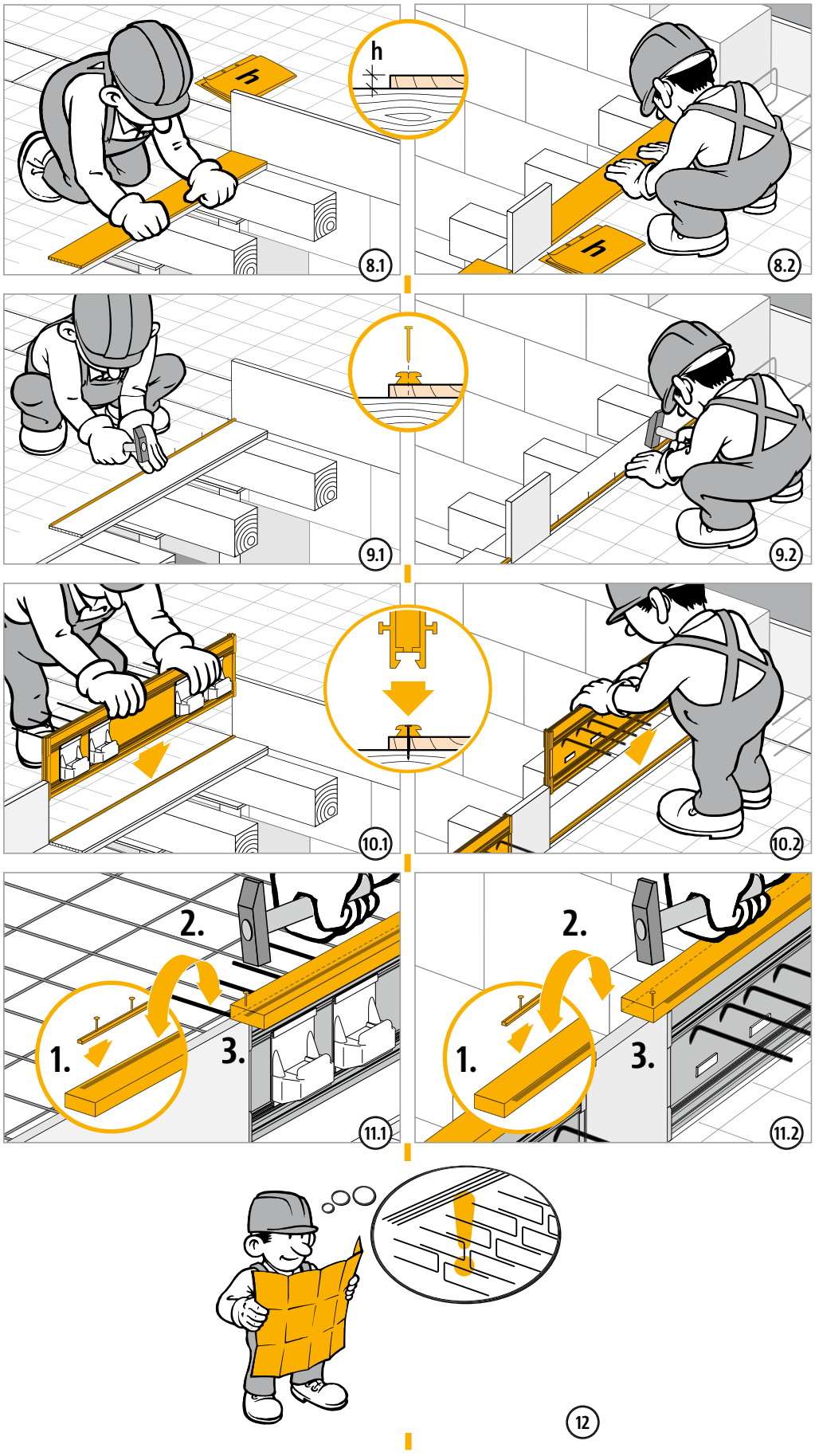
Installation instructions building site in-situ concrete



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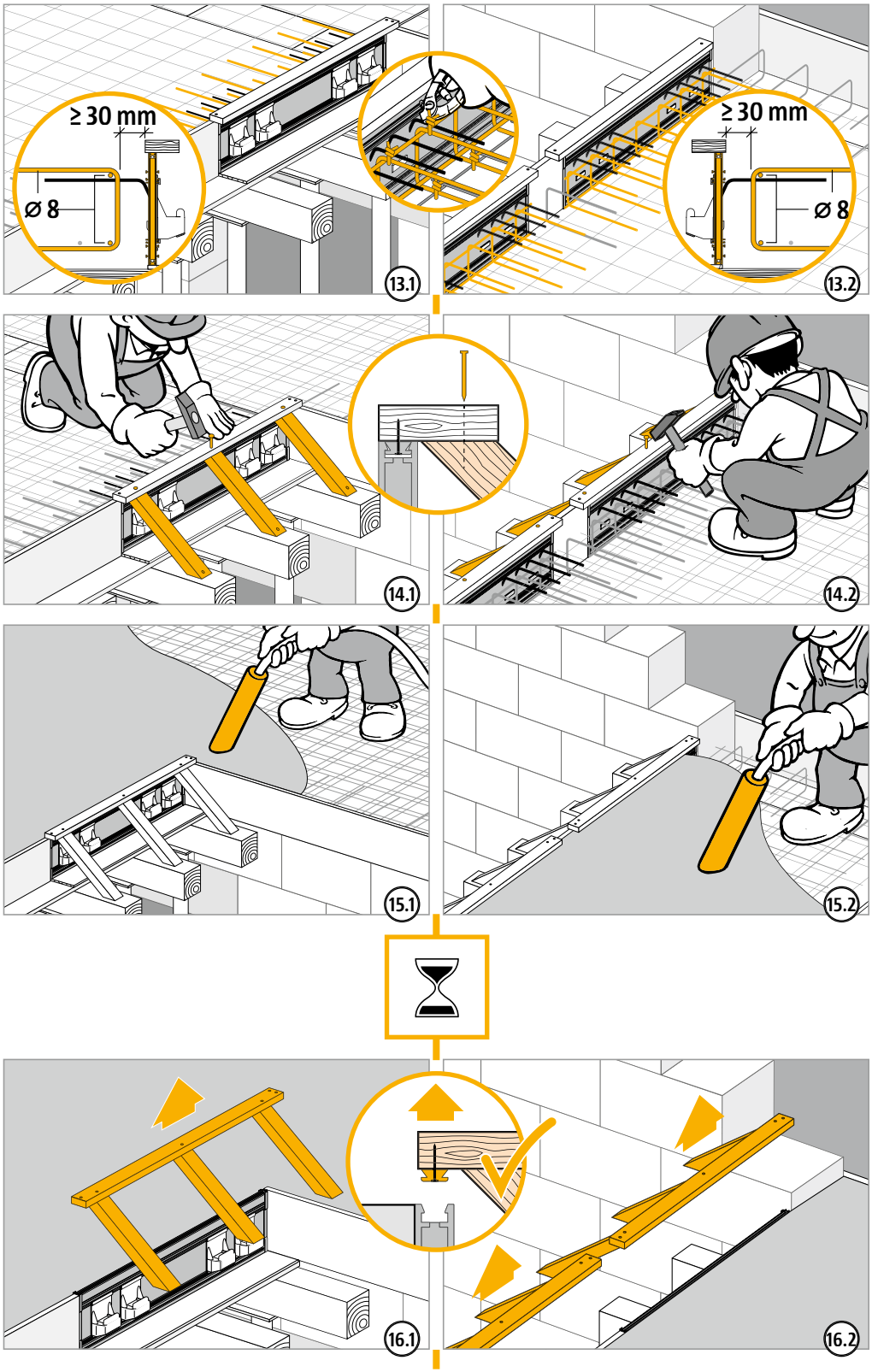

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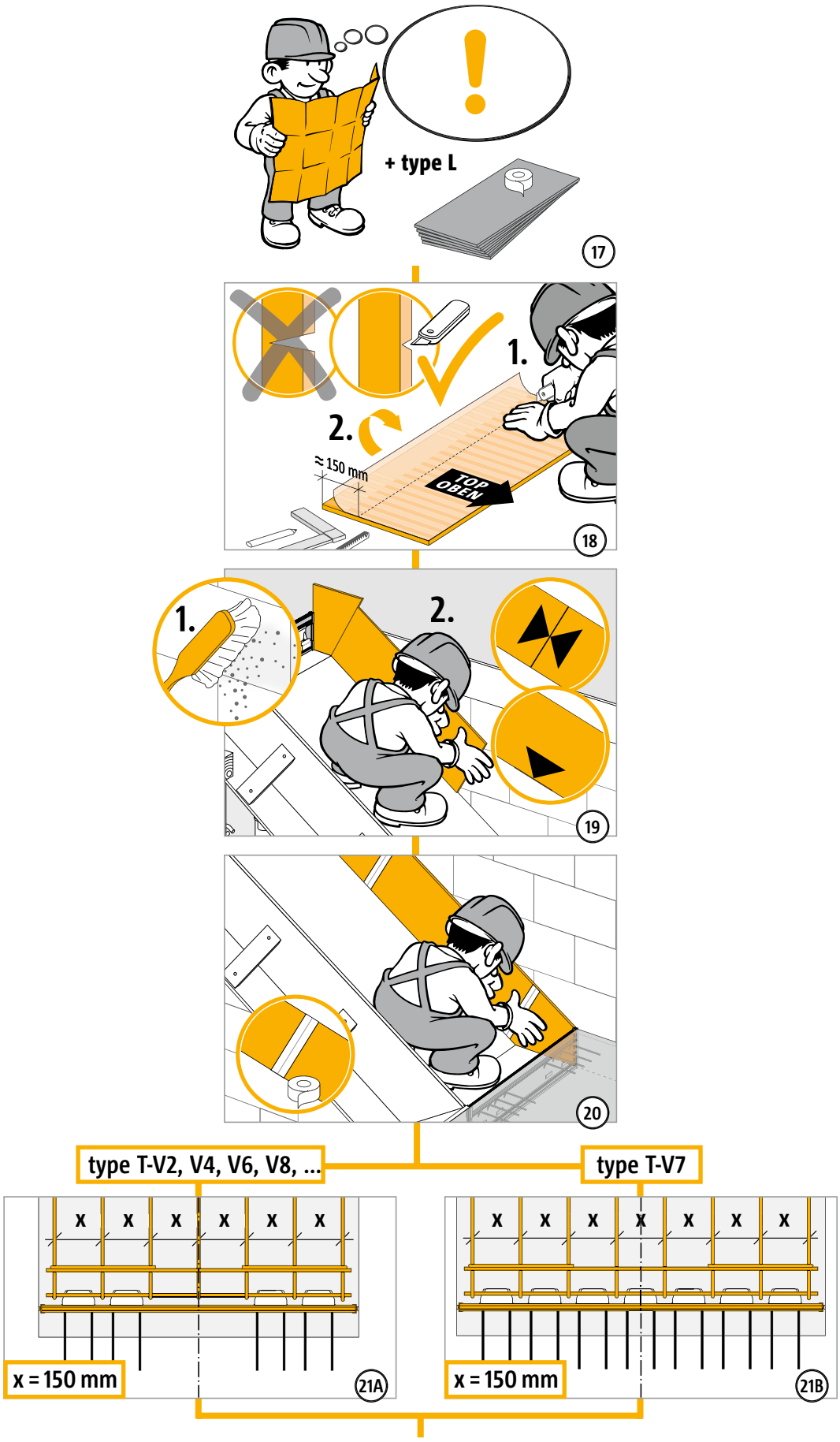

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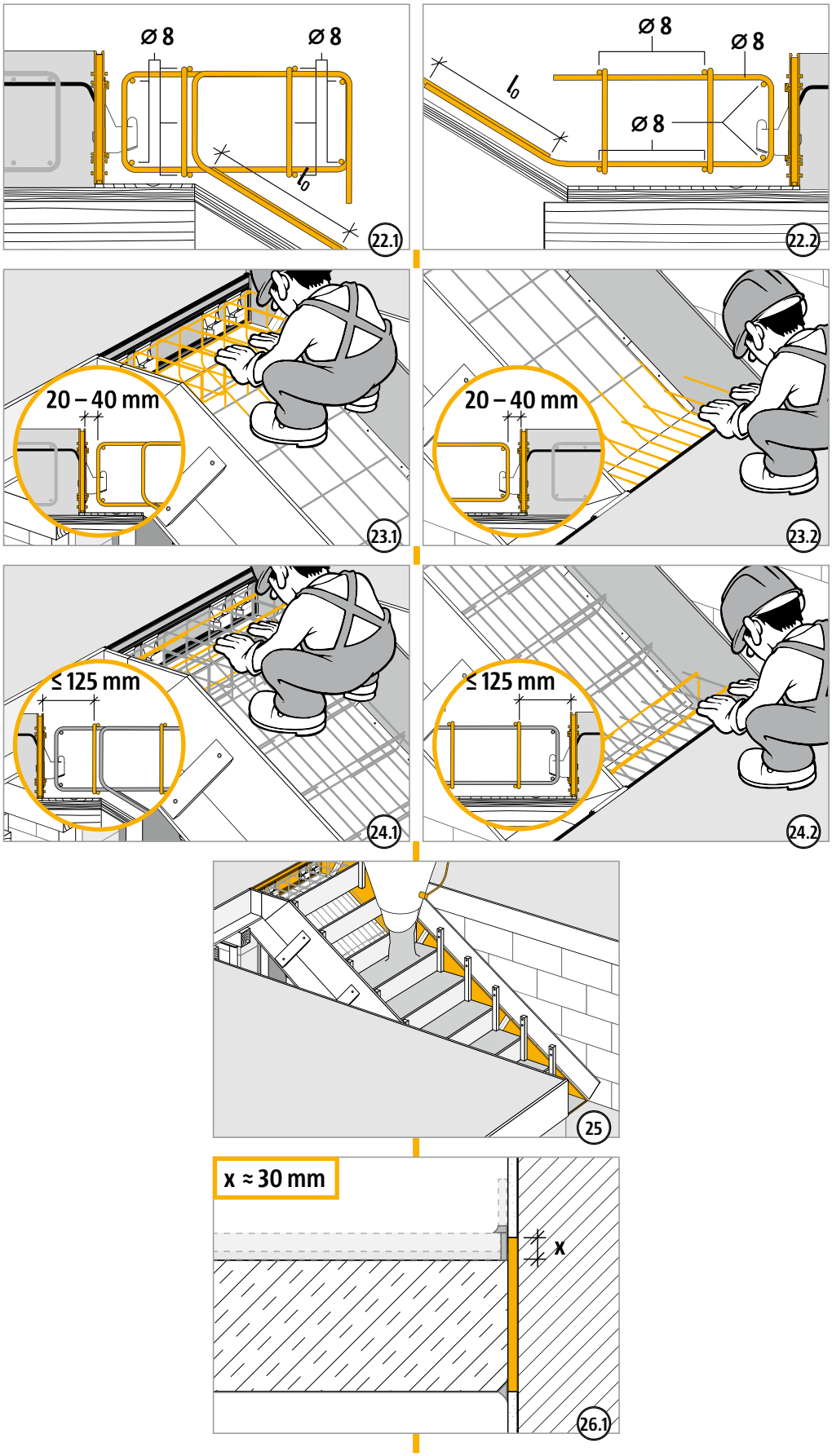

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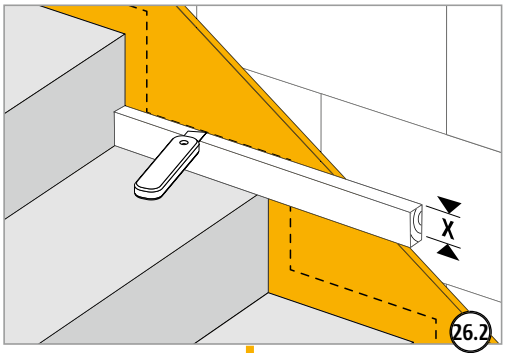
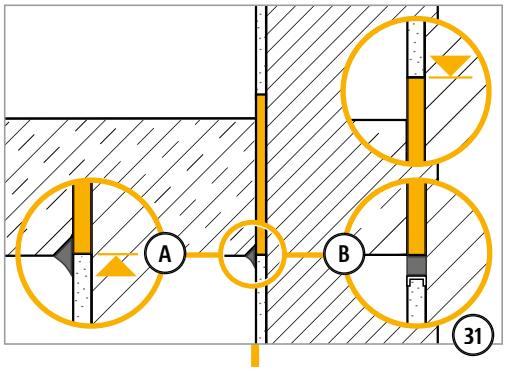
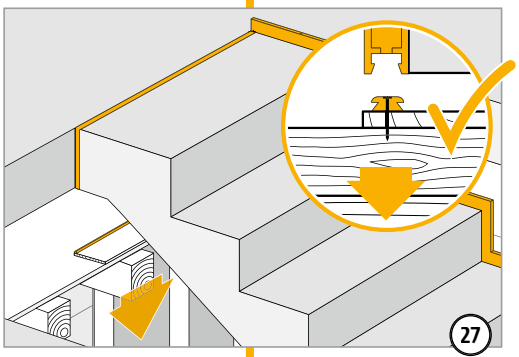
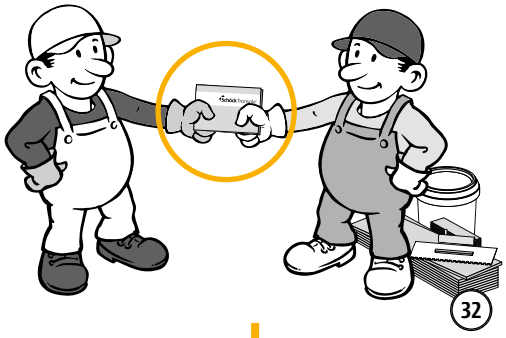
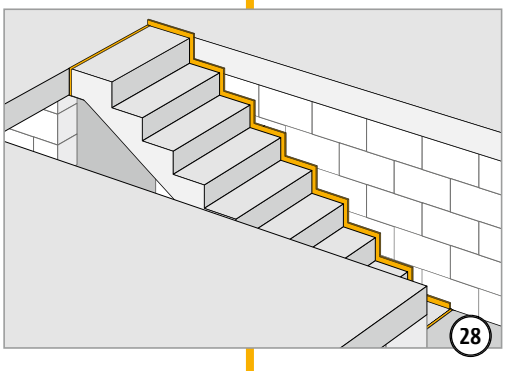
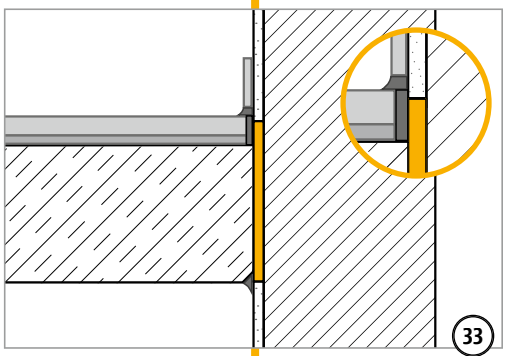


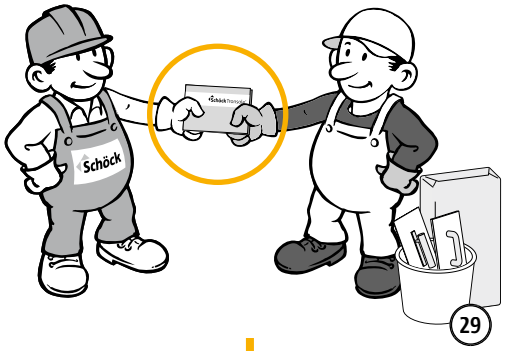


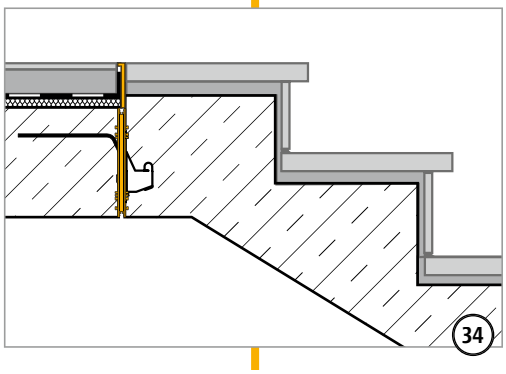


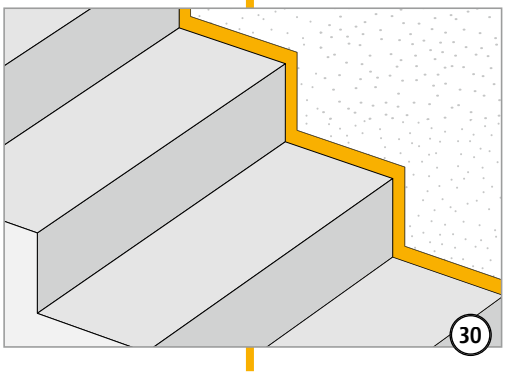




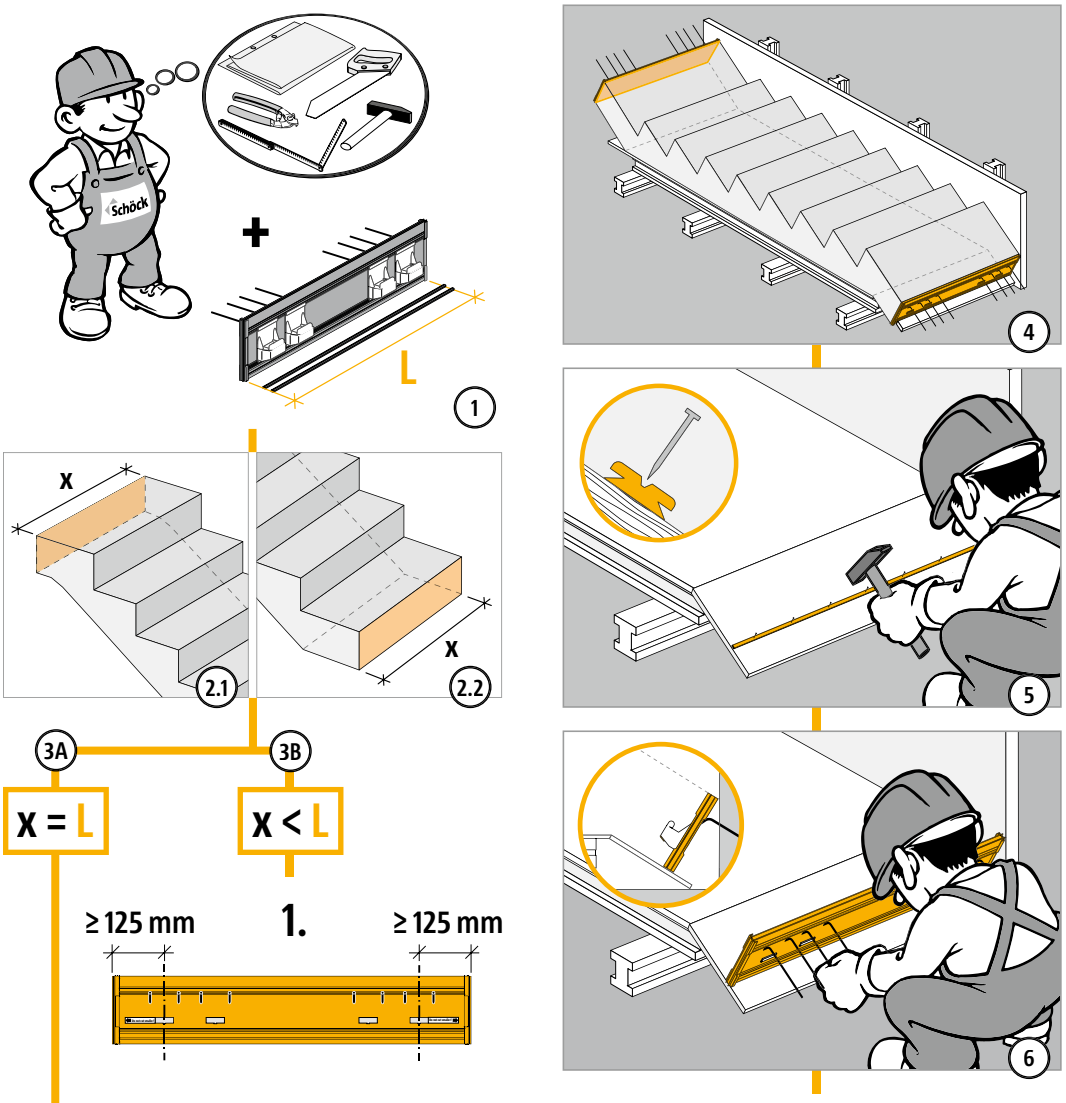








Installation instructions for prefabricating plant



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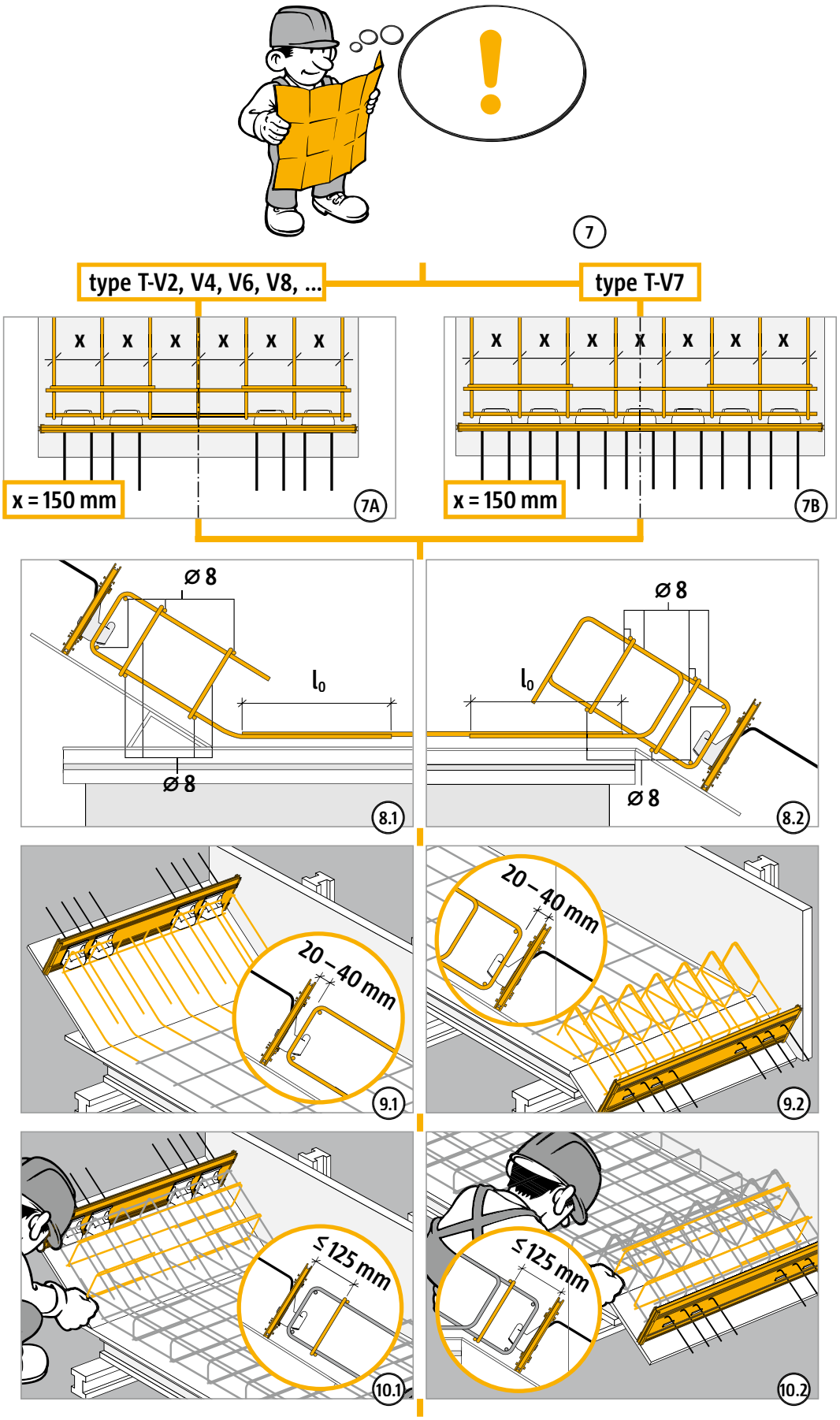

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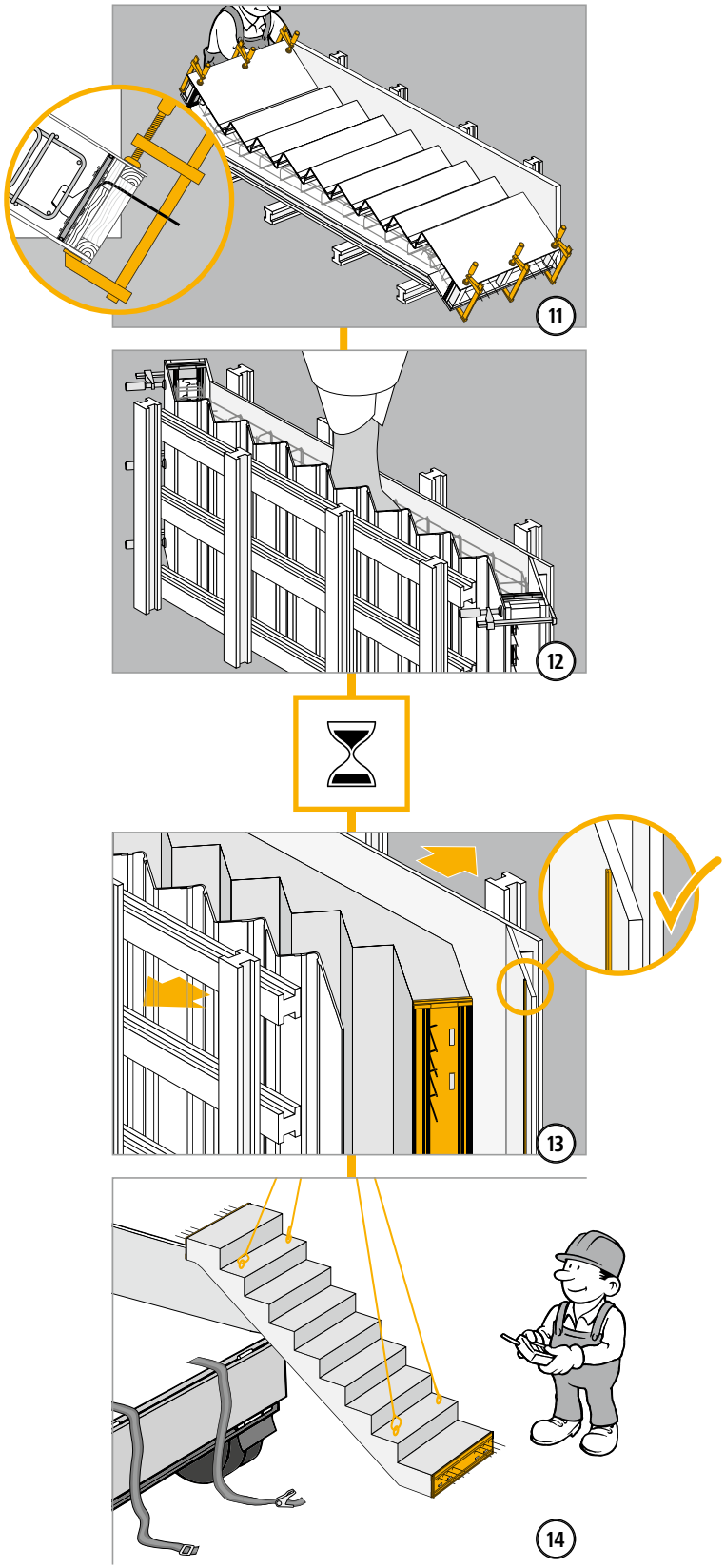
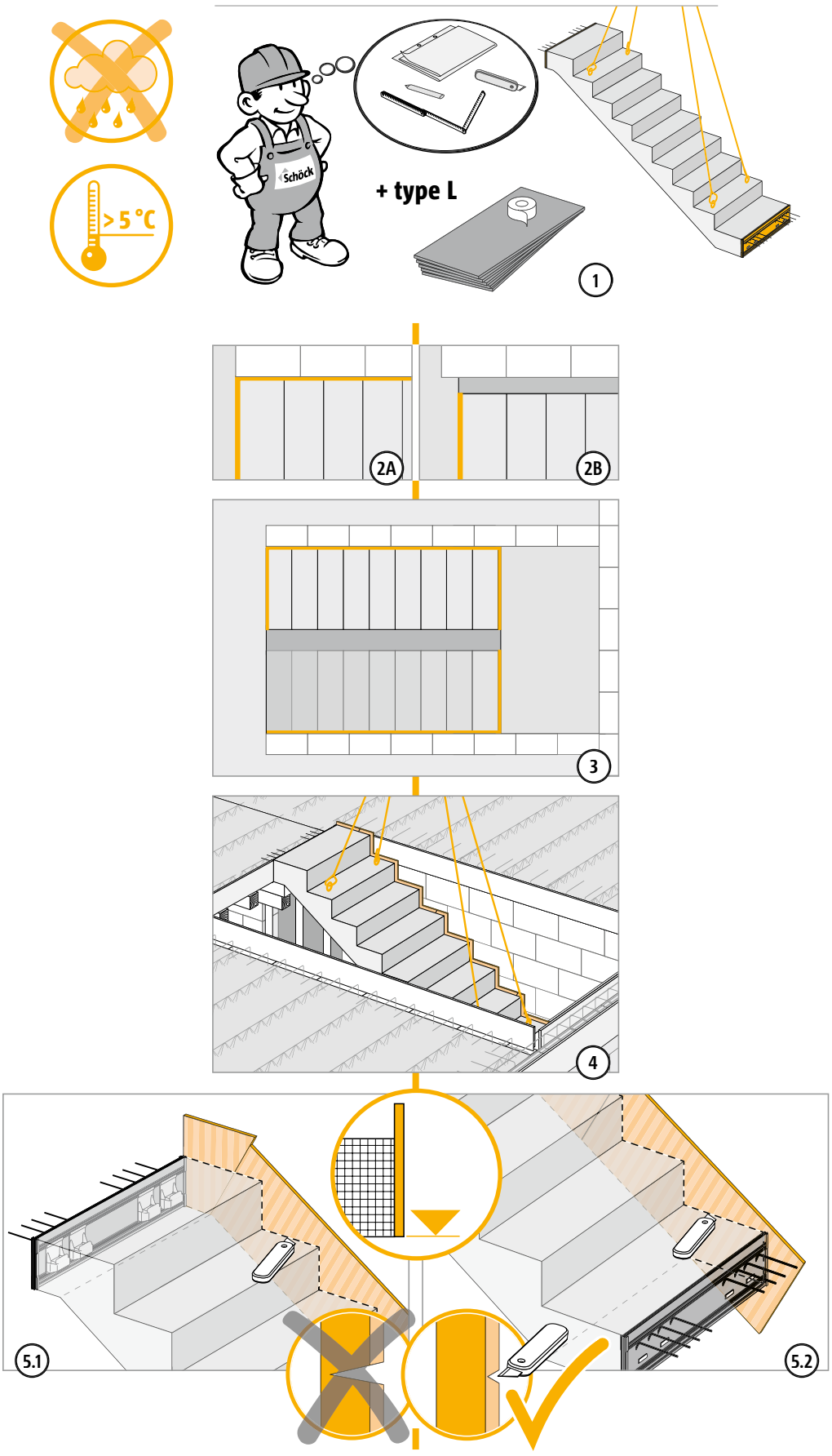


Installation instructions building site precast components



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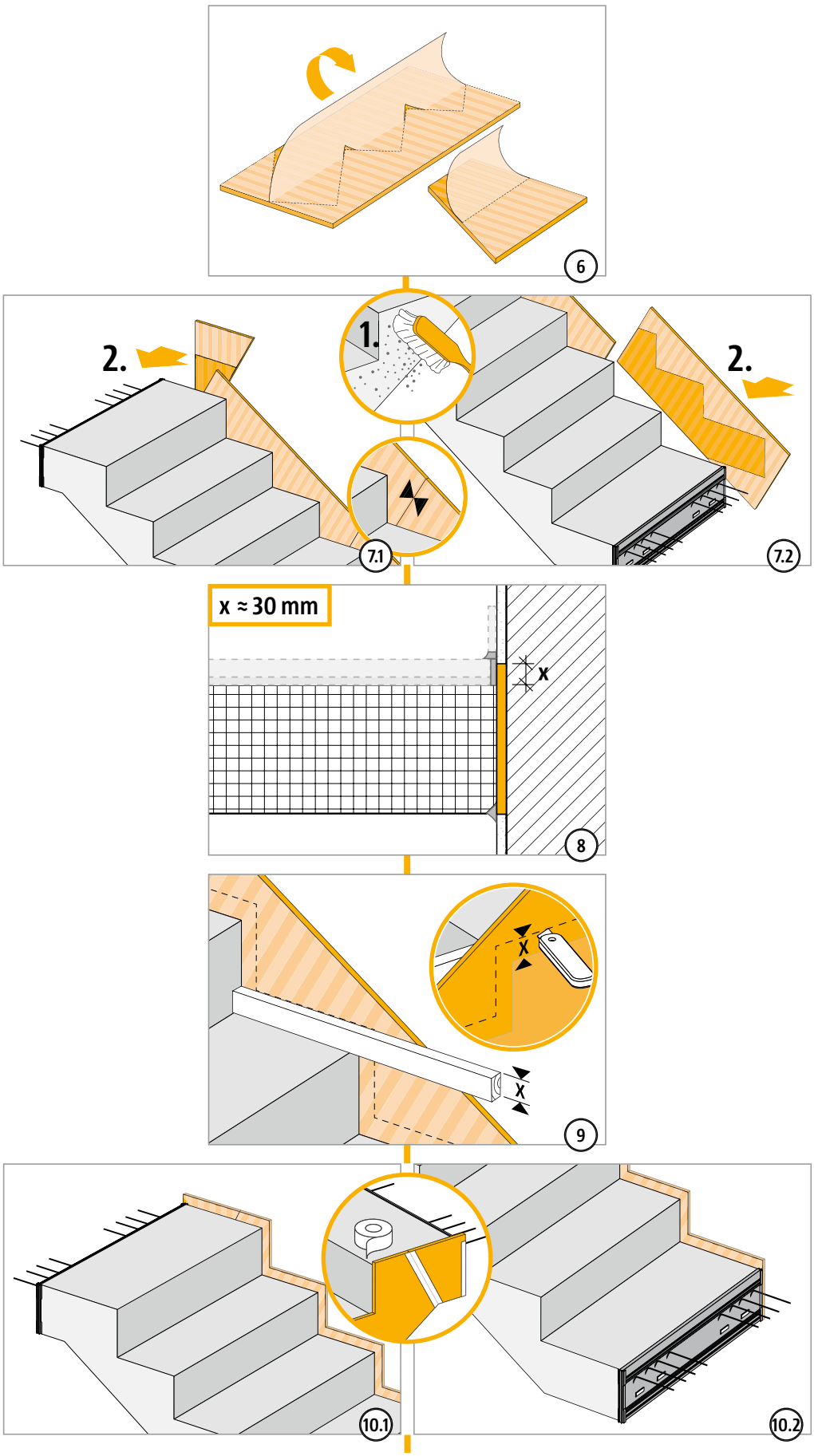

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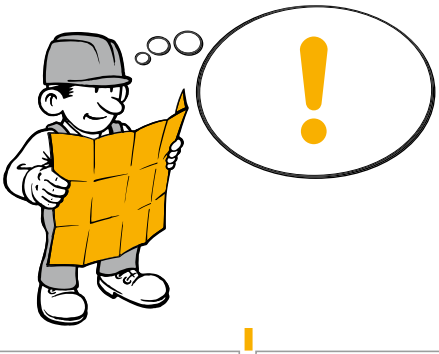

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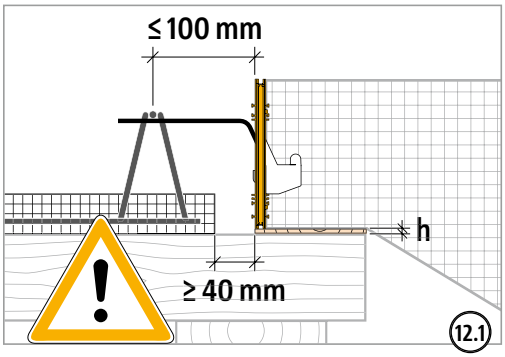
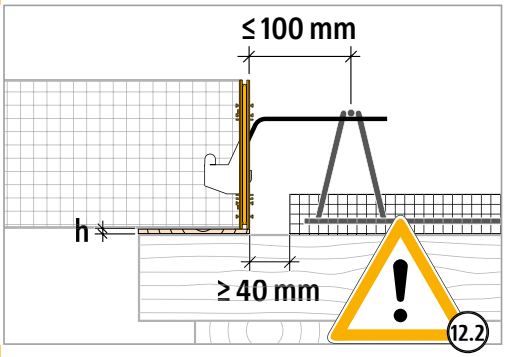
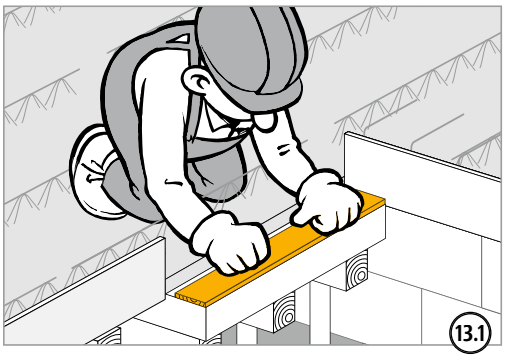
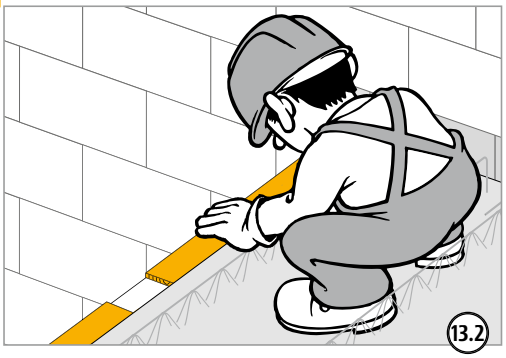
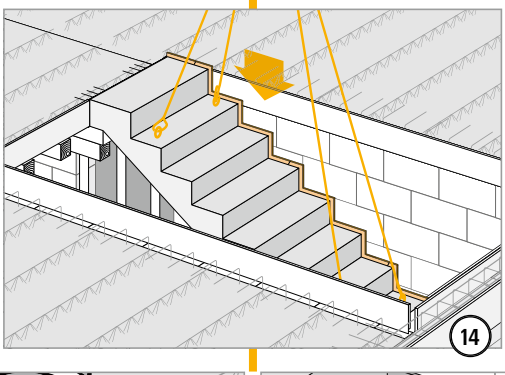
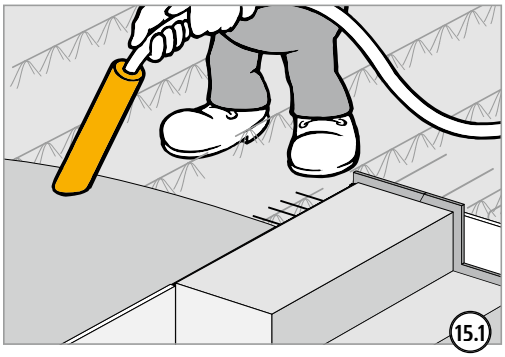


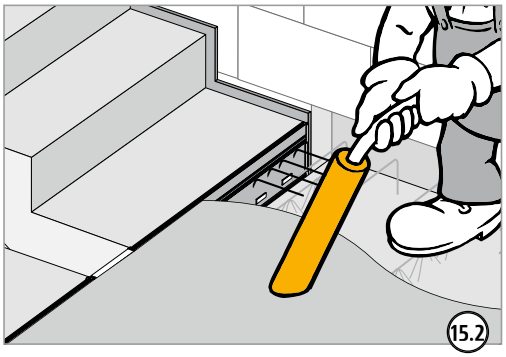




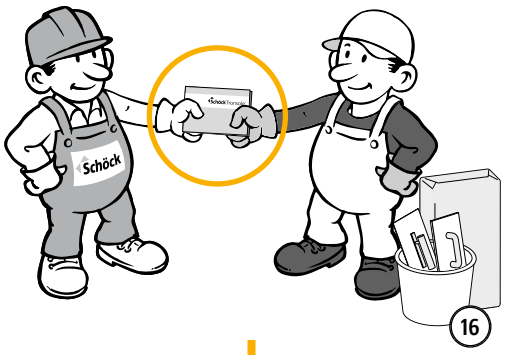


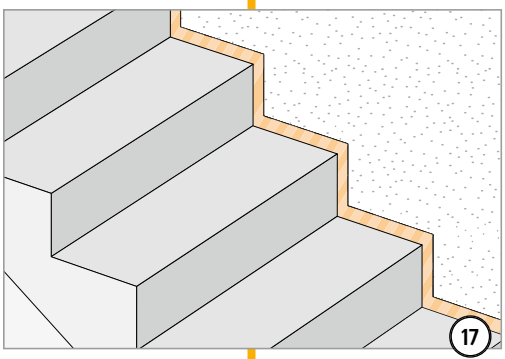


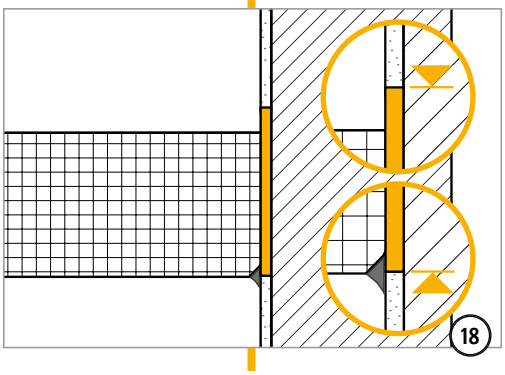


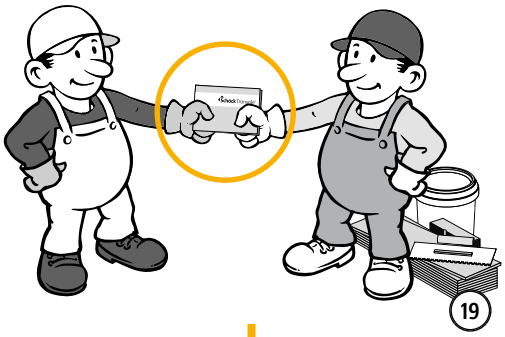


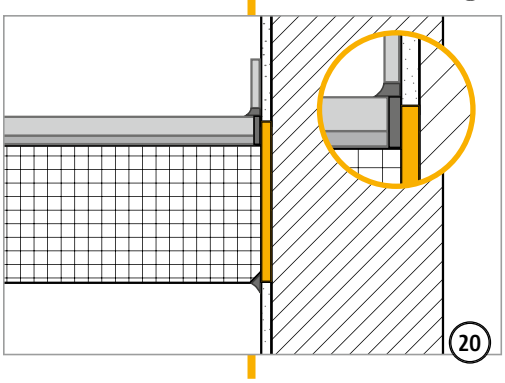
Installation instructions building site precast components

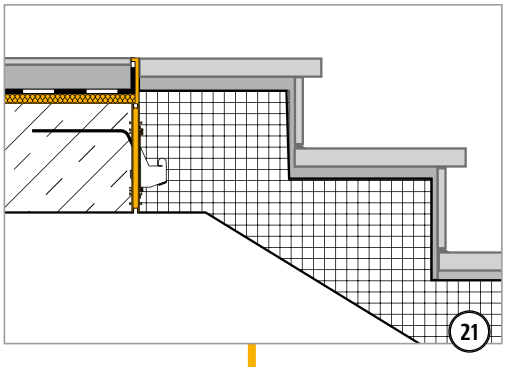










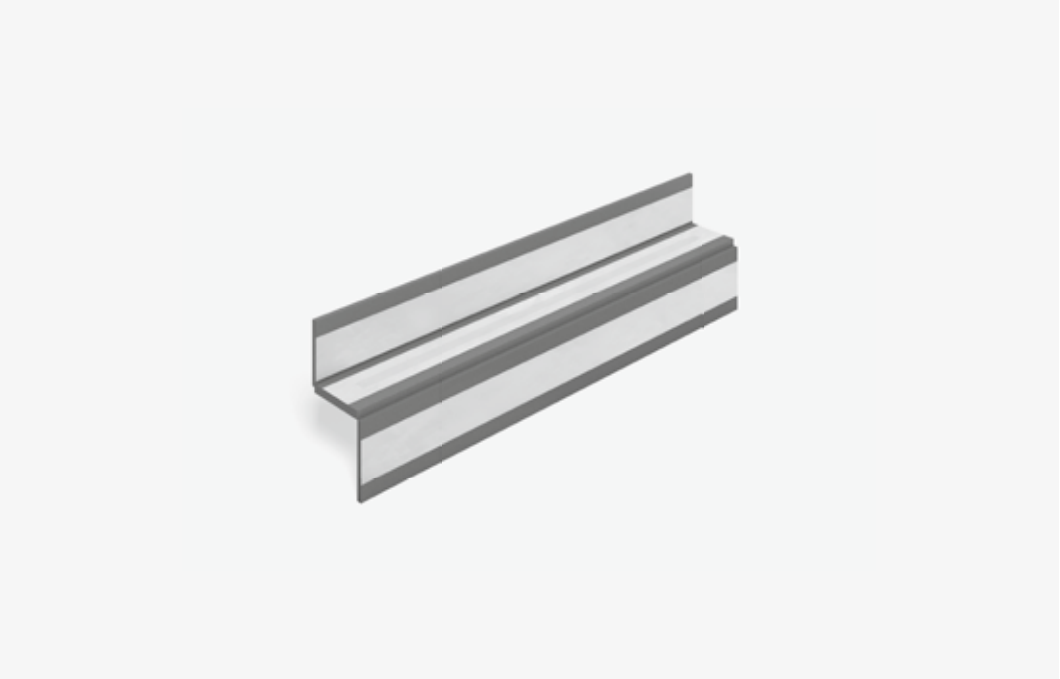


T

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 ≥ 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?

Schöck Tronsole® type F



Schöck Tronsole® type F
Serves the sound insulation of precast stair flight and landing with formation of support. The landing can be produced both in in-situ concrete as well as semi- or fully prefabricated.

Product characteristics | Product design

Product characteristics

- Impact sound pressure level difference $\Delta L^*_{n,w} \leq 30$ dB with type F-V2; $\Delta L^*_{n\,w} \geq 32$ dB with type F-V1, tested according to DIN 7396; Test reports Nos. 91386-01 to 91386-03;
- High value and efficient Elodur® elastomer support for linear connection
- Planning certainty through structural component statics
- Fire resistance class of the adjoining structural component (up to R90) in accordance with fire protection inspection report No. 16503/2013 iBMB Braunschweig
- Firm attachment to precast stair flight using adhesive assembly tape
- Length easy to shorten by 100 mm
- Simple and rapid installation through bracing clip joint

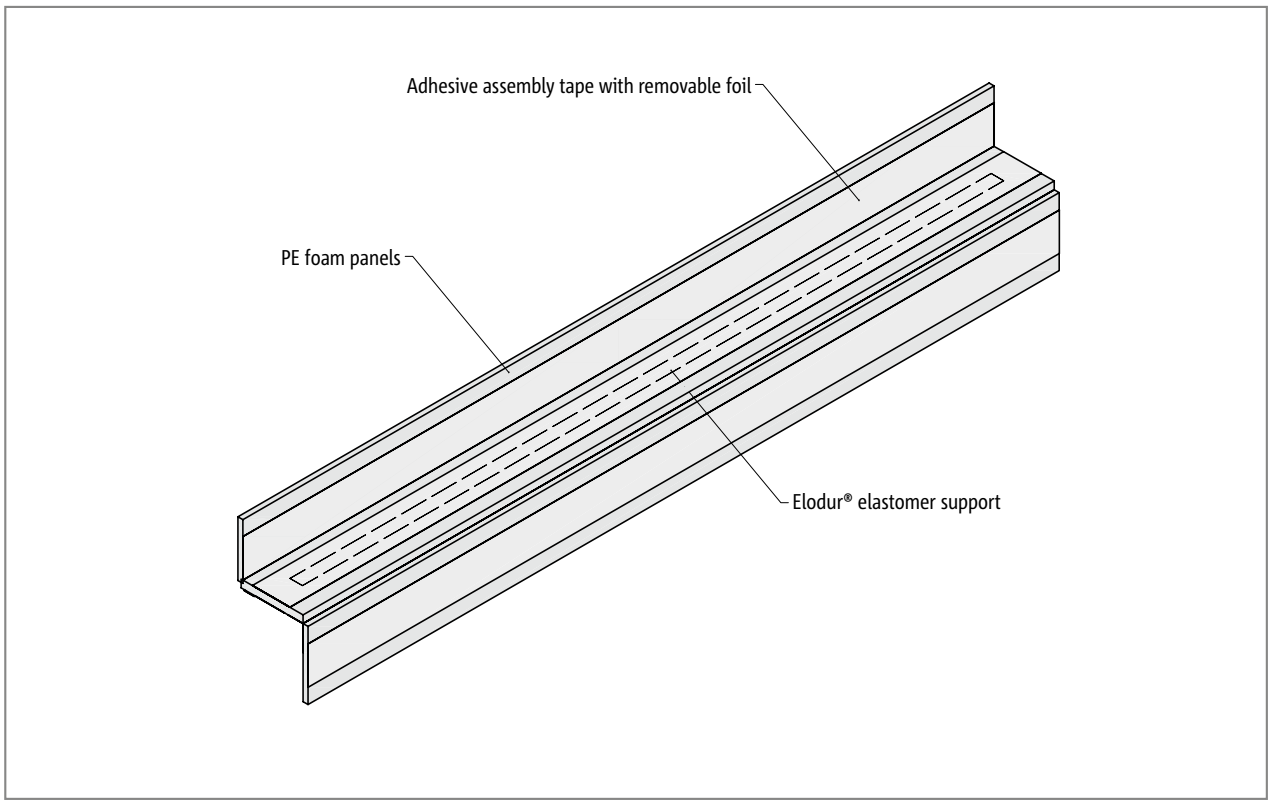


Fig. 53: Schöck Tronsole® type F

F

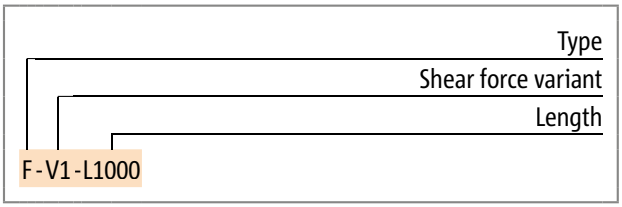
Product selection | Type designations | Special designs | Configuration variants

Schöck Tronsole® type F variants

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

- Shear force load-bearing level:
  Type F-V1, shear force load-bearing level 1, elastomer support width b = 25 mm or
  Type F-V2, shear force load-bearing level 2, elastomer support width b = 35 mm
  Type FS-V3, shear force load-bearing level 3, elastomer support width b = 2 x 25 mm (special type on request)
- Length:
  L = 1000 mm, 1100 mm, 1200 mm, 1300 mm and 1500 mm
- Corbel depth:
  130 - 160 mm

Type designation in planning documents



Special designs

The Schöck Tronsole® type F can be cut to length on site. Furthermore, the special dimensions of the Tronsole®, which differ from the standard product variants presented in the information, can be requested from Schöck Application Technology.

F

Configuration of various types of connection

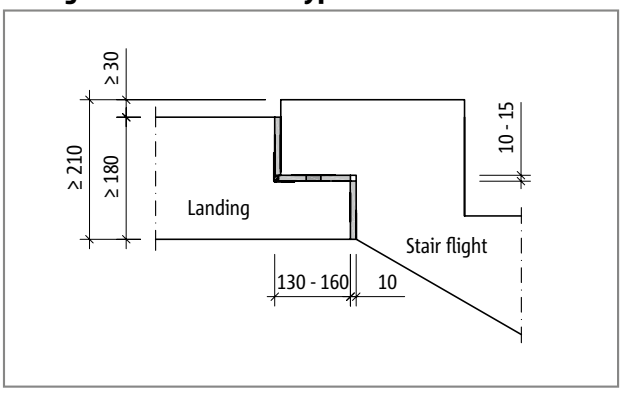


Fig. 54: Schöck Tronsole® type F: Design variant superelevated stair connection

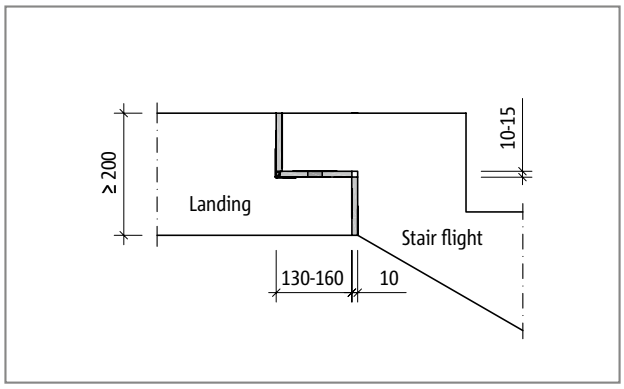


Fig. 55: Schöck Tronsole® type F: Design variant flush stair connection

Configuration variants

- Type of connection:
  The Schöck Tronsole® type F enables the formation of a flush or a superelevated connection on the stair flight side
- Height:
  A connection height of h with flush connection type$_A$ ≥ 200 mm possible.
  A height offset of at least 30 mm is assumed with superelevated connection on the stair side. This is found in the assumed minimum height for the impact soundproofing on the landing and leads to a total height of the connection of h_A ≥ 210 mm with a landing slab thickness of h ≥ 180 mm.
- Corbel depth:
  Corbel depths are possible between K_T ≥ 130 mm and K_T = 160 mm, because for corbel depths in this area the smallest possible anchoring length of the corbel reinforcement according to DIN EN 1992-1-1 can be verified.
- Depending on the static level of usage, a deflection of the Elodur® elastomer support of some 3 mm, but maximum 5 mm, is allowed- see diagram page 64.

Installation cross section

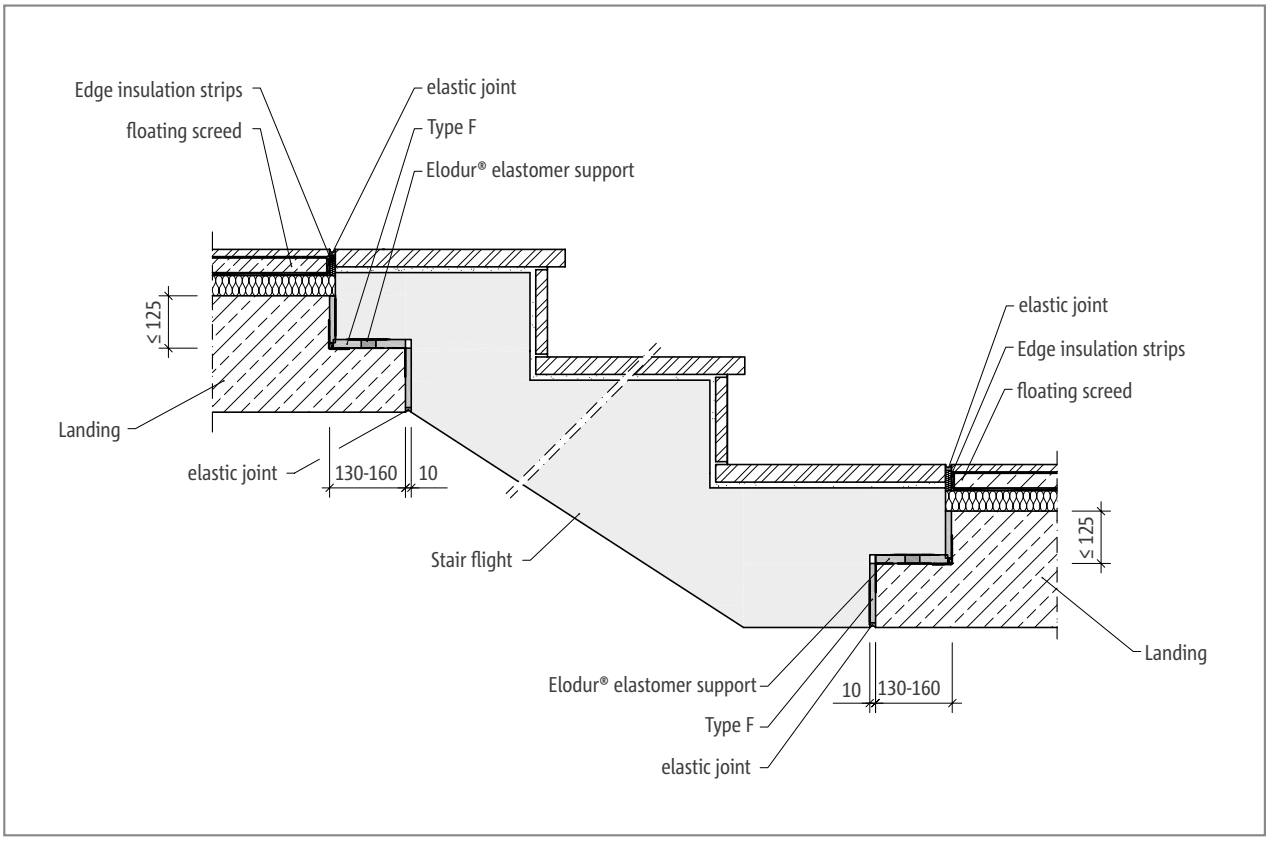


Fig. 56: Schöck Tronsole® type F: Installation cross section

Information on installation cross-section

- If the difference between the corbel height of the landing $h_{k,P}$ and the landing slab thickness h is greater than 125 mm, the upper end of the soundproofing joint between landing and stairs is closed using additional elastic joint material.

Element arrangement

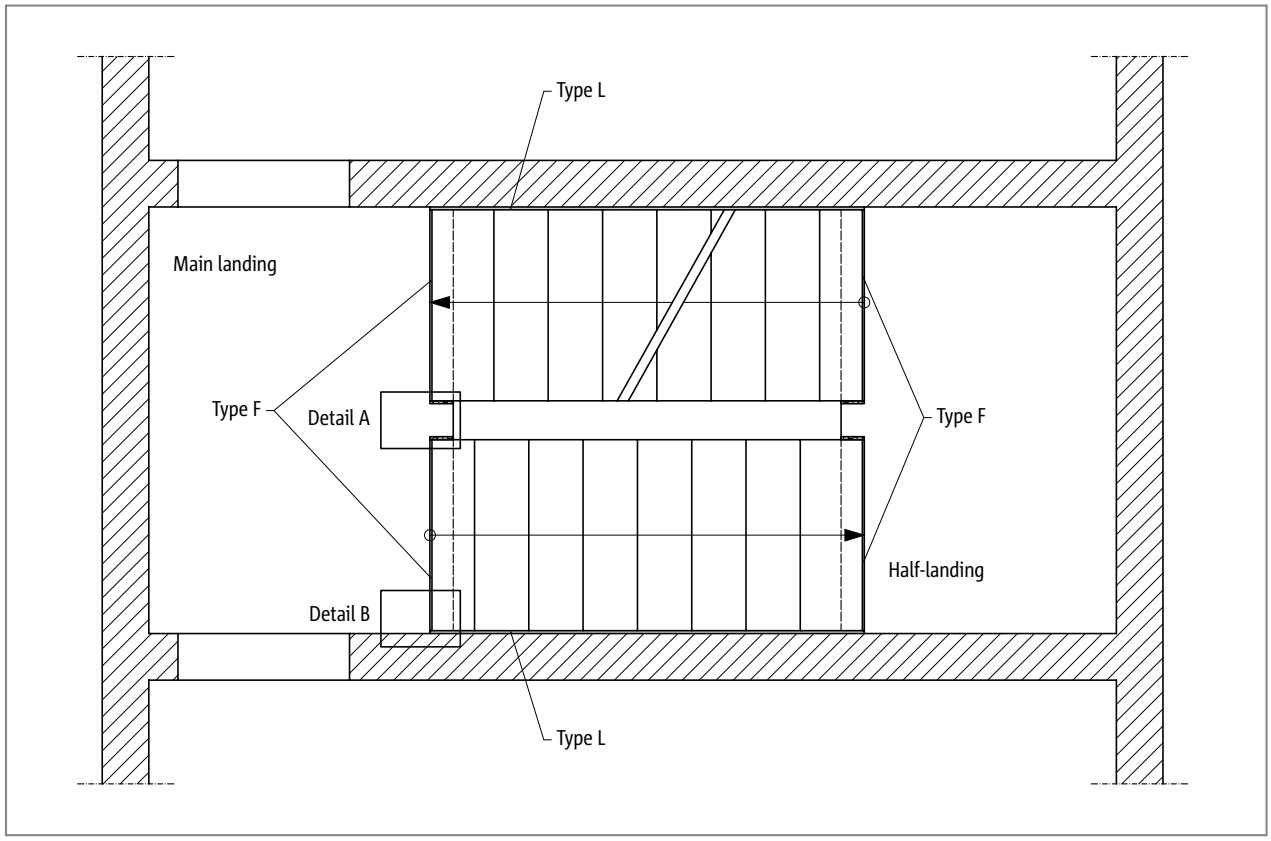


Fig. 57: Schöck Tronsole® type F: Element configuration in plan view

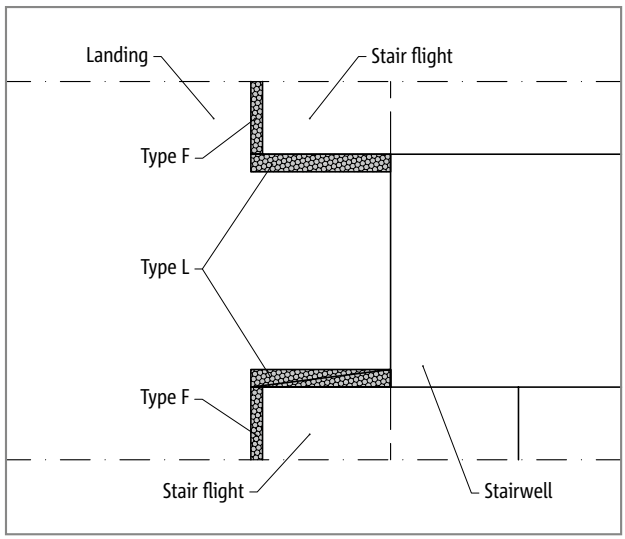


Fig. 58: Schöck Tronsole® type F: Element configuration, Detail A

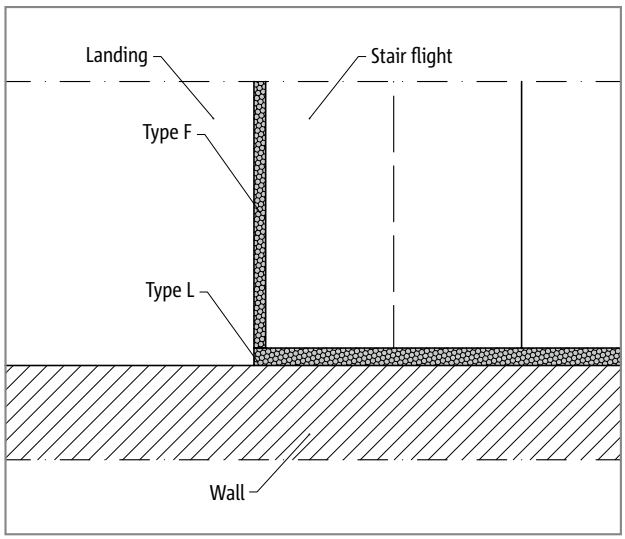


Fig. 59: Schöck Tronsole® type F: Element configuration, Detail B

Notes on element configuration

- For the avoidance of acoustic bridges between staircase wall and stair flight it is recommended that the Schöck Tronsole® type F is combined with type L-420. The Tronsole® type L-420 closes the joint between stair string and wall, maintaining a joint width of 15 mm.
- The use of the Schöck Tronsole® type B is suitable for the sound insulation of stair flight and floor slab. Tronsole® type B. The Tronsole® type F and B can be used combined.

Product description

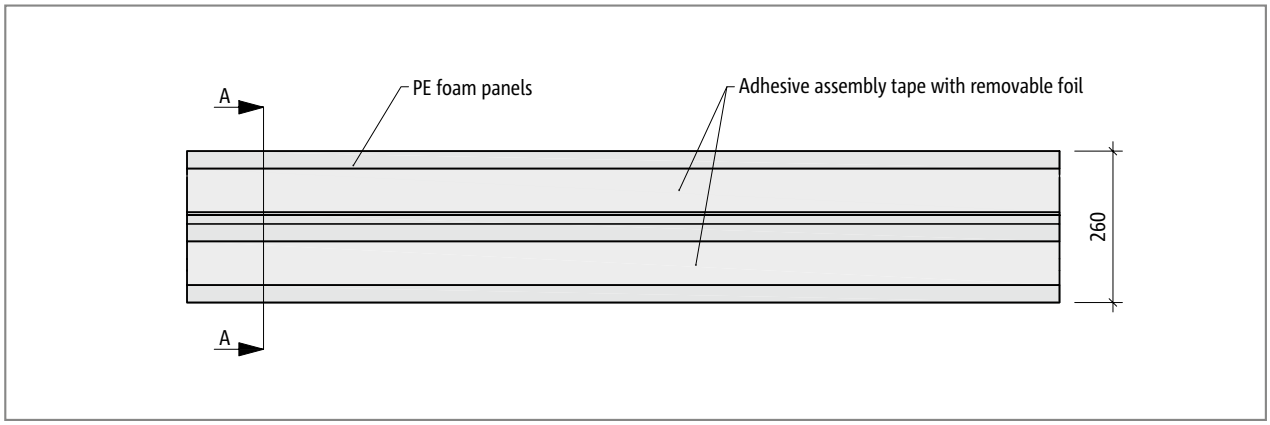


Fig. 60: Schöck Tronsole® type F: Elevation

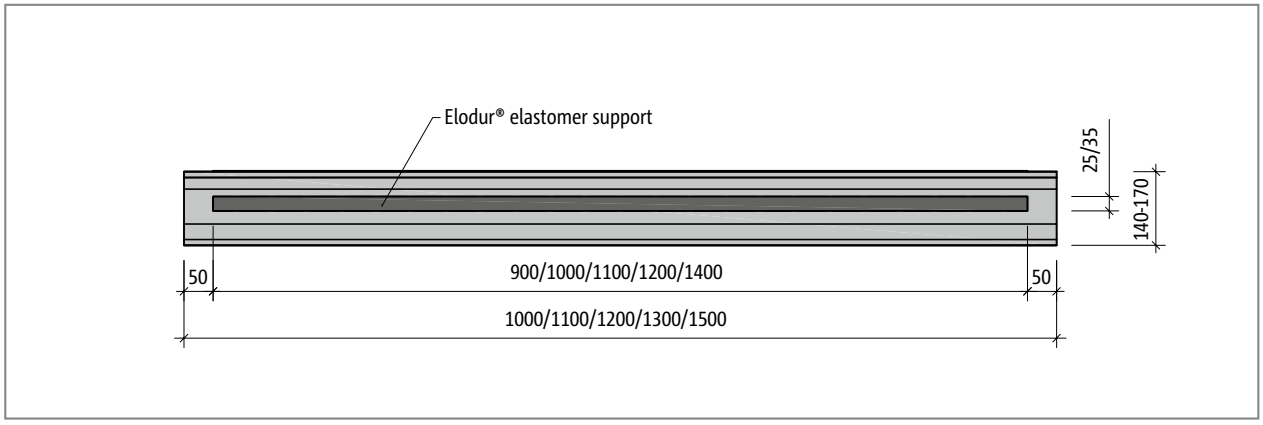


Fig. 61: Schöck Tronsole® type F: Layout

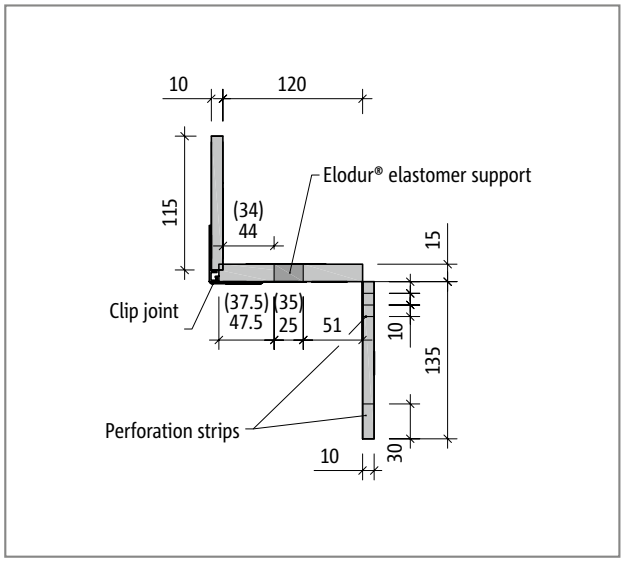


Fig. 62: Schöck Tronsole® type F-V1, (-V2): Product model, cross-section A-A, with adjustment to the minimum corbel depth

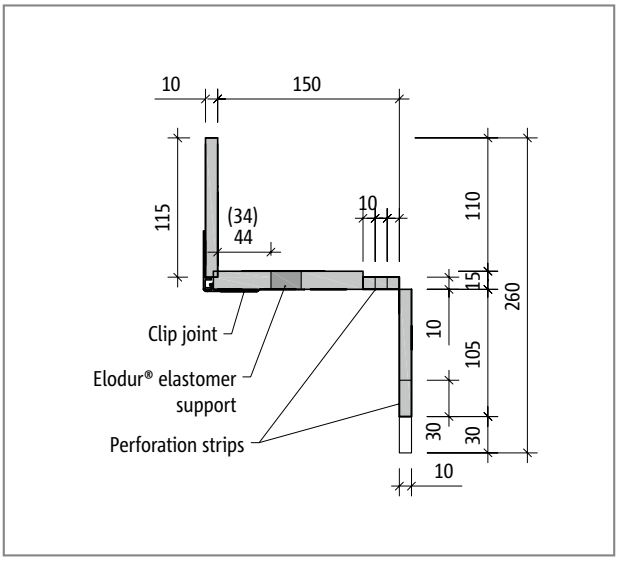


Fig. 63: Schöck Tronsole® type F-V1, (-V2): Product model with adjustment to the maximum corbel depth

Design Tronsole®

Schöck Tronsole® type	F-V1	F-V2
$v_{Rd,z}$ [kN/m]	42.4	59.3
$v_{Rd,x}$ [kN/m]	±3.8	±3.8
$v_{Rd,y}$ [kN/m]	±3.8	±3.8

Schöck Tronsole® type	F-V1	F-V2
Tronsole® length L [mm]	1000, 1100, 1200, 1300, 1500	
Tronsole® Thickness [mm]	15	
Elodur® elastomer support, length L_E [mm]	L - 100	
Elodur® elastomer support, thickness [mm]	15	
Elodur® elastomer support, width [mm]	25	35

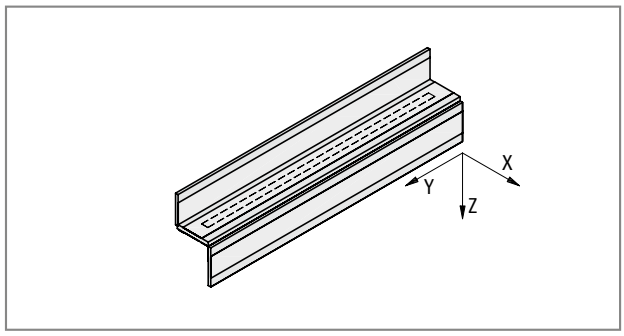


Fig. 64: Schöck Tronsole® type F: Sign rule for the design

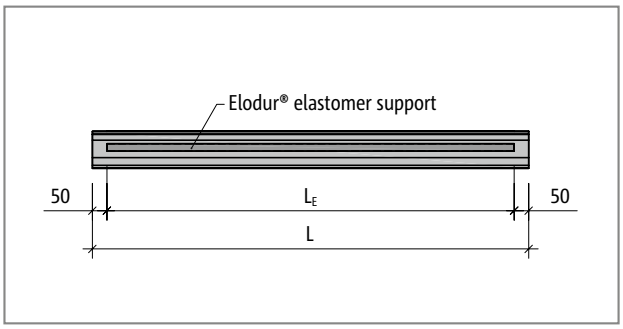


Fig. 65: Schöck Tronsole® type F: Representation of lengths L and L_E; the length of the Elodur® elastomer support is always 10 cm shorter than the length of the Tronsole®.

Notes on design

- The load-bearing capacity of the corbel area of the stair structural components is to be verified by the structural engineer, so far as the dimensioning does not take place according to type statics for the Tronsole® type F.
- The acceptable shear force of the elastomer support is limited by the impact sound reduction.

F

Corbel dimensioning according to type-tested structural standards | Design

Deviating from the corbel dimensioning according to type statics, any corbel dimensions can be selected, so far as for this a valid static verification is carried out by the responsible structural engineer.

Landing

Schöck Tronsole® type	F-V1			F-V2		
Design values Corbel landing with	Fire resistance class R0 Concrete strength landing ≥ C20/25					
Corbel height landing $h_{k,P}$ [mm]	≥ 90	≥ 100	≥ 110	≥ 90	≥ 100	≥ 110
Corbel depth K_T [mm]	$v_{Rd,z}$ [kN/m]					
130	39.8	42.4	42.4	49.5	57.1	59.3
140	42.4	42.4	42.4	57.0	59.3	59.3
150 - 160	42.4	42.4	42.4	59.3	59.3	59.3
Corbel depth K_T [mm]	$v_{Rd,y}$ [kN/m]					
130 - 160	±3.8					
Corbel depth K_T [mm]	$v_{Rd,x}$ [kN/m]					
130 - 160	±3.8					

Stair flight

Schöck Tronsole® type	F-V1			F-V2				
Design values Corbel stair flight with	Fire resistance class R0 Concrete strength class stair flight ≥ C30/37							
Corbel height stair flight h_{Item} [mm]	≥ 90	≥ 100	≥ 110	≥ 90	≥ 100	≥ 110	≥ 120	≥ 130
Corbel depth K_T [mm]	$v_{Rd,z}$ [kN/m]							
130	42.4	42.4	42.4	50.0	57.0	59.3	59.3	59.3
140	28.2	42.4	42.4	28.2	51.7	58.1	59.3	59.3
150	28.2	33.6	42.4	28.2	33.6	53.1	59.0	59.3
160	28.2	33.6	42.4	28.2	33.6	39.0	54.4	59.3
Corbel depth K_T [mm]	$v_{Rd,y}$ [kN/m]							
130 - 160	±3.8							
Corbel depth K_T [mm]	$v_{Rd,x}$ [kN/m]							
130 - 160	±3.8							

Notes on design

- The acceptable shear force of the corbels can only be verified with the on-site reinforcement presented in this section
- According to DIN EN 1992-1-1 (EC2) and DIN EN 1992-1-1/NA with exposure class XC1 the following nominal concrete cover results:
  In-situ concrete landing c_{nom} = 20 mm
  Prefabricated stairway: c_{nom} = 15 mm
- For the fire resistance class R90 a higher concrete cover according to DIN EN 1992-1-2 is necessary. See page 65
- With the predefined concrete strengths one is concerned with minimum requirements which are based on the design.
- The verification of the shear force in the slabs is to take place through the structural engineer, whereby $V_{Rd,max}$ according to DIN EN 1992-1-1 (EC2), Gl. (6.9) for θ = 45 ° and α = 90 ° is to be determined.
- The PE foam panel of the Schöck Tronsole® type specifies the position of the elastomer support. The position of the elastomer support is relevant for the dimensioning of the corbel. Schöck Tronsole® is to be installed fitting exactly to the corbel.

Corbel dimensioning according to type-tested structural standards - Superelevated connection

On the following pages, combinations of corbel and landing height are calculated as examples.

Superelevated connection

Schöck Tronsole® type	F-V1, F-V2			
Connection geometry with	Fire resistance class R 0			
	Stair flight connection height h_A [mm]			
	≥ 210	≥ 230	≥ 250	≥ 270
Corbel height landing $h_{k,P}$ [mm]	≥ 90	≥ 100	≥ 110	≥ 120
Corbel height stair flight h_{Item} [mm]	≥ 110	≥ 120	≥ 130	≥ 140

Schöck Tronsole® type F, table: Flush connection geometry with R0

Schöck Tronsole® type	F-V1, F-V2			
Connection geometry with	Fire resistance class R90			
	Stair flight connection height h_A [mm]			
	≥ 240	≥ 260	≥ 280	≥ 300
Corbel height landing $h_{k,P}$ [mm]	≥ 100	≥ 110	≥ 120	≥ 130
Corbel height stair flight h_{Item} [mm]	≥ 130	≥ 140	≥ 150	≥ 160

Schöck Tronsole® type F, table: Flush connection geometry with R90

Schöck Tronsole® type	F-V1				F-V2			
Design values with	Concrete strength landing ≥ C20/25, stair flight ≥ C30/37							
	Connection height h_A [mm] with superelevated stair head							
Fire resistance class R 0	≥ 210	≥ 230	≥ 250	≥ 270	≥ 210	≥ 230	≥ 250	≥ 270
Fire resistance class R90	≥ 240	≥ 260	≥ 280	≥ 300	≥ 240	≥ 260	≥ 280	≥ 300
Corbel depth K_T [mm]	$v_{Rd,z}$ [kN/m]							
130	39.8	42.4	42.4	42.4	49.5	57.1	59.3	59.3
140	42.4	42.4	42.4	42.4	57.0	59.3	59.3	59.3
150	42.4	42.4	42.4	42.4	53.1	59.0	59.3	59.3
160	39.0	42.4	42.4	42.4	39.0	54.4	59.3	59.3
Corbel depth K_T [mm]	$v_{Rd,y}$ [kN/m]							
130 to 160	±3.8							
Corbel depth K_T [mm]	$v_{Rd,x}$ [kN/m]							
130 to 160	±3.8							

Schöck Tronsole® type F, table: Dimensioning with superelevated connection

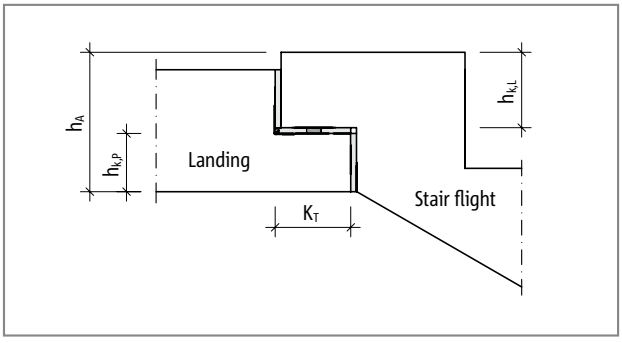


Fig. 66: Schöck Tronsole® type F: Design

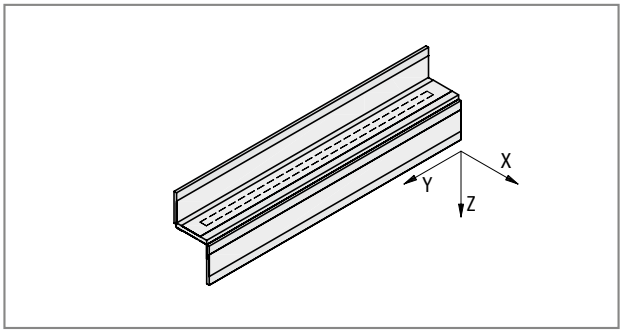


Fig. 67: Schöck Tronsole® type F: Sign rule for the design

On-site reinforcement according to type-tested structural standards - Superelevated connection

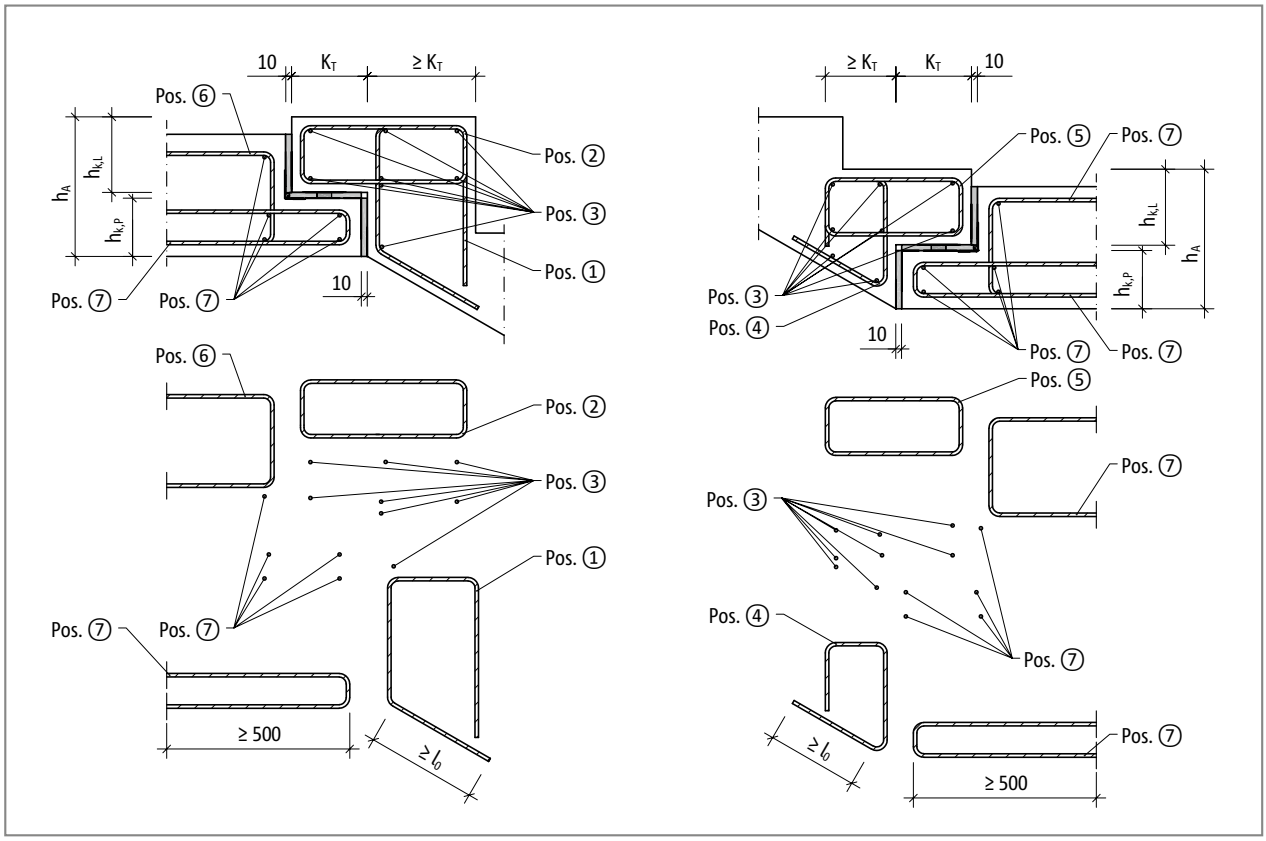


Fig. 68: Schöck Tronsole® type F: On-site reinforcement with superelevated connection

F

On-site reinforcement according to type-tested structural standards - Superelevated connection

Schöck Tronsole® type		F-V1, F-V2
On-site reinforcement	Location	Landing (XC1) concrete strength class ≥ C20/25 Stair flight (XC1) concrete strength class ≥ C30/37
		210 ≤ h_A [mm] (R0)
		240 ≤ h_A [mm] (R90)
Pos. 1 open stirrup (vertical tensile reinforcement)		
Pos. 1	on the flight side	H8@150 mm
Pos. 2 closed stirrups (horizontal tensile reinforcement)		
Pos. 2	on the flight side	⌀ 8/100 mm
Pos. 3 Steel bars along the support joint		
Pos. 3	on the flight side	2x 8 ⌀ 8
Pos. 4 open stirrups (vertical tensile reinforcement)		
Pos. 4	on the flight side	H8@150 mm
Pos. 5 closed stirrups (horizontal tensile reinforcement)		
Pos. 5	on the flight side	⌀ 8/100 mm
Pos. 6 ties (vertical tensile reinforcement)		
Pos. 6	on the landing side	H8@150 mm
Pos. 7 ties (horizontal tensile reinforcement)		
Pos.7	on the landing side	⌀ 8/100 mm
Pos. 8 Steel bars along the support joint		
Pos. 8	on the landing side	5 • H8
Pos. 9 ties (vertical tensile reinforcement)		
Pos. 9	on the landing side	H8@150 mm
v 10 ties (horizontal tensile reinforcement)		
Pos. 10	on the landing side	⌀ 8/100 mm
Pos. 11 Steel bars along the support joint		
Pos. 11	on the landing side	5 • H8

On-site reinforcement

- The height of the reinforcement stirrup in the corbel varies with the various corbel heights of the Tronsole® type F, in order to achieve the greatest possible internal lever arm for the different load-bearing levels.
- The on-site stirrup reinforcement is to be led as closely as possible to the respective vertical edge of the structural component taking into account the required concrete cover.
- In order to keep the manufacturing tolerances with the laying of the reinforcement and the structural component dimensions as small as possible, attention is to be paid to correct implementation.
- Pos. 1 and Pos. 4 with the slab reinforcement of the stair flight form an overlap connection. With this, a sufficient overlap length l_0 is to be ensured.
- Pos. 1 and Pos. 4 can be implemented as closed stirrup if, with this, a sufficient overlap length l_0 can be realised.
- In order to be able to realise the smallest possible anchoring length $l_{b,min}$ = max (6.7 ϕ_s; 0.3 $l_{b,rqd}$), in the cases presented here for the corbels, more than the 2 to 3 times the statically required tensile reinforcement has been selected.

Corbel dimensioning according to type-tested structural standards - Flush connection

On the following pages, combinations of corbel and landing height are calculated as examples.
Deviating from the corbel dimensioning according to type statics, any corbel dimensions can be selected, so far as for this a valid static verification is carried out by the responsible structural engineer.

Flush connection

Schöck Tronsole® type	F-V1, F-V2			
Connection geometry with	Fire resistance class R 0			
	Stair flight connection height h_A [mm]			
	≥ 200	≥ 220	≥ 240	≥ 260
Corbel height landing $h_{k,P}$ [mm]	≥ 100	≥ 110	≥ 120	≥ 130
Corbel height stair flight h_{Item} [mm]	≥ 90	≥ 100	≥ 110	≥ 120

Schöck Tronsole® type F, table: Flush connection geometry with R0

Schöck Tronsole® type	F-V1, F-V2			
Connection geometry with	Fire resistance class R90			
	Stair flight connection height h_A [mm]			
	≥ 230	≥ 250	≥ 270	≥ 290
Corbel height landing $h_{k,P}$ [mm]	≥ 110	≥ 120	≥ 130	≥ 140
Corbel height stair flight h_{Item} [mm]	≥ 110	≥ 120	≥ 130	≥ 140

Schöck Tronsole® type F, table: Flush connection geometry with R90

Schöck Tronsole® type	F-V1				F-V2			
Design values with	Concrete strength landing ≥ C20/25, stair flight ≥ C30/37							
	Stair flight connection height h_A [mm]							
Fire resistance class R 0	≥ 200	≥ 220	≥ 240	≥ 260	≥ 200	≥ 220	≥ 240	≥ 260
Fire resistance class R90	≥ 230	≥ 250	≥ 270	≥ 290	≥ 230	≥ 250	≥ 270	≥ 290
Corbel depth K_T [mm]	$v_{Rd,z}$ [kN/m]							
130	42.4	42.4	42.4	42.4	50.0	57.0	59.3	59.3
140	28.2	42.4	42.4	42.4	28.2	51.7	58.1	59.3
150	28.2	33.6	42.4	42.4	28.2	33.6	53.1	59.0
160	28.2	33.6	39.0	42.4	28.2	33.6	39.0	54.4
Corbel depth K_T [mm]	$v_{Rd,y}$ [kN/m]							
130 to 160	±3.8							
Corbel depth K_T [mm]	$v_{Rd,x}$ [kN/m]							
130 to 160	±3.8							

Schöck Tronsole® type F, table: Dimensioning with flush connection

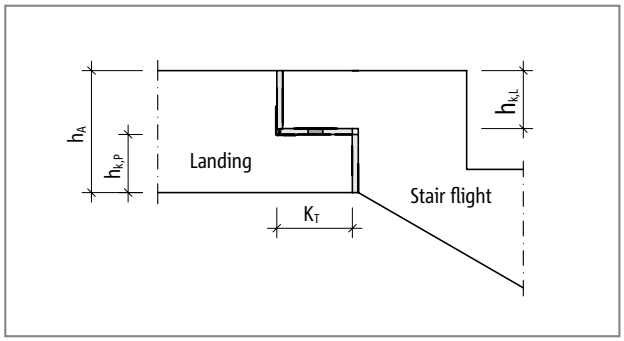


Fig. 69: Schöck Tronsole® type F: Design

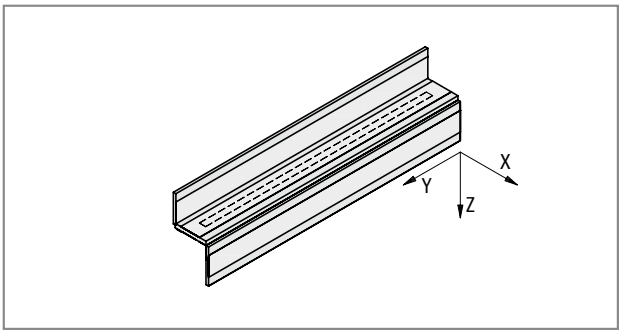


Fig. 70: Schöck Tronsole® type F: Sign rule for the design

Design

Notes on design

- The acceptable shear force of the corbels can only be verified with the on-site reinforcement presented in this section
- According to DIN EN 1992-1-1 (EC2) and DIN EN 1992-1-1/NA with exposure class XC1 the following nominal concrete cover results:
  In-situ concrete landing c_{nom} = 20 mm
  Prefabricated stairway: c_{nom} = 15 mm
- With the predefined concrete strengths one is concerned with minimum requirements which are based on the design.
- The verification of the shear force in the slabs is to take place through the structural engineer, whereby $V_{Rd,max}$ according to DIN EN 1992-1-1 (EC2), Gl. (6.9) for θ = 45 ° and α = 90 ° is to be determined.
- The PE foam panel of the Schöck Tronsole® type specifies the position of the elastomer support. The position of the elastomer support is relevant for the dimensioning of the corbel. Schöck Tronsole® is to be installed fitting exactly to the corbel.

On-site reinforcement according to type-tested structural standards - Flush connection

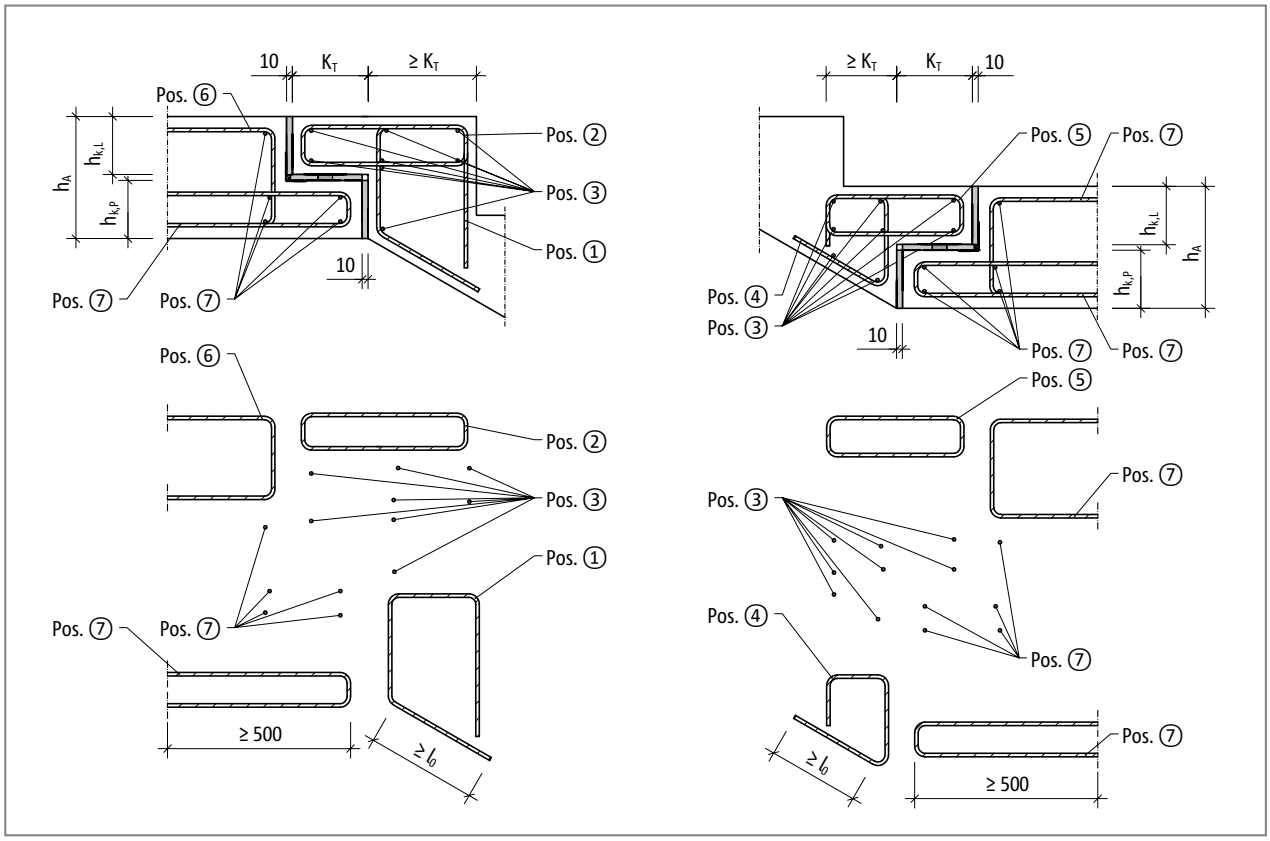


Fig. 71: Schöck Tronsole® type F: On-site reinforcement with flush connection

F

On-site reinforcement according to type-tested structural standards - Flush connection

Schöck Tronsole® type		F-V1, F-V2
On-site reinforcement	Location	Landing (XC1) concrete strength class ≥ C20/25 Stair flight (XC1) concrete strength class ≥ C30/37
		200 ≤ h_A [mm] (R0)
		230 ≤ h_A [mm] (R90)
Pos. 1 open stirrup (vertical tensile reinforcement)		
Pos. 1	on the flight side	H8@150 mm
Pos. 2 closed stirrups (horizontal tensile reinforcement)		
Pos. 2	on the flight side	⌀ 8/100 mm
Pos. 3 Steel bars along the support joint		
Pos. 3	on the flight side	2x 8 ⌀ 8
Pos. 4 open stirrups (vertical tensile reinforcement)		
Pos. 4	on the flight side	H8@150 mm
Pos. 5 closed stirrups (horizontal tensile reinforcement)		
Pos. 5	on the flight side	⌀ 8/100 mm
Pos. 6 ties (vertical tensile reinforcement)		
Pos. 6	on the landing side	H8@150 mm
Pos. 7 ties (horizontal tensile reinforcement)		
Pos.7	on the landing side	⌀ 8/100 mm
Pos. 8 Steel bars along the support joint		
Pos. 8	on the landing side	5 • H8
Pos. 9 ties (vertical tensile reinforcement)		
Pos. 9	on the landing side	H8@150 mm
v 10 ties (horizontal tensile reinforcement)		
Pos. 10	on the landing side	⌀ 8/100 mm
Pos. 11 Steel bars along the support joint		
Pos. 11	on the landing side	5 • H8

Schöck Tronsole® type F, table: On-site reinforcement with flush connection

On-site reinforcement

- The height of the reinforcement stirrup in the corbel varies with the various corbel heights of the Tronsole® type F, in order to achieve the greatest possible internal lever arm for the different load-bearing levels.
- The on-site stirrup reinforcement is to be led as closely as possible to the respective vertical edge of the structural component taking into account the required concrete cover.
- In order to keep the manufacturing tolerances with the laying of the reinforcement and the structural component dimensions as small as possible, attention is to be paid to correct implementation.
- Pos. 1 and Pos. 4 with the slab reinforcement of the stair flight form an overlap connection. With this, a sufficient overlap length l_0 is to be ensured.
- Pos. 1 and Pos. 4 can be implemented as closed stirrup if, with this, a sufficient overlap length l_0 can be realised.
- In order to be able to realise the smallest possible anchoring length $l_{b,min}$ = max (6.7 ϕ_s; 0.3 $l_{b,rqd}$), in the cases presented here for the corbels, more than the 2 to 3 times the statically required tensile reinforcement has been selected.

Deflection

Deformation of the Elodur® elastomer support of the Tronsole® type F-V1

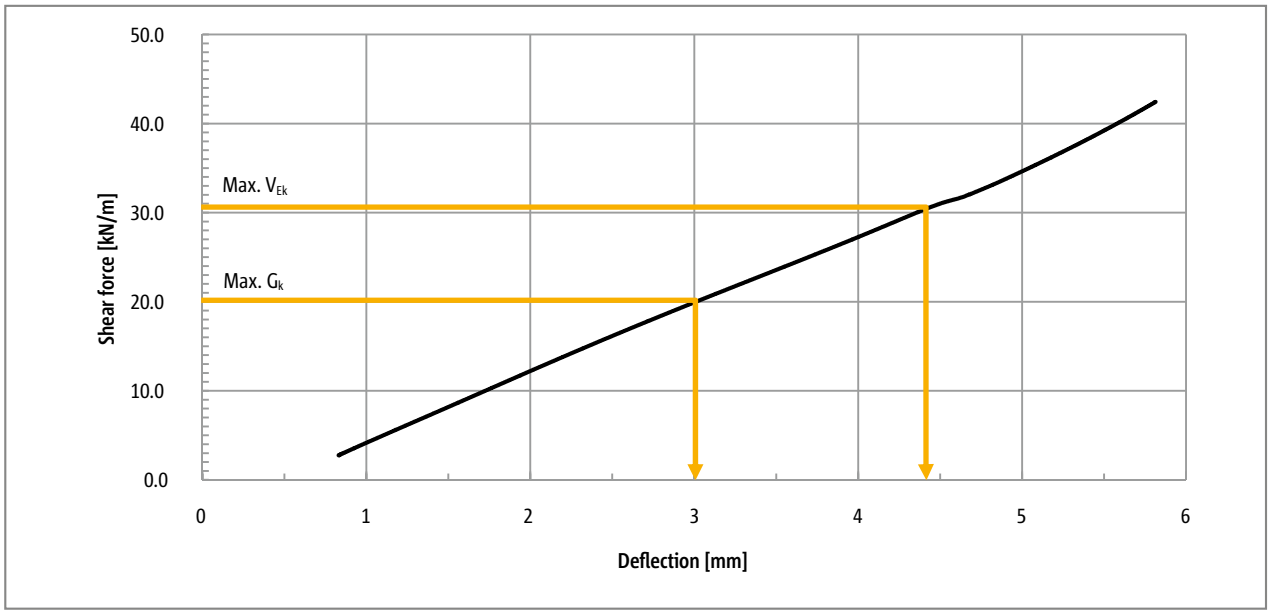


Fig. 72: Schöck Tronsole® type F-V1: Deformation of the Elodur® elastomer support

F

Deformation of the Elodur® elastomer support of the Tronsole® type F-V2

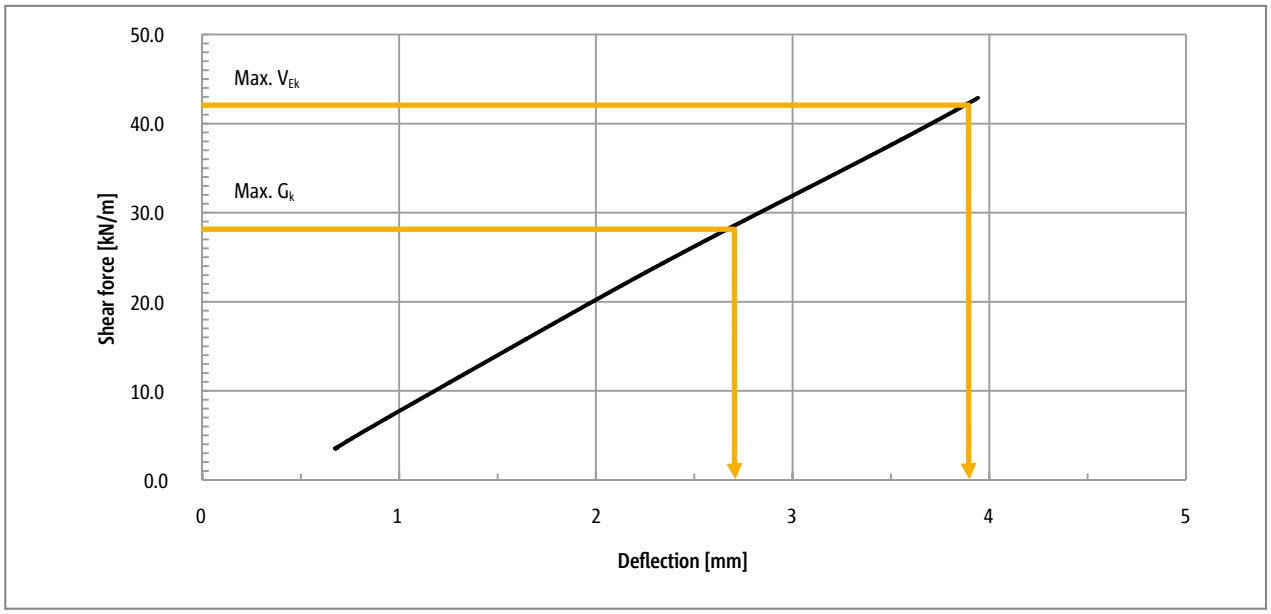


Fig. 73: Schöck Tronsole® type F-V2: Deformation of the Elodur® elastomer support

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 .
- Max. V_{Ek} = Max. V_{Ed}/γ, whereby $\gamma = 1.4$
- $\gamma = 1.4$ applies under the assumption that Max. V_{Ed} is made up of two thirds from own weight and one third from live load.
- Thus Max. is V_{Ek} the maximum service load and the maximum own weight is Max. $G_k = 2/3 \cdot$ Max. V_{Ek}.
- From the deflection of the Elodur® elastomer support there results the following rule of thumb for the connection height h_A: Connection height h_A = Corbel height landing $h_{k,P}$ + Corbel height stair flight $h_{k,L}$ + 10 mm

Fire protection | Materials | Installation

Fire protection

For the use of the Schöck Tronsole® type F the connection range of the notched slab edges in accordance with Fire protection Report No. EBB 150003 TU Kaiserslautern can be classified in the fire resistance class R90 For this, however, the maintaining of the following conditions is prerequisite:
Attention is to be paid to the required nominal concrete cover according to DIN EN 1992-1-2 in combination with DIN EN 1992-1-2/NA. With a joint width a ≤ 30 mm between stairs and landing these reinforced structural components, with regard to fire protection according to DIN 4102-4, are considered as single unit, i.e. as a monolithic connection.
From this, it results that the required concrete cover at the corbel joint itself does not have to be increased due to fire protection requirements. Consequently, the on-site stirrup reinforcement in the area of the corbel connection in the case of a fire protection requirement $c_{nom,L}$ and $c_{nom,P}$ is to be brought up to the impact soundproofing joint just as tight as in the case without fire protection requirement.
Nevertheless, a vertical minimum centre-to-centre distance of the reinforcement from the horizontal structural component edge on the room side of u = 35 mm is necessary. This requirement would naturally also exist with a monolithic connection. The vertical centre-to-centre distance is measured respectively from the lower to the upper edge of the structural component. The neighbouring reinforced concrete structural components must satisfy the same building supervisory requirements on fire resistance capability as the connection area itself.

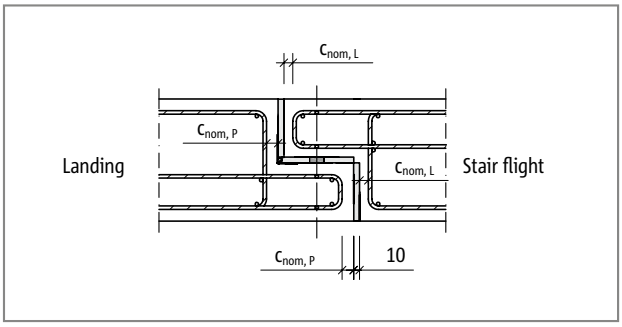


Fig. 74: Schöck Tronsole® type F: Vertical section along the stairs in the area of the corbel support; depiction of the concrete cover $c_{nom,L}$ and $c_{nom,P}$

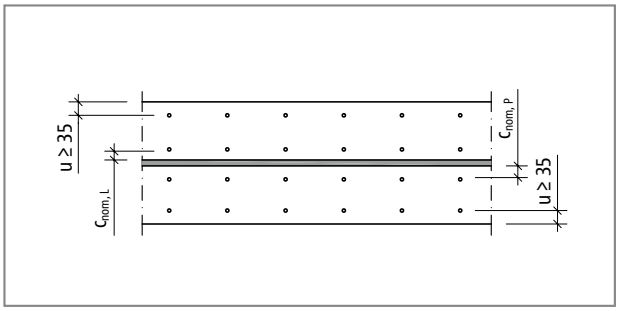


Fig. 75: Schöck Tronsole® type F: Vertical section transverse to the stairs in the area of the corbel support; depiction of the concrete cover $c_{nom,L}$, $c_{nom,P}$ and the minimum centre-to-centre distance u of the reinforcement

F

Fire protection

- The Tronsole® type F conforms with building materials class B2 according to DIN 4102.

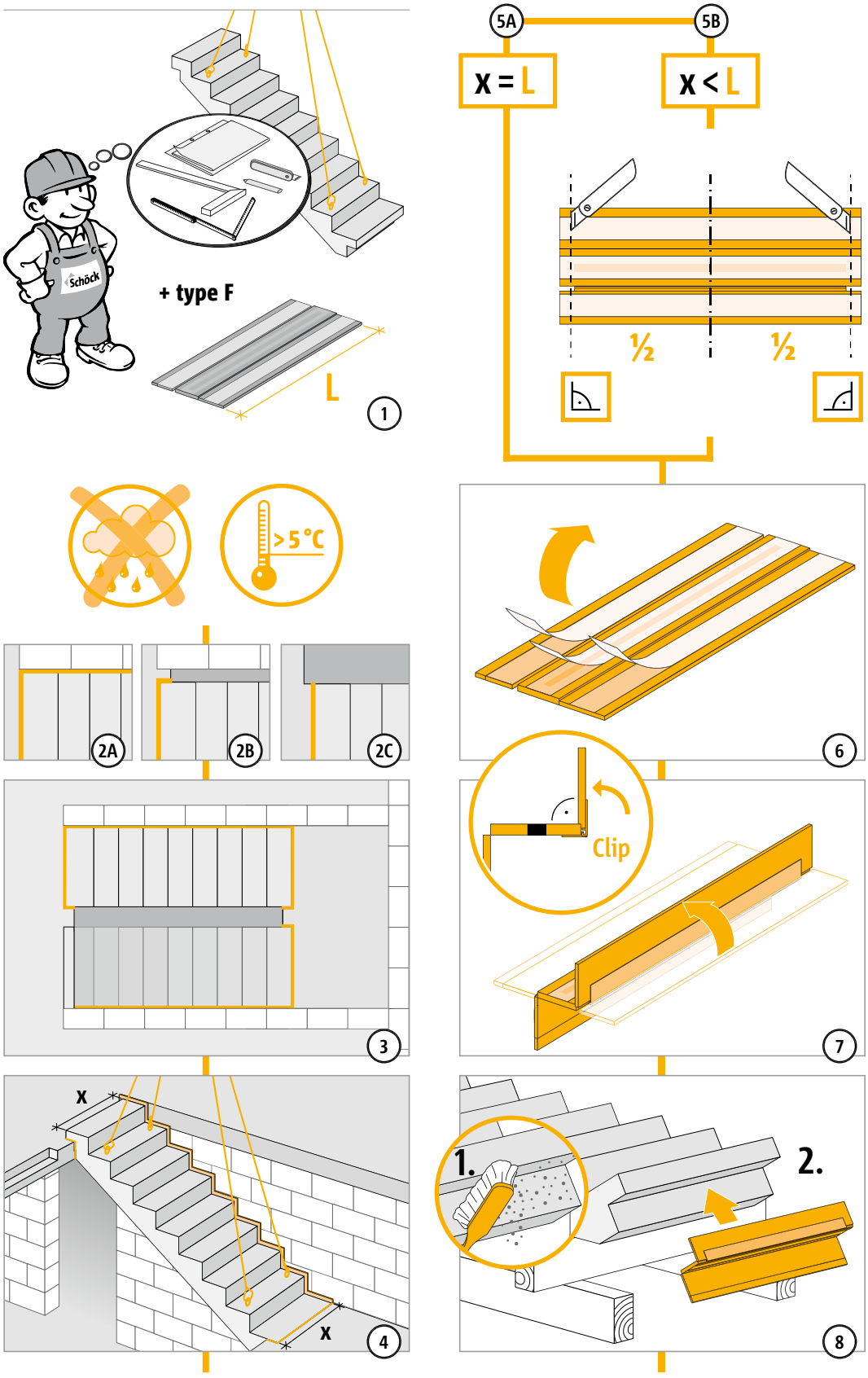
Materials and construction materials

Schöck Tronsole® type F	Material
PE foam panel	PE foam according to DIN EN 14313
Plastic profile	PVC-U according to DIN EN 13245-1
Elastomer support	Polyurethane according to DIN EN 13165

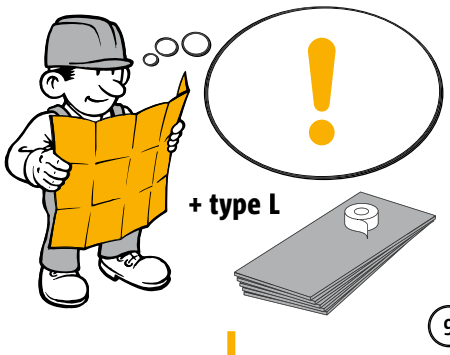
Installation

- The Schöck Tronsole® type F is bonded to the dry precast stair flight with the aid of an own-product assembly adhesive tape. Through the bracing clip hinge it is also suitable as alternative for positioning in the landing corbel.
- The PE foam panels can be cut by hand using a simple cutting tool. As the PE foam panel at both ends of the linear elastomer support projects by 50 mm, the Tronsole® type F can be easily shortened without interfering with the elastomer support.
- With the cutting to length of the Tronsole® type F care is to be taken that the projection of the PE foam panels over the elastomer support is shortened to the same length on both sides, in order to retain the central position of the elastomer support.

Installation instructions building site precast components



Installation instructions building site precast components



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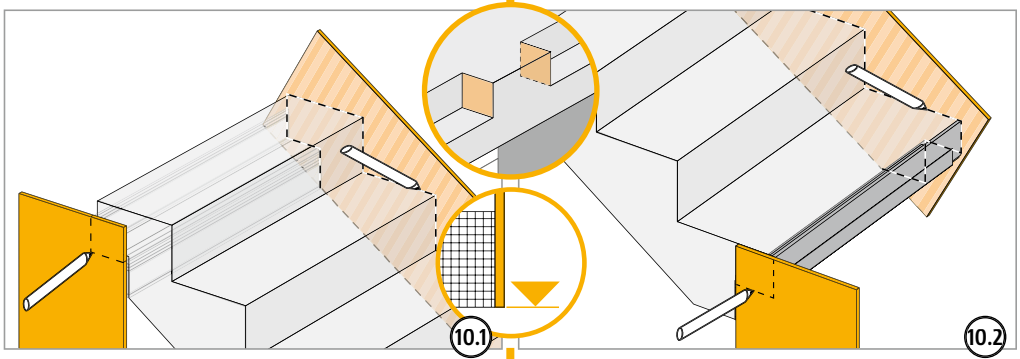

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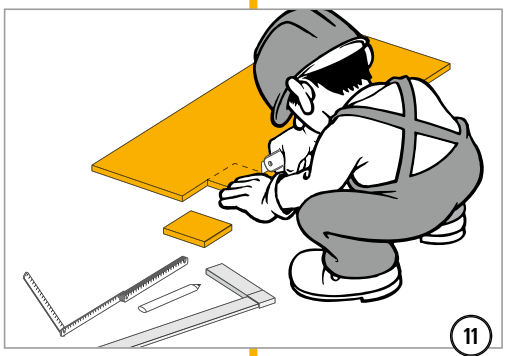

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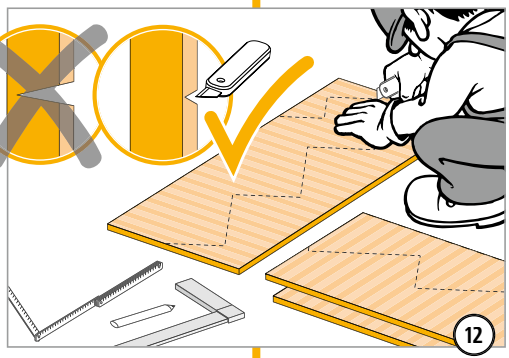

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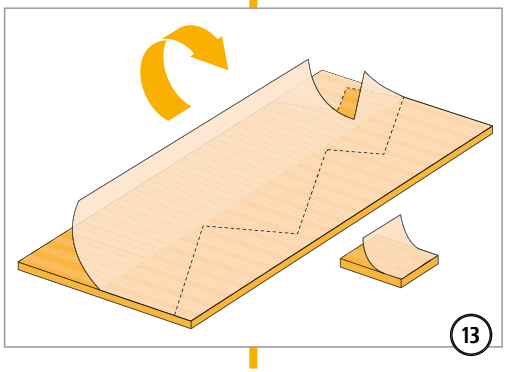

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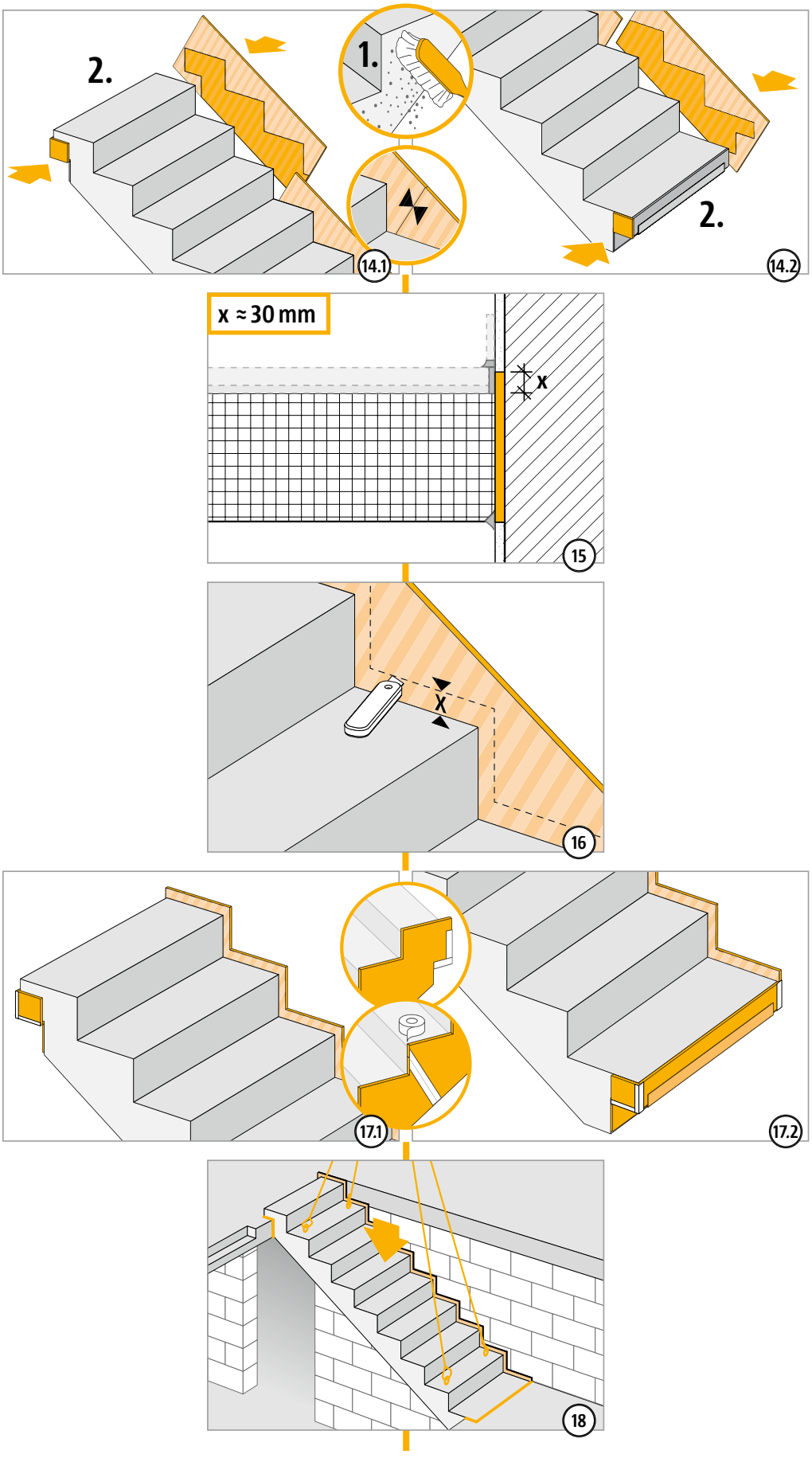
Installation instructions building site precast components



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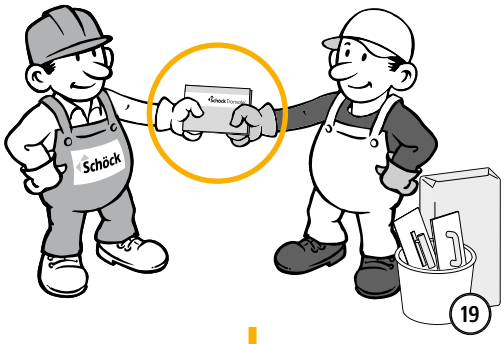
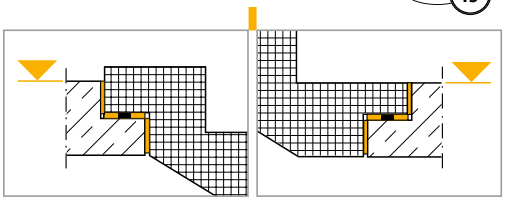
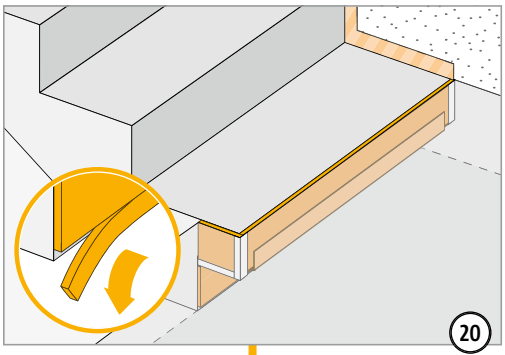
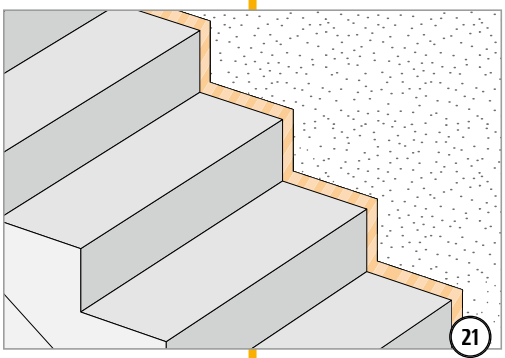
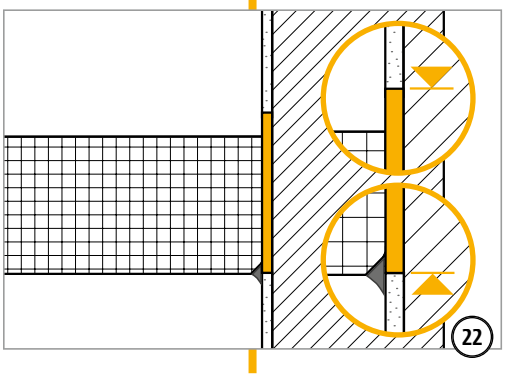
Installation instructions building site precast components

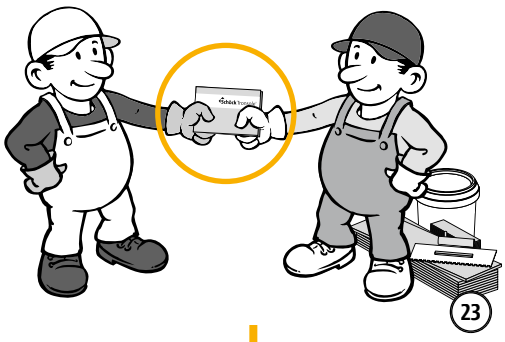


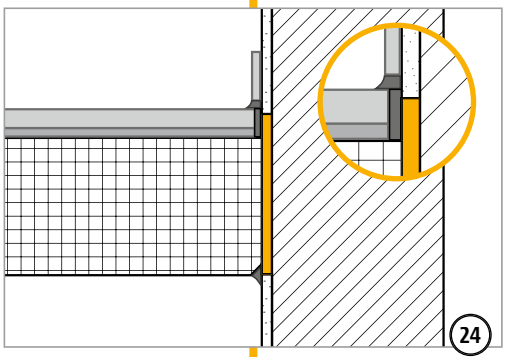


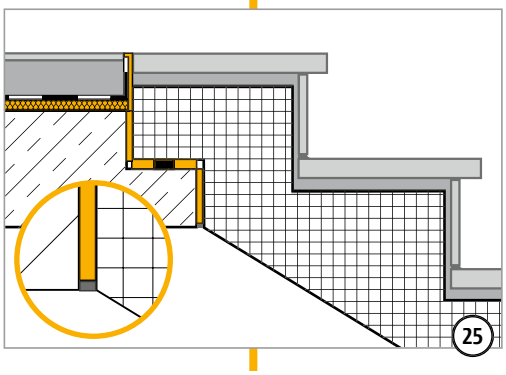












F

Check list

- ☐ Are the dimensions of the Schöck Tronsole® matched to the geometry of the structural components which are to be insulated?
- ☐ Have the effects on the Schöck Isokorb® connection been specified at design level?
- ☐ With type F are the minimum concrete strengths for the landing ≥ C20/25 and the stair flight ≥ C30/37 taken into account?
- ☐ With type F is the stair flight designed as prefabricated element with exposure class XC1, a concrete cove of c_{nom} = 15 mm and fire resistance class R0?
- ☐ With type F is the landing planned as prefabricated element with exposure class XC1, a concrete cover of c_{nom} = 20 mm and fire resistance class R0?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ Due to a fire protection requirement are larger concrete covers and larger structural component heights taken into account?
- ☐ Is the corbel depth defined within a range between 130 mm and 160 mm?
- ☐ With V_{Ed} is the respective limiting value of the slab load-bearing capacity checked on the non-notched slab side of the landing or of the stair flight?
- ☐ Are planned existing horizontal loads, which can be conducted away via type T, taken into account?

Schöck Tronsole® type Q

Schöck Tronsole® type Q
Serves as point support with sound insulation of winding stair flight and staircase wall. The stair flight can be produced in in-situ concrete or as fully precast component. The staircase wall can consist of reinforced concrete or masonry.

Product characteristics

Product characteristics

- Impact sound pressure level difference $\Delta L^*_{n,w} \geq 30$ dB, tested in accordance with DIN 7396; Test reports Nos. 91386-10 to 91386-11;
- High value and efficient Elodur® elastomer support for point connection.
- With DIBt general building supervisory approval under the No. Z-15.7-311
- Fire resistance class R90 up to maximum 65 mm joint width with optionally obtainable fire protective collars (Fire Protection Report No. GS 3.2/13-390-1)
- Joint widths to maximum 100 mm can be realised
- Rotatable load-bearing component enables the alignment of the sliding sleeve parallel to the stair reinforcement

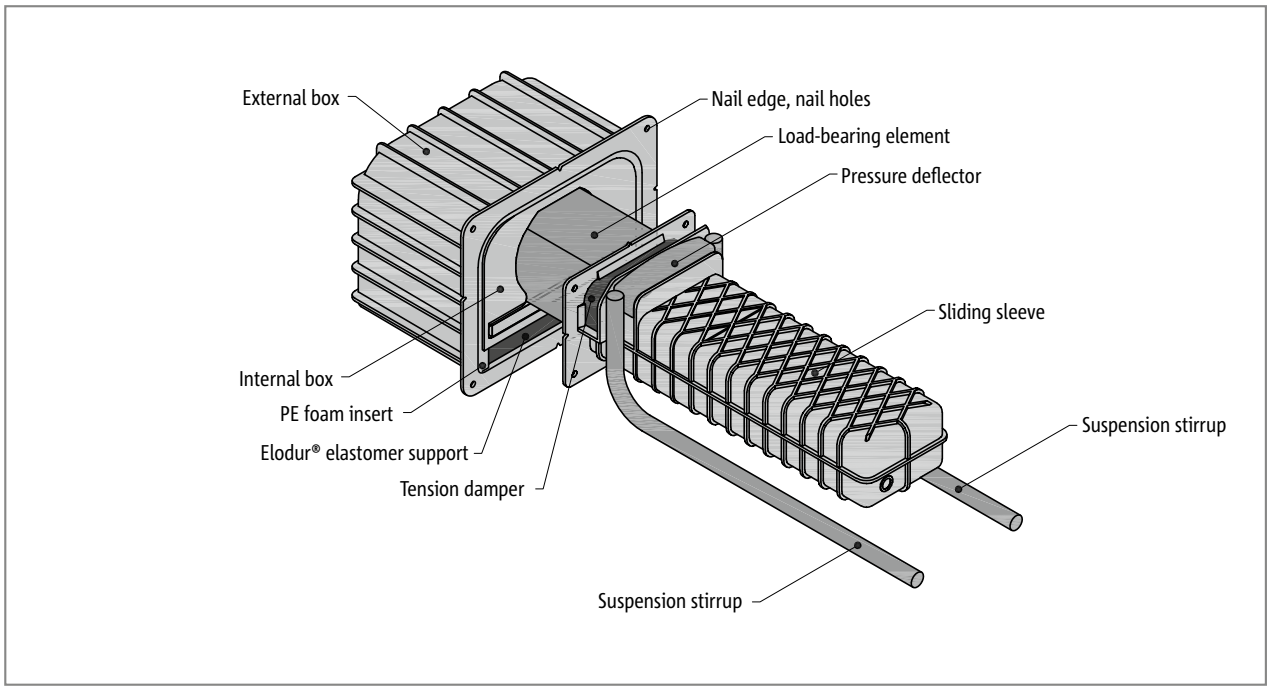


Fig. 76: Schöck Tronsole® type Q: Wall component, load-bearing component and sliding sleeve with detailed components

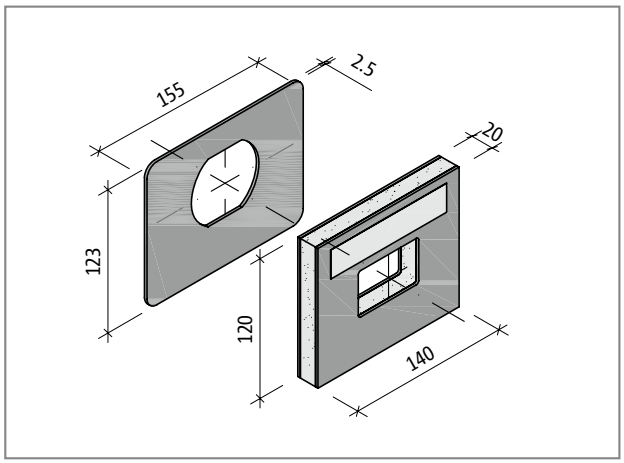


Fig. 77: Schöck Tronsole® type Q: Fire protection set consisting of fire protective cover (t = 2.5 mm) and fire protective collar(s)

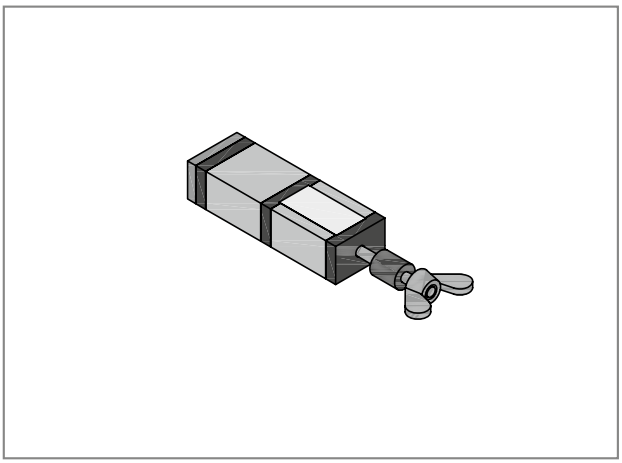


Fig. 78: Schöck Tronsole® type Q: Assembly element

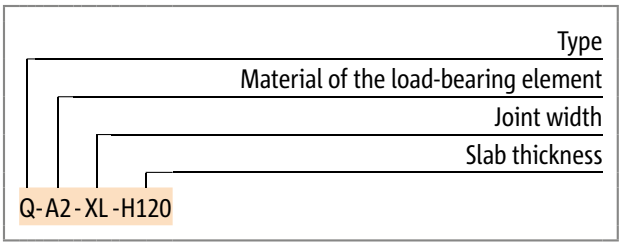
Product selection | Type designations

Schöck Tronsole® type Q variants

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

- Material of the load-bearing component:
  Type Q-FV: Load-bearing component made from hot-dipped construction steel
  Type Q-A2: Load-bearing component made from stainless steel
- Joint width:
  XL designates a range of the joint width between 51 mm and 100 mm. The long version of the load-bearing component is required for this range. With smaller joint widths the designation XL is omitted. For this reason the short version of the load-bearing component is selected.
- Slab thickness:
  H120 stands for a configuration of the sliding sleeve with a ⌀8 mm hanger loop, which is employed with tread thicknesses with h = 120 mm or h = 130 mm For larger slab thicknesses the designation H120 is omitted without replacement.

Type designation in planning documents



Installation variants

Installation with different inclination angles of the stair flight

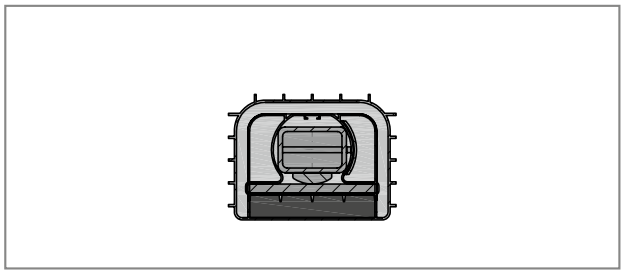


Fig. 79: Schöck Tronsole® type Q: Installation variant horizontal installation of the load-bearing element

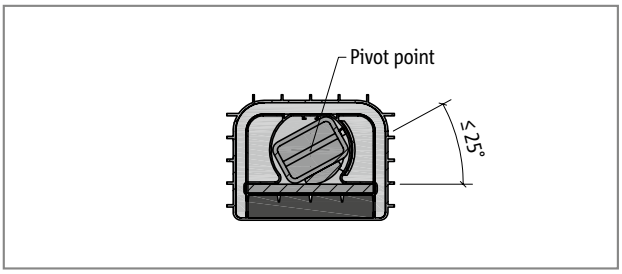


Fig. 80: Schöck Tronsole® type Q: Installation variant inclined installation of the load-bearing element

Installation with different joint widths

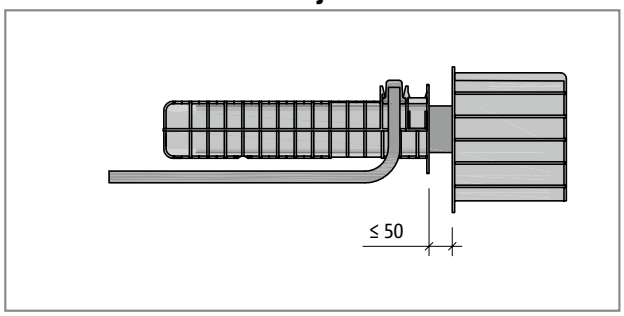


Fig. 81: Schöck Tronsole® type Q: Installation variant joint width ≤ 50 mm

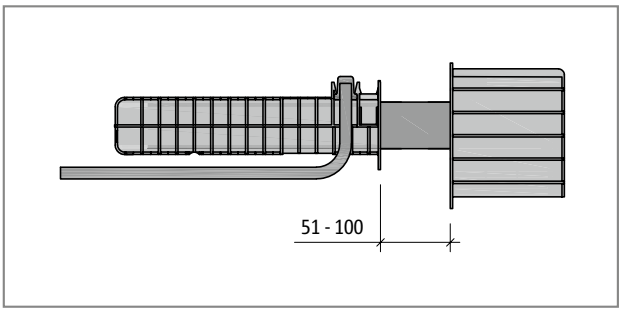


Fig. 82: Schöck Tronsole® type Q...-XL: Installation variant joint width 51 mm - 100 mm

Installation with different slab thicknesses

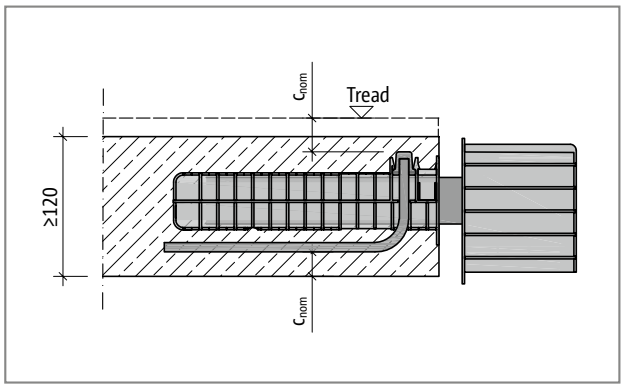


Fig. 83: Schöck Tronsole® type Q: Installation with slab thickness h = 120 mm requires the inclusion of the concrete of the tread for the enabling of the concrete cover c_{nom}

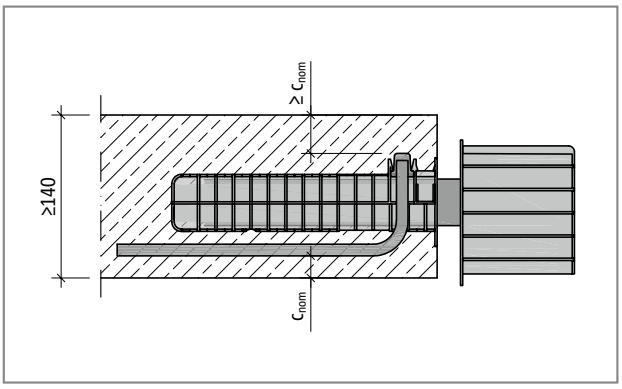


Fig. 84: Schöck Tronsole® type Q: Installation with slab thickness h ≥ 140 mm taking note of the concrete cover c_{nom}

Installation variants

- The rotatability of the load-bearing component of the Schöck Tronsole® type Q enables the alignment of the sliding sleeve parallel to the level of the reinforcement in the stair flight. In this way a matching of the sliding sleeve and the load-bearing component to the pitch of the stairs takes place.
- Two different lengths of the load-bearing component allow joint widths up to 50 mm resp. between 51 and 100 mm. With the use of the Tronsole® type L for the avoidance of acoustic bridges between the stair string and the stairwell wall there results a minimum joint width of 15 mm, to which the given soundproofing values refer.
- The minimum slab thickness of a stair flight with Tronsole® type Q lies at h = 120 mm.

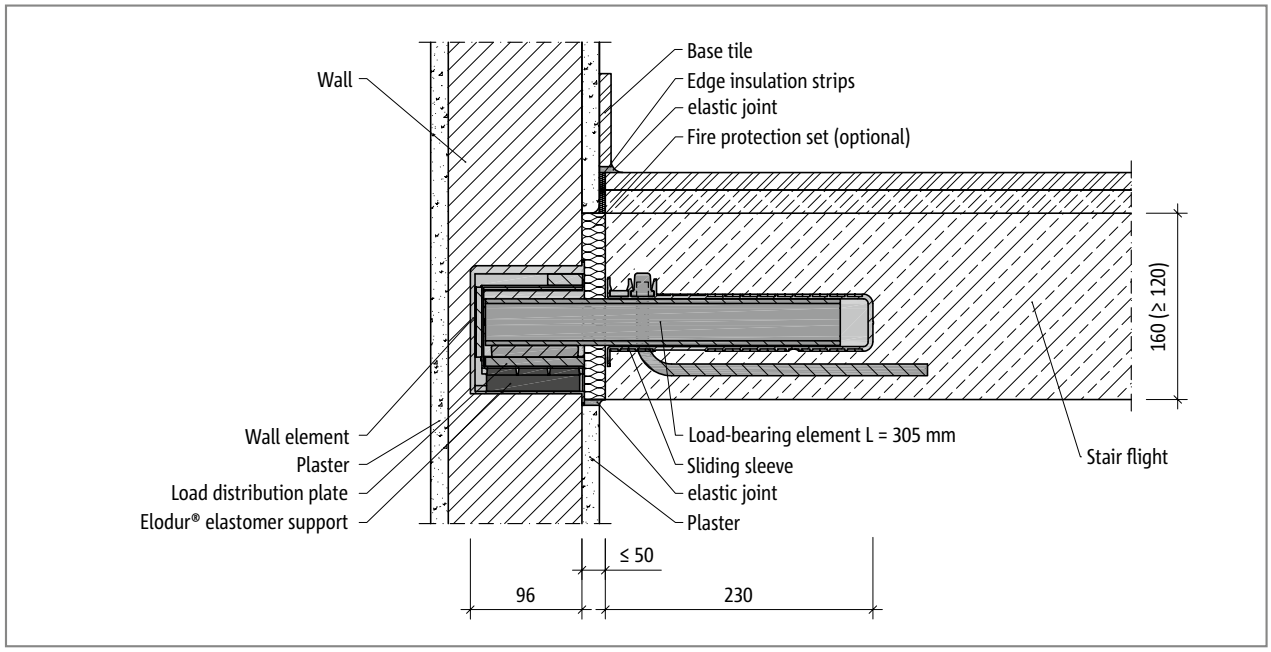


Fig. 85: Schöck Tronsole® type Q-FV or Q-A2: Installation cross-section wall thickness 11.5 cm

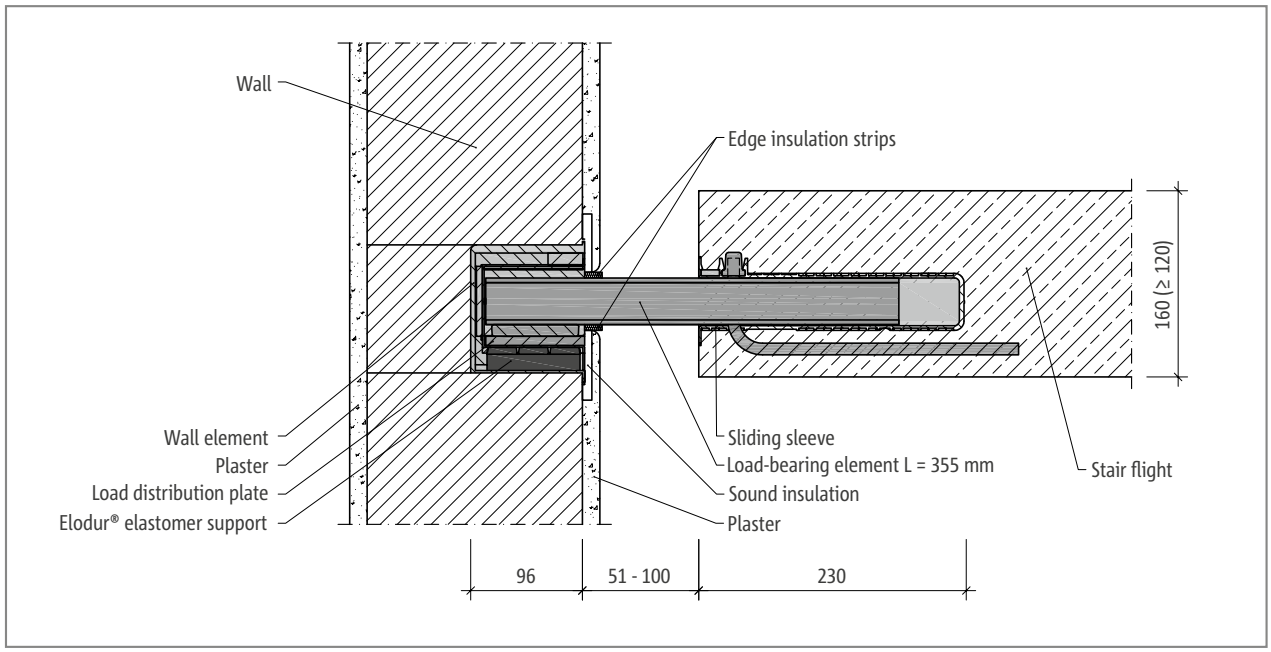


Fig. 86: Schöck Tronsole® type Q-FV-XL or Q-A2-XL: Installation cross-section

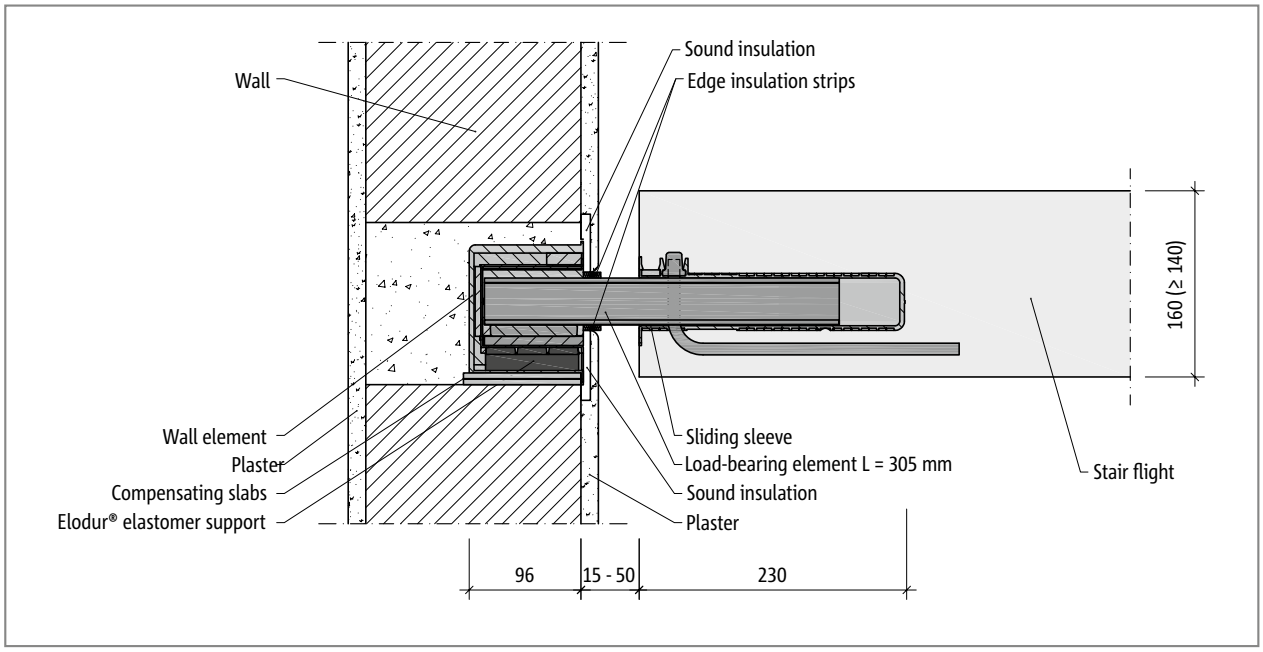


Fig. 87: Schöck Tronsole® type Q-FV or Q-A2: Installation cross-section with precast stairs flight

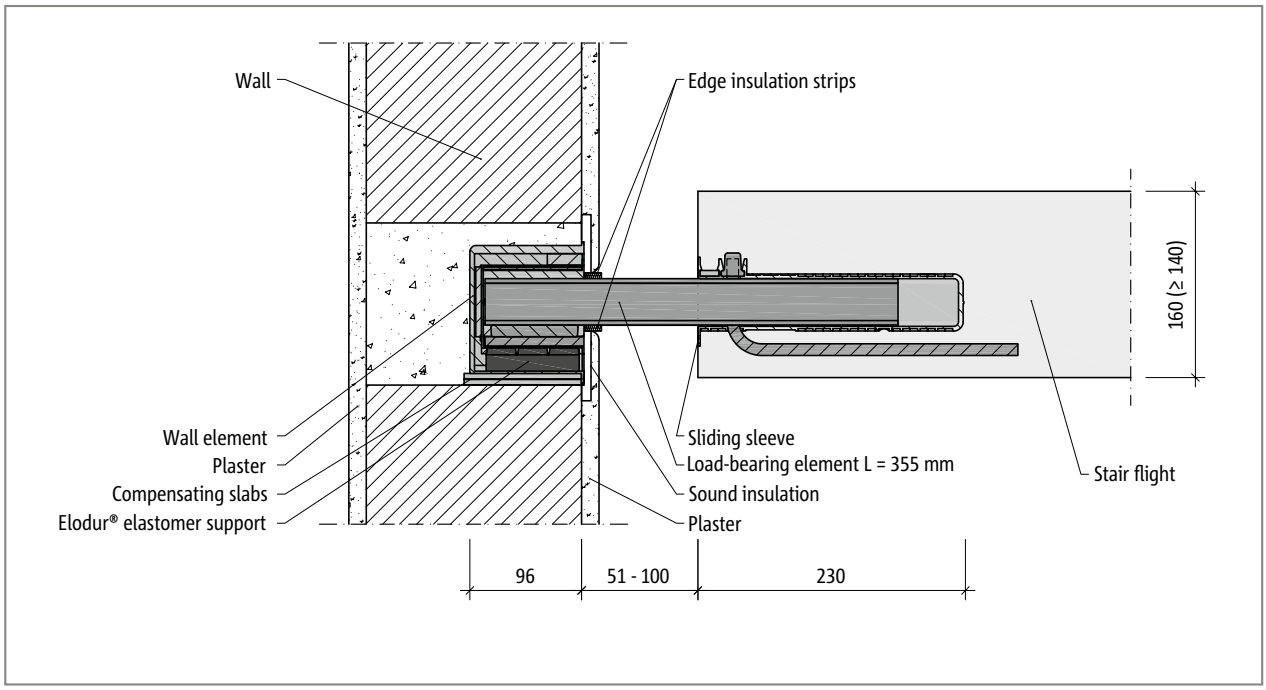


Fig. 88: Schöck Tronsole® type Q-FV-XL or Q-A2-XL: Installation cross-section with precast stairs flight

Element arrangement

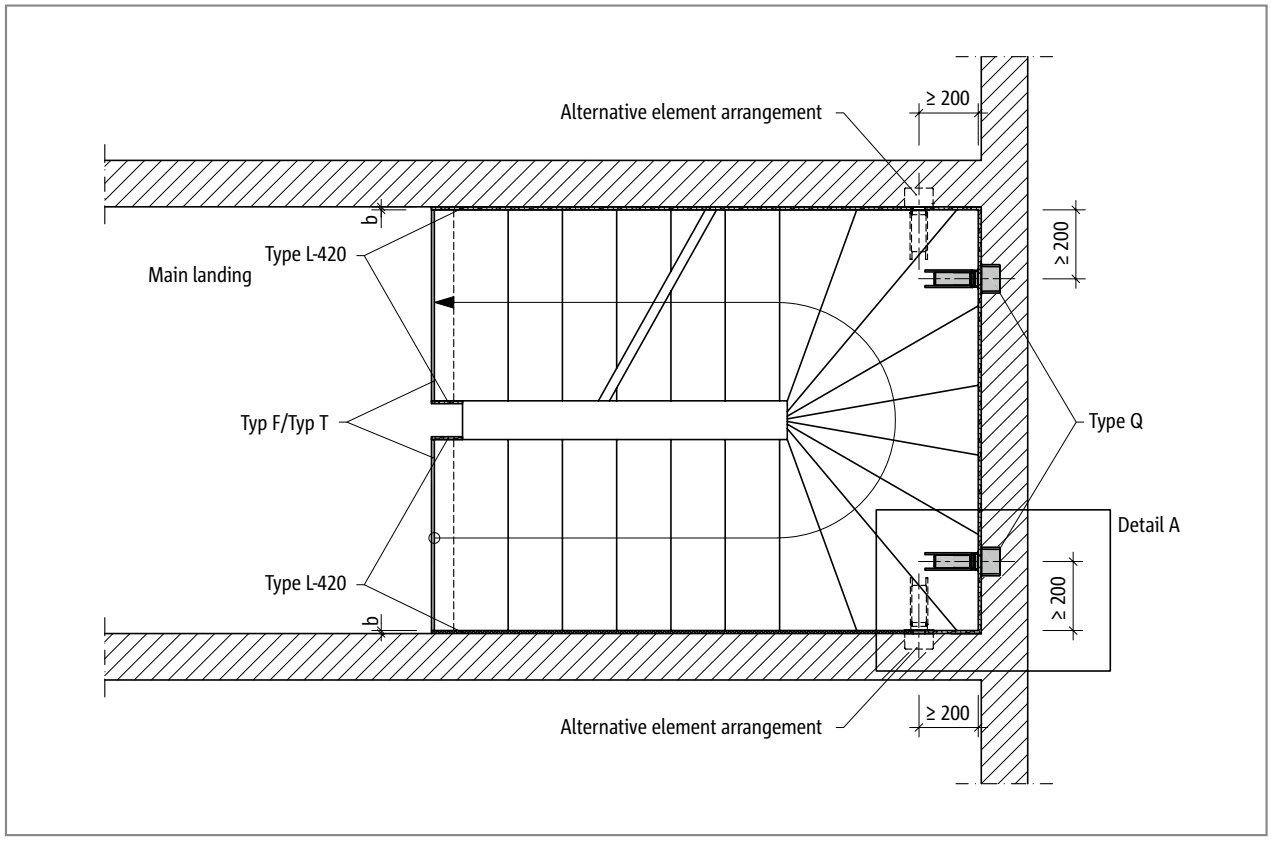


Fig. 89: Schöck Tronsole® type Q: Component arrangement in the layout using the Tronsole® type L

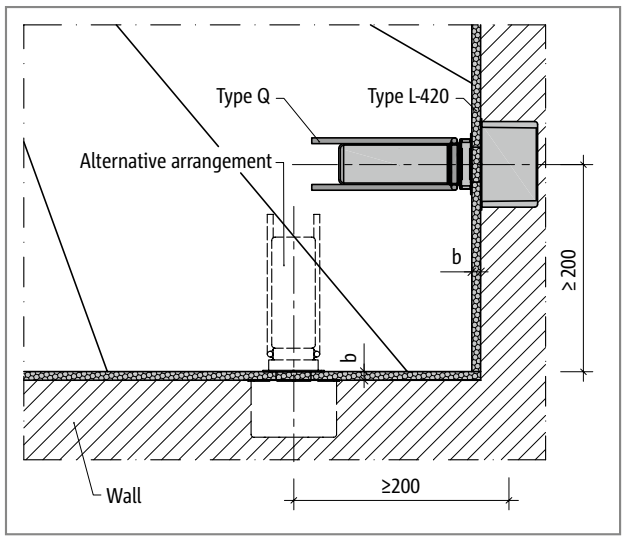


Fig. 90: Schöck Tronsole® type Q: Component arrangement, Detail A, joint width b = 15 mm with in-situ concrete, with precast stair flights the necessity of an additional installation tolerance is to be checked by the planner

Element arrangement

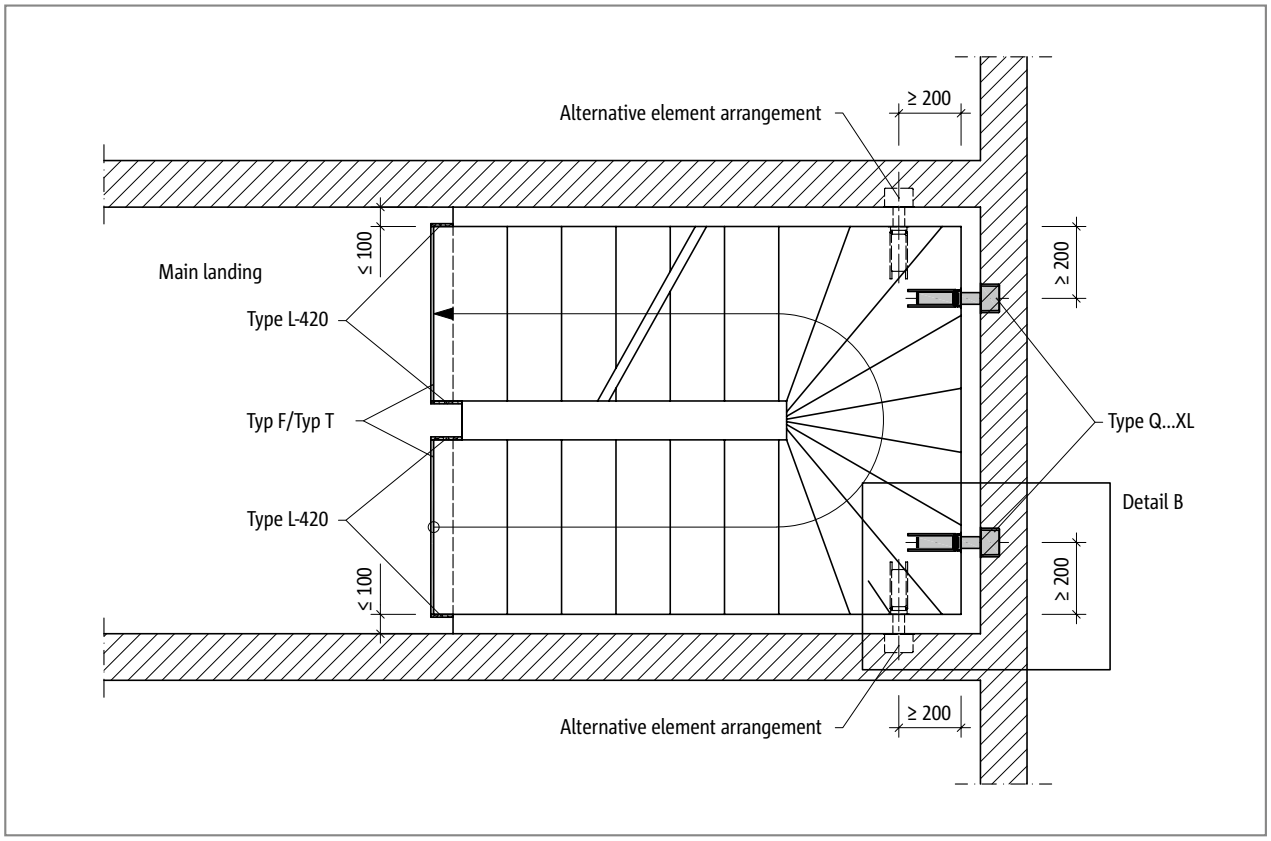


Fig. 91: Schöck Tronsole® type Q...-XL: Component arrangement in the layout with a joint width of maximum 100 mm

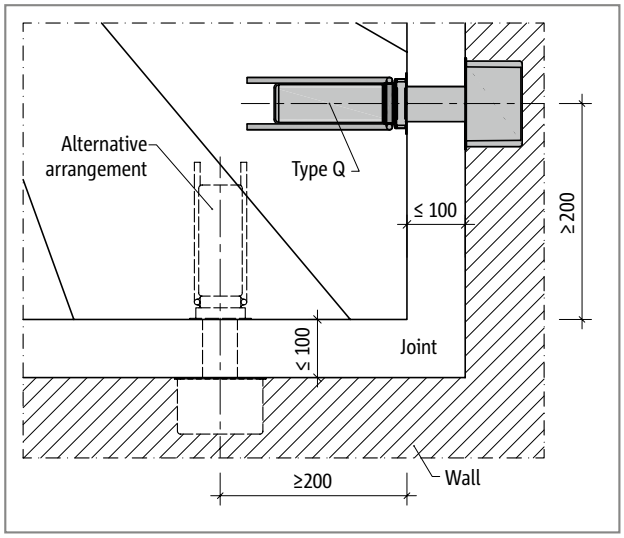


Fig. 92: Schöck Tronsole® type Q: Component configuration, Detail B

Combination possibilities

- The given acoustic insulation values are only achieved in combination with the Tronsole® type L-420 or with a sufficiently wide air joint (50 mm). For prefabricated construction with regard to installation tolerances the explanation for the Tronsole® type L on page 160 is to be noted.
- The use of the Schöck Tronsole® type B is suitable for the sound insulation of stair flight and floor slab. The Tronsole® type Q and B can be combined.
- The employment of the Schöck Tronsole® type F or type T is suitable for the sound insulation of the stair-head and/or stair-foot and landing slab or floor. Tronsole® type F is suitable for precast stairs, while type T is used for in-situ concrete and fully pre-fabricated stair flights.

Product description

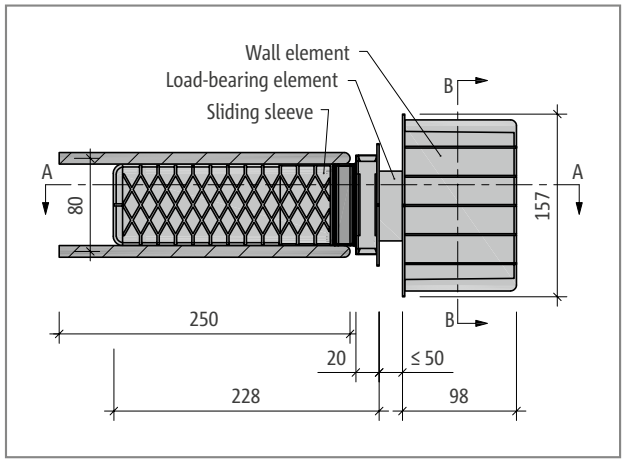


Fig. 93: Schöck Tronsole® type Q: Product layout

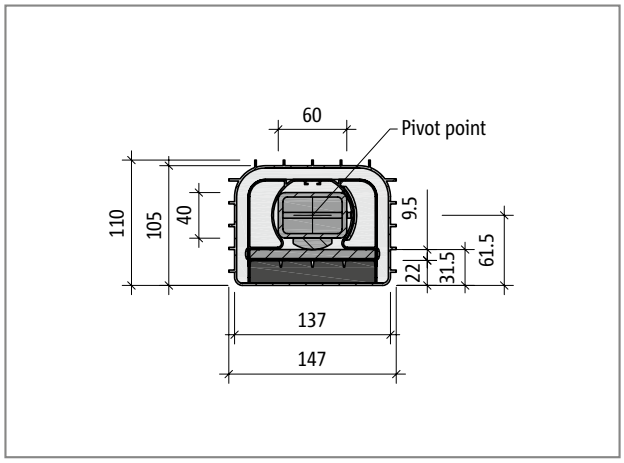


Fig. 94: Schöck Tronsole® type Q: Product cross-section B-B with horizontal load-bearing element

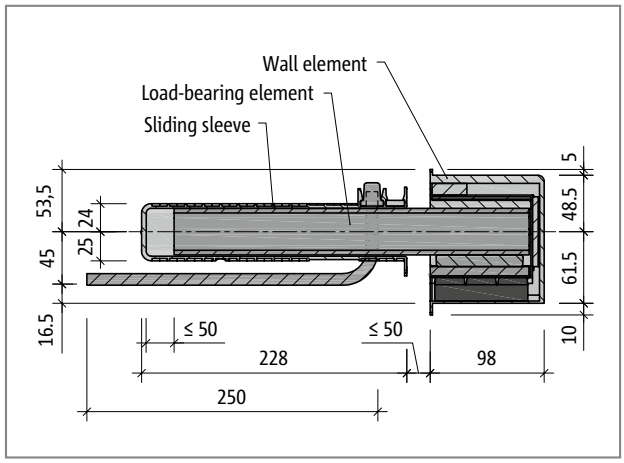


Fig. 95: Schöck Tronsole® type Q: Product section A-A

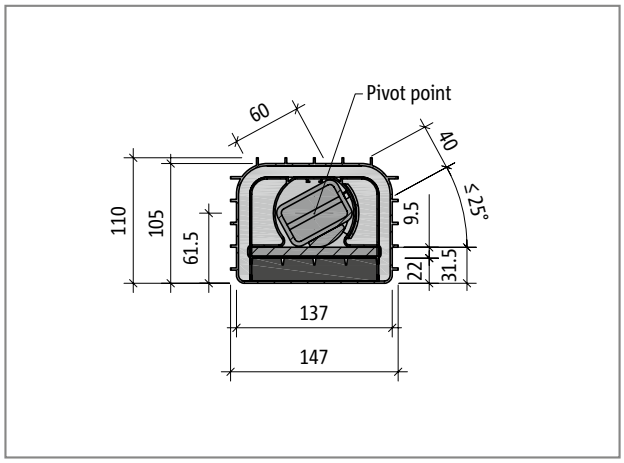


Fig. 96: Schöck Tronsole® type Q: Product cross-section with rotated load-bearing element

Product information

- For slab thicknesses h = 120mm and h= 130 mm the case of the Schöck Tronsole® type Q is supplied with ⌀8 mm and a length of 210 mm.
- For slab thicknesses of h ≥ 140 mm the rod diameter of the hanger loop increases to ⌀10 mm in the layout.
- For approval reasons the Schöck Tronsole® type Q must be used always in the set with wall component, load-bearing profile and staircase.

Design

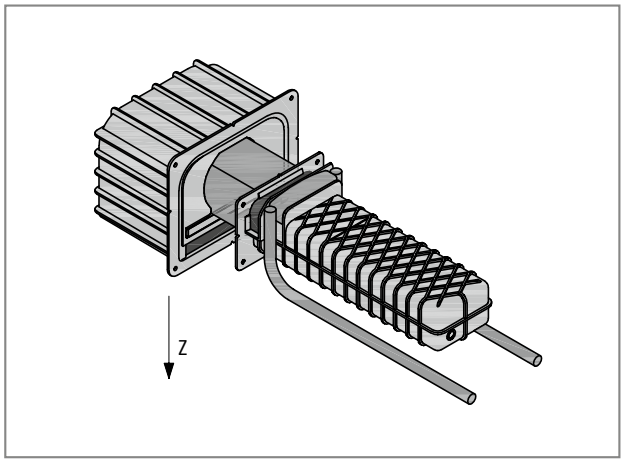


Fig. 97: Schöck Tronsole® type Q: 3D view with centre line designation

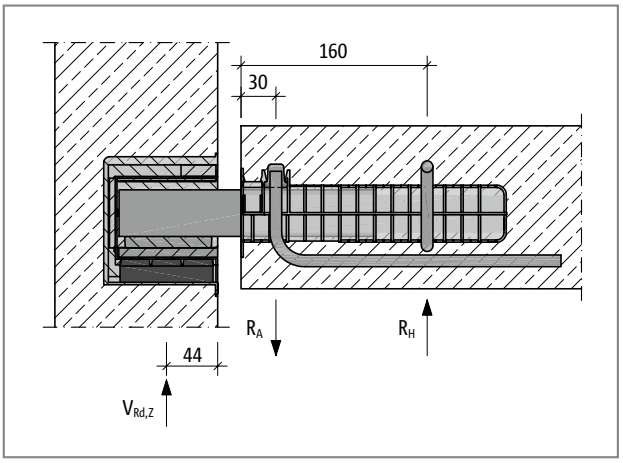


Fig. 98: Schöck Tronsole® type Q: Static system

Design

For the bearing surface of the Tronsole® at least the compression strength class 20 in combination with mortar group III is required as masonry. With lower compression strength classes a concrete pressure pad under the wall element can be used, with which the permitted pressing is observed.
The shear force $V_{Ed,z}$ is transmitted via the Elodur® elastomer support into the wall element of the Tronsole® type Q with a surface area of 110 mm × 80 mm.

Q

Notes on design

- The stress impacting the masonry is calculated as follows: $\sigma_{Ed} = V_{Ed} / (110 \cdot 80)$ mm². With the maximum utilisation of 40.1 kN σ is$_{Ed}$ = 4.5 N/mm².
- Listed in the design tables are the $V_{Rd,z}$values for various joint widths. Intermediate values may be interpolated linearly.
- The application range of the Schöck Tronsole® type Q stretches exclusively on structural components with mainly static loading according to DIN EN 1991-1-1 (EC1) and DIN EN 1991-1-1/NA.
- The verification of the shear force in the stair flight and in the landing slab must be carried out by the structural engineer.
- With the predefined concrete strengths it is a matter of the minimum requirements, which are the basis for the design.
- For stair flights exposure classs XC1 is assumed.
- According to DIN EN 1992-1-1 (EC2) and DIN EN 1992-1-1/NA, with exposure class XC1, the following nominal concrete cover results:
  In-situ concrete staiir flight: c_{nom} = 20 mm.
  Prefabricated stair flight: c_{nom} = 15 mm.
- For the Tronsole® type Q, with the stair slab thicknesses h = 120 mm and H = 130 mm the product designation H120 must be taken into account, as the products own hanger loops in these cases is adjusted to a lower construction height.
- With configuration of the 120 mm thick stair slabs with the Schöck Tronsole® type Q, the required upper concrete cover is achieved through the concrete of the tread.
- With the installation of several elements of the Tronsole® type Q, the minimum separation of Tronsole® to Tronsole® is 400 mm.

Design

Schöck Tronsole® type		Q-FV	Q-FV-XL	Q-A2	Q-A2-XL
Design values with		Concrete strength class ≥ C20/25			
Slab thickness [mm]	Joint width [mm]	$V_{Rd,z}$ [kN/element]			
120, 130	15	28.3	-	28.3	-
	20	27.6	-	27.6	-
	30	26.4	-	26.4	-
	40	25.3	-	25.3	-
	50	24.3	24.3	24.3	24.3
	60	-	23.4	-	23.4
	70	-	22.6	-	21.9
	80	-	21.8	-	20.5
	90	-	21.0	-	19.3
	100	-	20.3	-	18.2
≥ 140	15	38.4	-	34.2	-
	20	36.6	-	32.5	-
	30	33.5	-	29.7	-
	40	30.8	-	27.3	-
	50	28.3	33.0	25.3	25.3
	60	-	30.5	-	23.5
	70	-	28.4	-	21.9
	80	-	26.6	-	20.5
	90	-	24.9	-	19.3
	100	-	23.5	-	18.2

Schöck Tronsole® type		Q-FV	Q-FV-XL	Q-A2	Q-A2-XL
Design values with		Concrete strength class ≥ C25/30			
Slab thickness [mm]	Joint width [mm]	$V_{Rd,z}$ [kN/element]			
120, 130	15	30.2	-	30.2	-
	20	29.5	-	29.5	-
	30	28.2	-	28.2	-
	40	27.1	-	27.1	-
	50	26.0	26.0	25.3	25.3
	60	-	25.0	-	23.5
	70	-	24.1	-	21.9
	80	-	23.2	-	20.5
	90	-	22.5	-	19.3
	100	-	21.7	-	18.2
≥ 140	15	38.4	-	34.2	-
	20	36.6	-	32.5	-
	30	33.5	-	29.7	-
	40	30.8	-	27.3	-
	50	28.3	33.0	25.3	25.3
	60	-	30.5	-	23.5
	70	-	28.4	-	21.9
	80	-	26.6	-	20.5
	90	-	24.9	-	19.3
	100	-	23.5	-	18.2

Design

Schöck Tronsole® type		Q-FV	Q-FV-XL	Q-A2	Q-A2-XL
Design values with		Concrete strength ≥ C30/37			
Slab thickness [mm]	Joint width [mm]	$V_{Rd,z}$ [kN/element]			
120, 130	15	32.0	-	32.0	-
	20	31.3	-	31.3	-
	30	29.9	-	29.7	-
	40	28.7	-	27.3	-
	50	27.6	27.6	25.3	25.3
	60	-	26.5	-	23.5
	70	-	25.6	-	21.9
	80	-	24.7	-	20.5
	90	-	23.8	-	19.3
	100	-	23.0	-	18.2
≥ 140	15	38.4	-	34.2	-
	20	36.6	-	32.5	-
	30	33.5	-	29.7	-
	40	30.8	-	27.3	-
	50	28.3	33.0	25.3	25.3
	60	-	30.5	-	23.5
	70	-	28.4	-	21.9
	80	-	26.6	-	20.5
	90	-	24.9	-	19.3
	100	-	23.5	-	18.2

Schöck Tronsole® type		Q-FV	Q-FV-XL	Q-A2	Q-A2-XL
Design values with		Concrete strength ≥ C35/45			
Slab thickness [mm]	Joint width [mm]	$V_{Rd,z}$ [kN/element]			
120, 130	15	33.9	-	33.9	-
	20	33.1	-	32.5	-
	30	31.7	-	29.7	-
	40	30.4	-	27.3	-
	50	28.3	29.2	25.3	25.3
	60	-	28.1	-	23.5
	70	-	27.0	-	21.9
	80	-	26.1	-	20.5
	90	-	24.9	-	19.3
	100	-	23.5	-	18.2
≥ 140	15	38.4	-	34.2	-
	20	36.6	-	32.5	-
	30	33.5	-	29.7	-
	40	30.8	-	27.3	-
	50	28.3	33.0	25.3	25.3
	60	-	30.5	-	23.5
	70	-	28.4	-	21.9
	80	-	26.6	-	20.5
	90	-	24.9	-	19.3
	100	-	23.5	-	18.2

On-site reinforcement

Required on-site reinforcement

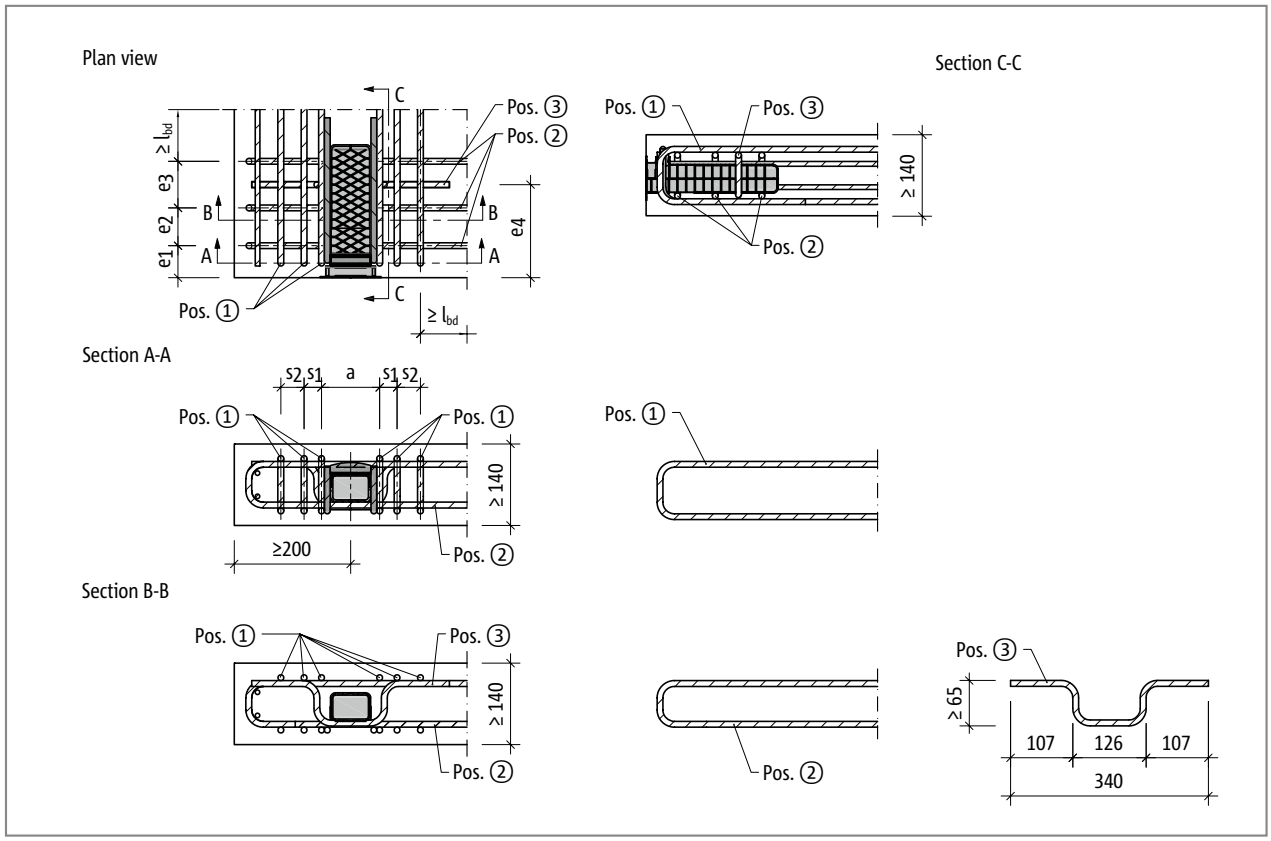


Fig. 99: Schöck Tronsole® type Q: On-site reinforcement

Schöck Tronsole® type		Q		
On-site reinforcement	**Slab thickness [mm]**	**Separation [mm]**		**Concrete strength class ≥ C20/25**
Pos. 1 tie, A_{sx}				
Pos. 1	120, 130	a	100	6 • H8
		s_1	30	
		s_2	30	
Pos. 1	≥ 140	a	100	6 • H10
		s_1	30	
		s_2	30	
Pos. 2 ties as transverse reinforcement, A_{sy}				
Pos. 2	120, 130	e_1	50	3 • H8
		e_2	70	
		e_3	80	
Pos. 2	≥ 140	e_1	55	3 • H10
		e_2	65	
		e_3	80	
Pos. 3 hat brackets				
Pos. 3	120, 130	e_4	160	1 • H8
Pos. 3	≥ 140			1 • H10

Schöck Tronsole® type Q, table: On-site reinforcement

Q

On-site reinforcement

On-site reinforcement

- The height of the on-site hat bracket (Pos. 3) depends on the slab thickness h. It should be so selected that the hat bracket can be fed around the underside of the sleeve and its ends are in the 2nd position of the slab reinforcement.
- The underside of the sliding sleeve of the Tronsole® type Q is for the force transmission to the on-site hat bracket (Pos. 3) is fitted with a notch on the contact side.
- The ties, A_{sx} (Pos. 1), with sufficient length on the statically required slab reinforcement A_{sx}, which is to be verified by the structural engineer, may be taken into account.
- If the impacting shear force $V_{Ed,z}$ with slab thickness 140 is smaller or equal to the acceptable shear force $V_{Rd.z}$ with slab thickness 120,130, then the on-site reinforcement can be selected analogue to the slab thickness 120,130.

Application example spiral staircase

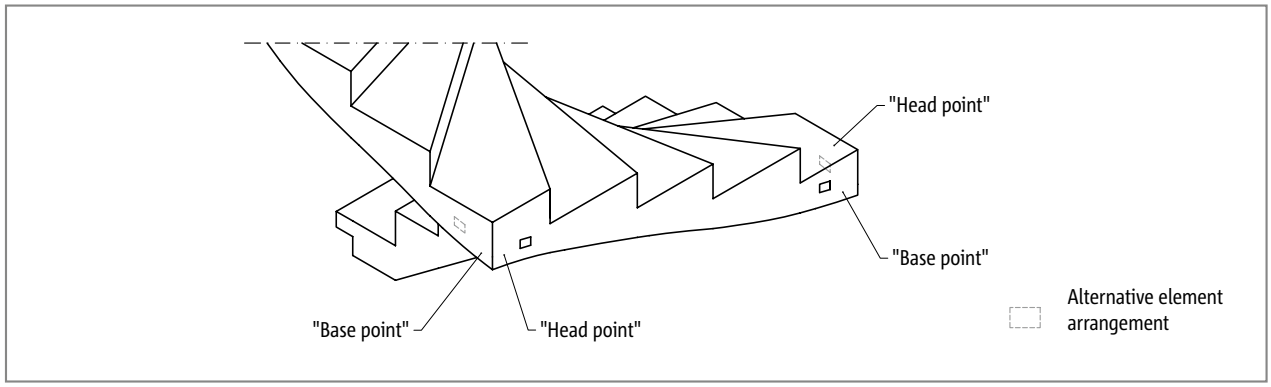
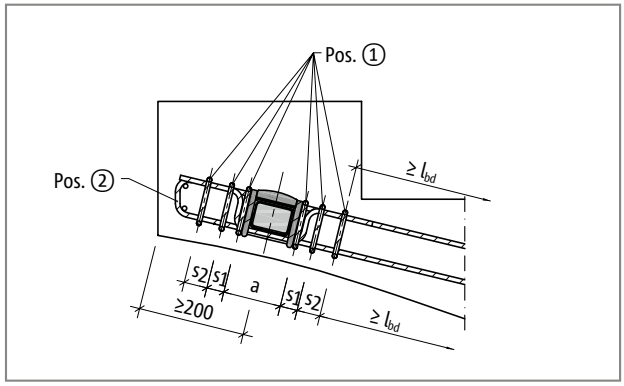
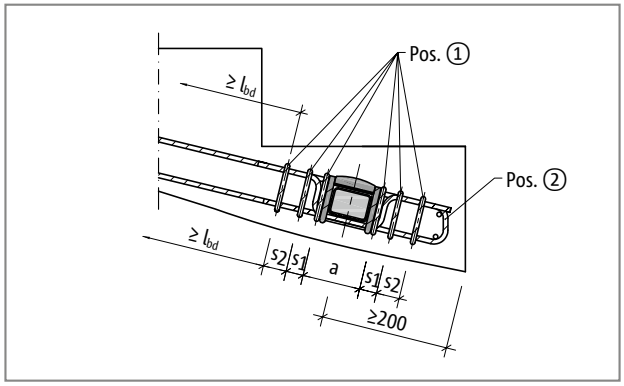
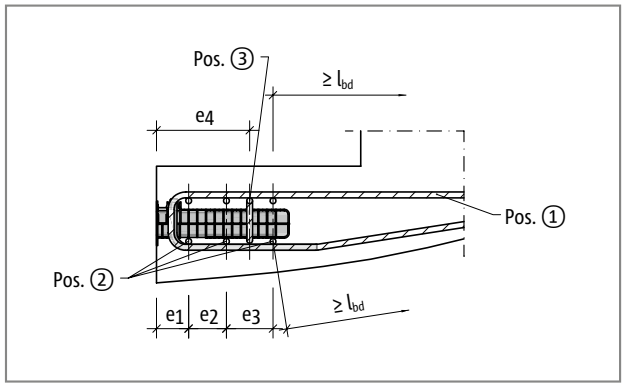


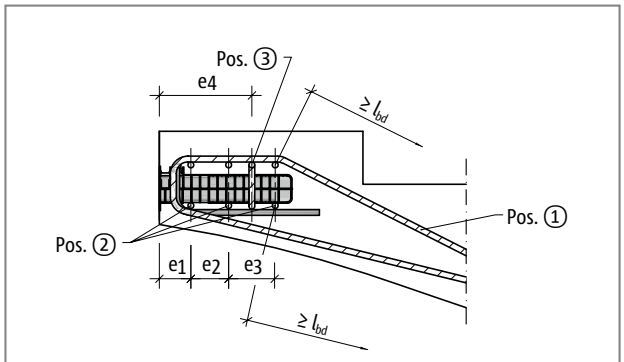
Fig. 100: Schöck Tronsole® type Q: Attachment point in “head point” and “base point”

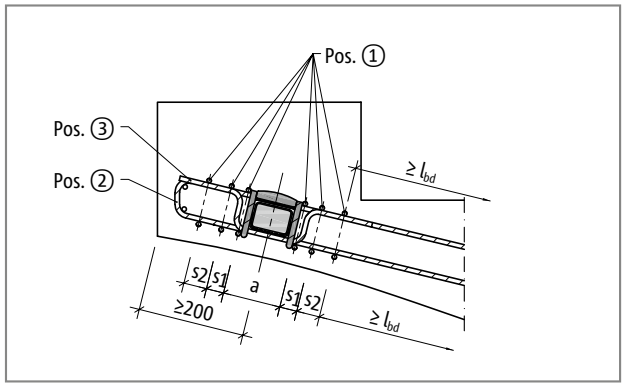
Cross-sectional views

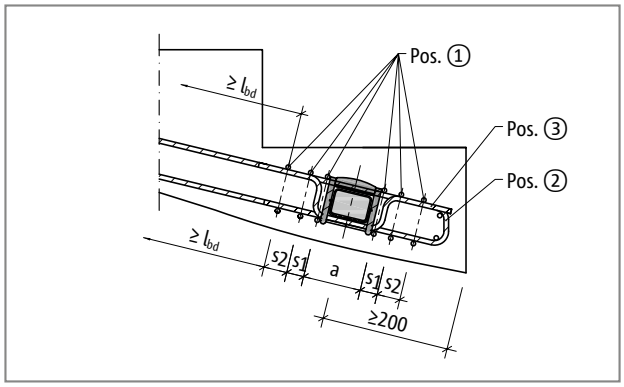












Deflection

Deformation of the Elodur® elastomer support

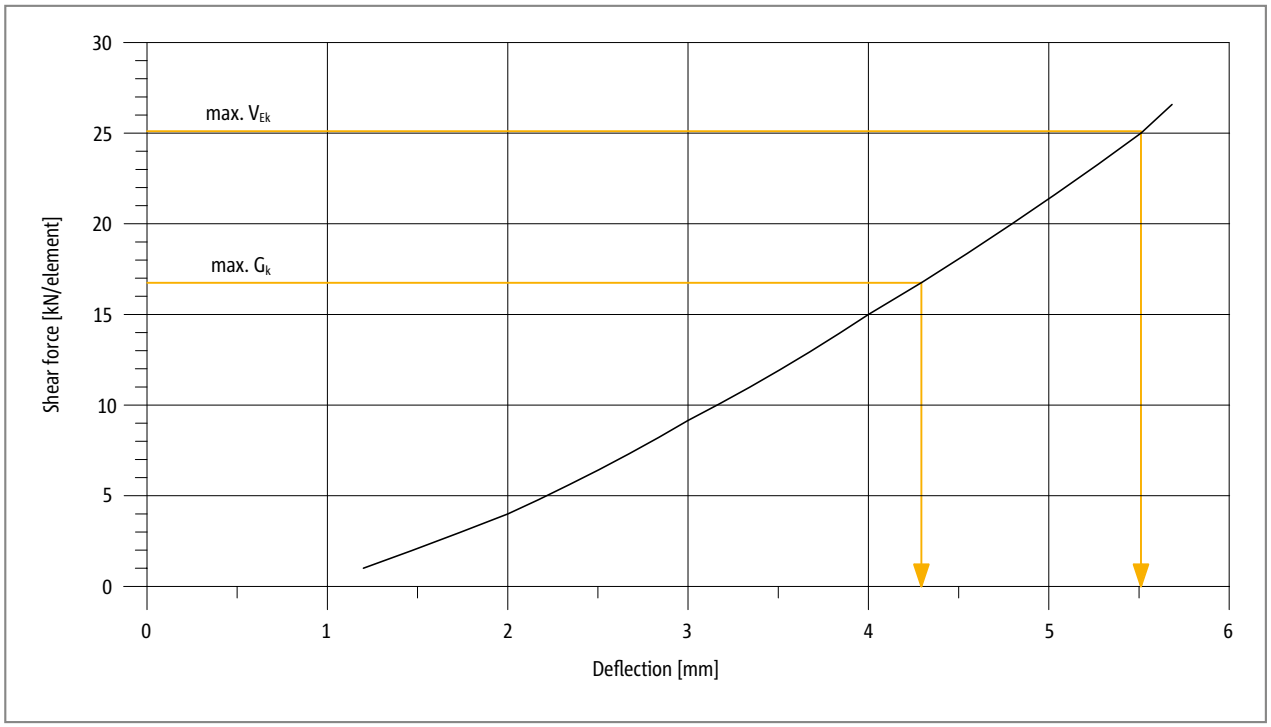


Fig. 101: Schöck Tronsole® type Q: Deformation of the Elodur® elastomer support

Q

Notes on deformation

- With deflection, it is understood to be the vertical deformation of the Elodur® elastomer support under vertical shear force load.
- Max. V_{Ek} = Max. V_{Ed}/γ, whereby $\gamma = 1.4$
- $\gamma = 1.4$ applies under the assumption that Max. V_{Ed} is made up of two thirds from own weight and one third from live load.
- Thus Max. is V_{Ek} the maximum service load and the maximum own weight is Max. $G_k = 2/3 \cdot$ Max. V_{Ek}.

On-site hat bracket

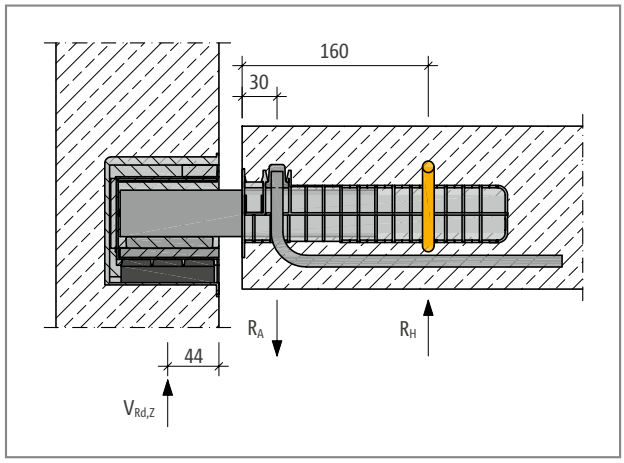


Fig. 102: Schöck Tronsole® type Q: Here: On-site hat bracket coloured orange

Hat bracket for the development of the static system required

The sliding sleeve of the Schöck Tronsole® type Q contains a hanger loop. As assumed, a hat bracket must be added for the development of the static system. Through the hanger loop and the hat bracket a force pair is generated, which is necessary for the restraint of the Tronsole® in the reinforced concrete structural component

Hazard warning - missing hat bracket

- For the given load-bearing capacity of the Schöck Tronsole®, the on-site hat bracket (Pos. 3) is absolutely necessary.
- The hat bracket must be planned as part of the on-site reinforcement and integrated in the planned notch on the underside of the carrier sleeve.

Load-bearing element

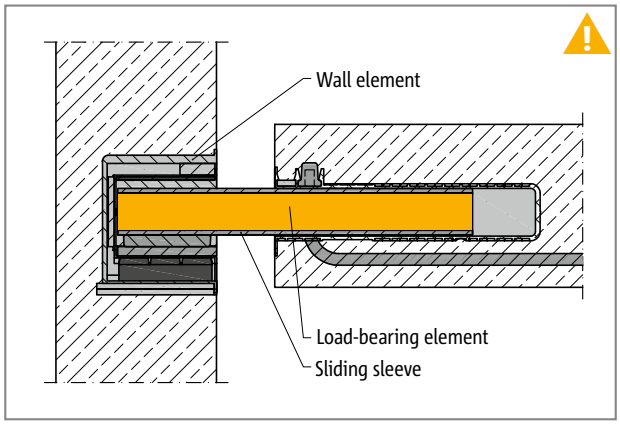


Fig. 103: Schöck Tronsole® type Q: Multi-part product (wall component, load-bearing component, sliding sleeve); load-bearing element (yellow) must be installed on the building site.

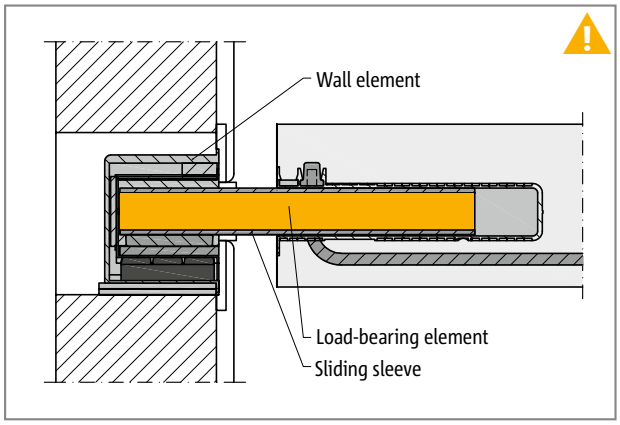


Fig. 104: Schöck Tronsole® type Q: Multi-part product (wall component, load-bearing component, sliding sleeve); load-bearing element (yellow) must be installed on the building site.

Load-bearing element for the transmission of shear force required

Schöck Tronsole® type Q consists of a wall element, sliding sleeve and load-bearing element. The load-bearing element must be installed on site. The wall element is installed on site. The sliding sleeve can be installed in the prefabrication plant or on site. Each sliding sleeve is to be assigned to a load-bearing element,

Hazard warning - missing load-bearing element

- The step will collapse without the load-bearing element.
- The load-bearing element must be installed on site.

Q

Precast construction

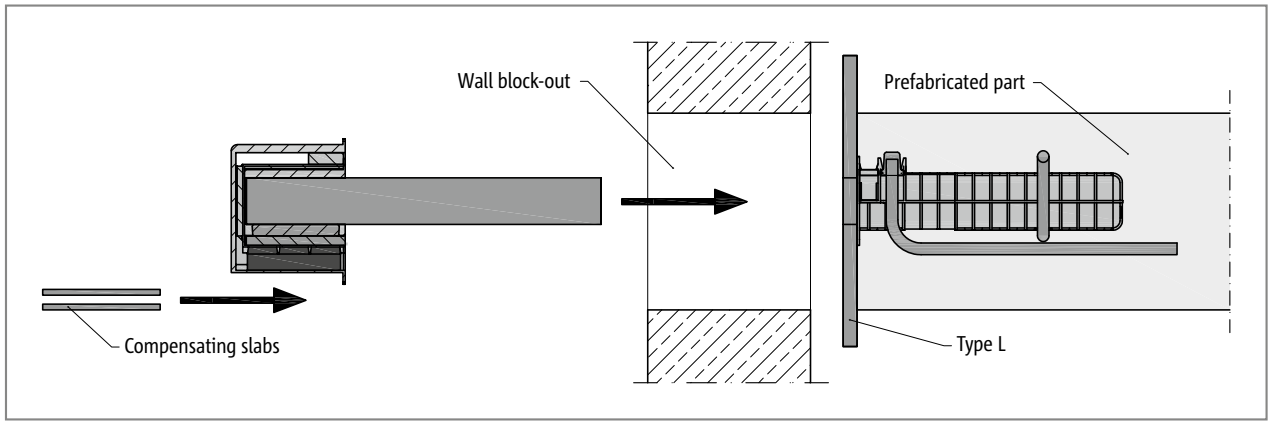


Fig. 105: Schöck Tronsole® type Q: Wall recess with prefabricated construction

Precast part construction

- The wall element of the Schöck Tronsole® type Q lies on a level full-faced support. Configuration of the support: Compressive strength class 20 and mortar group III,
- The stress impacting the masonry is calculated as follows: $\sigma_{Ed} = V_{Ed} / (110 \cdot 80)$ mm². With the maximum utilisation of 40.1 kN σ is$_{Ed}$ = 4.5 N/mm².
- The Schöck Tronsole® type Q is subsequently pushed through the staircase wall. A full-length block-out is to be arranged in the staircase wall.
- With the installing of the staircase the height of the stairs, if required, is to be adjusted using pressure-resistant compensating plates under the wall element. The complete support surface of the wall element must be underlaid flush with the compensating plates.

Fire protection | Materials

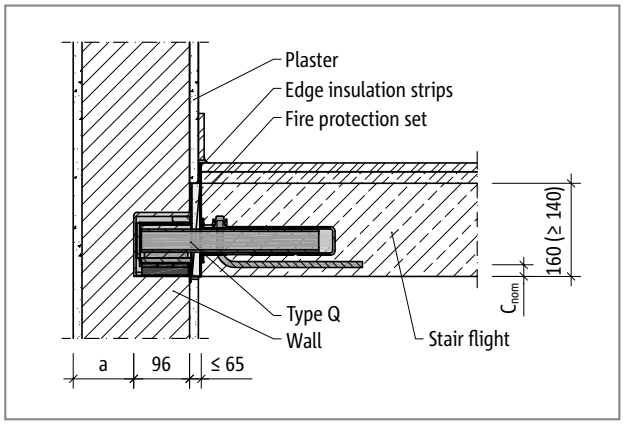


Fig. 106: Schöck Tronsole® type Q: Fire protection configuration

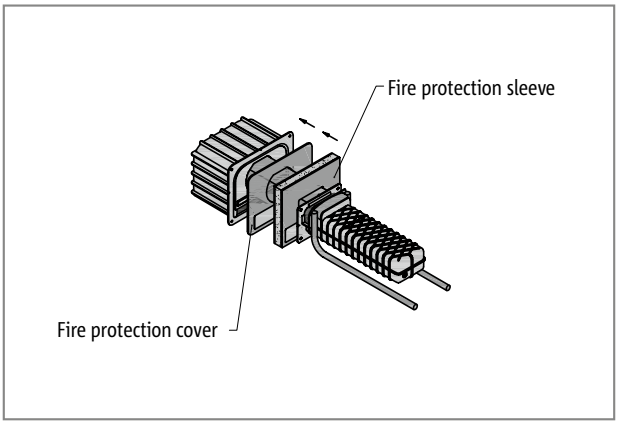


Fig. 107: Schöck Tronsole® type Q: 3D view of the product with two-part fire protection set

Fire protection

- The fire protection classification of the staircase wall is not disturbed by the wall element if a backing of at least 40 mm masonry blocks (a ≥ 40 mm) is carried out. A mineral render may be added to the thickness.
- A minimum separation of the hanger loops of the Tronsole® type Q for the structural component surface of u ≥ 35 mm is to be maintained.
- With the Schöck Tronsole® type Q the fire resistance class R90 is achievable for the surrounding structural components up to a joint width of a maximum of 65 mm.
- R90 Landings can be achieved using Tronsole® type Q with a thickness of h ≥ 160 mml
- R90 Treads can be achieved using Tronsole® type Q with a minimum thickness of h ≥ 140 mm, if the concrete of the tread is available as required concrete cover
- For the achievement of fire resistance class R90 an optional fire protective set is necessary for the Tronsole® type Q. This set consists of a fire protection cover and, depending on the joint width, one, two or three fire protection sleeves.
- The wall element of the Tronsole® type Q is to be protected here through the fire protection cover which, using a product-own adhesive surface, is fixed to the adhesive label of the wall element.
- The load-bearing element is protected through the fire protection sleeve(s).
- Joint width ≤ 25 mm: 1 fire protection set
- Joint width 26 mm to 45 mm: 1 fire protection set + 1 additional fire protection collar
- Joint width 46 mm to 65 mm: 1 fire protection set + 2 additional fire protection collars

Materials and construction materials

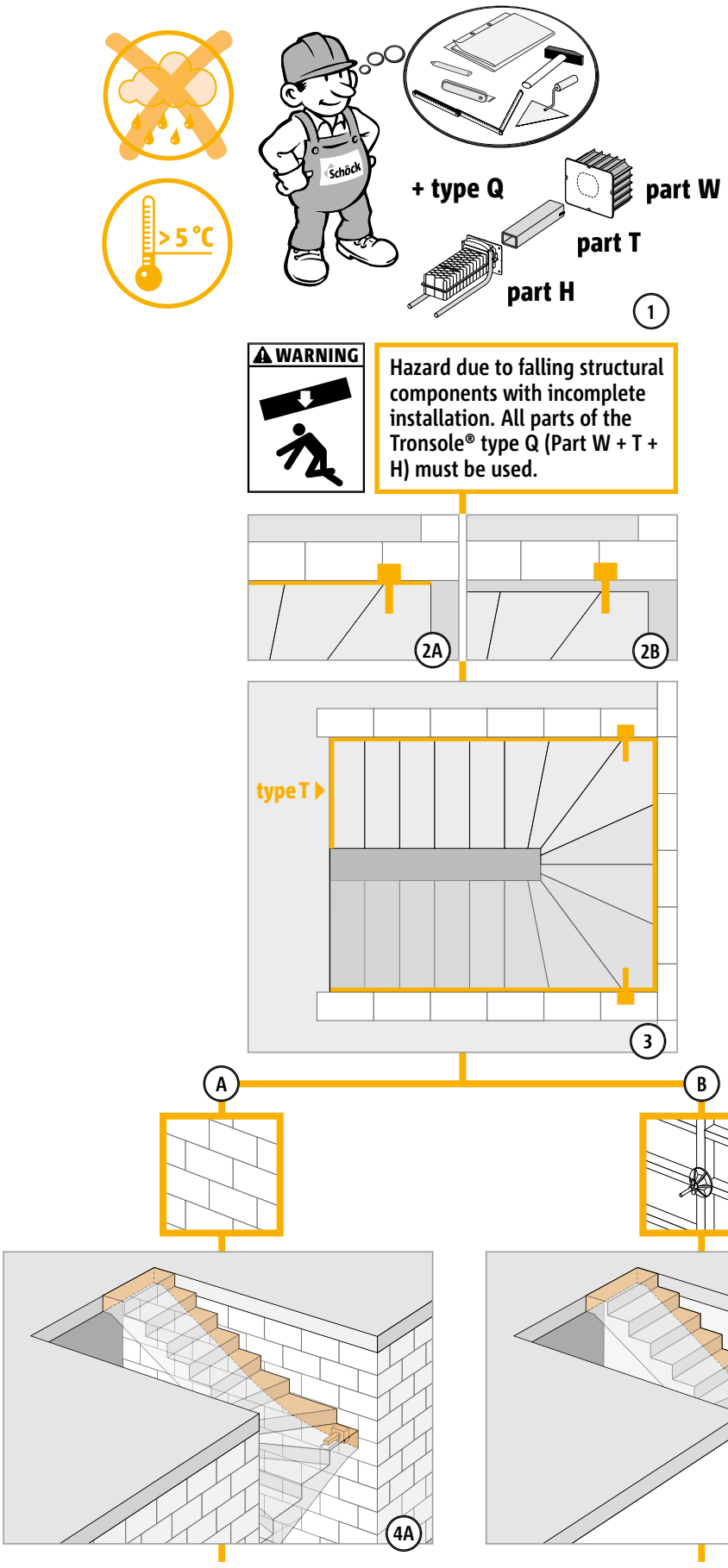
Schöck Tronsole® type Q	Material
External box	Polystyrene
Internal box	Polystyrene
PE foam insert	PE foam according to DIN EN 14313
Elastomer support	Polyurethane according to DIN EN 13165
Load distribution plate	Fine-grain construction steel S460 according to DIN EN 10025
Load-bearing element	FV: S355 JO; A2: S355, corrosions protection class. II according to Z-30.3-6
Sleeve	Polystyrene
Hanger loop	Reinforcing steel B500B according to DIN 488-1
Pressure deflector	Construction steel S355 JO according to DIN EN 10025
Tension damper	Polyurethane according to DIN EN 13165

Installation

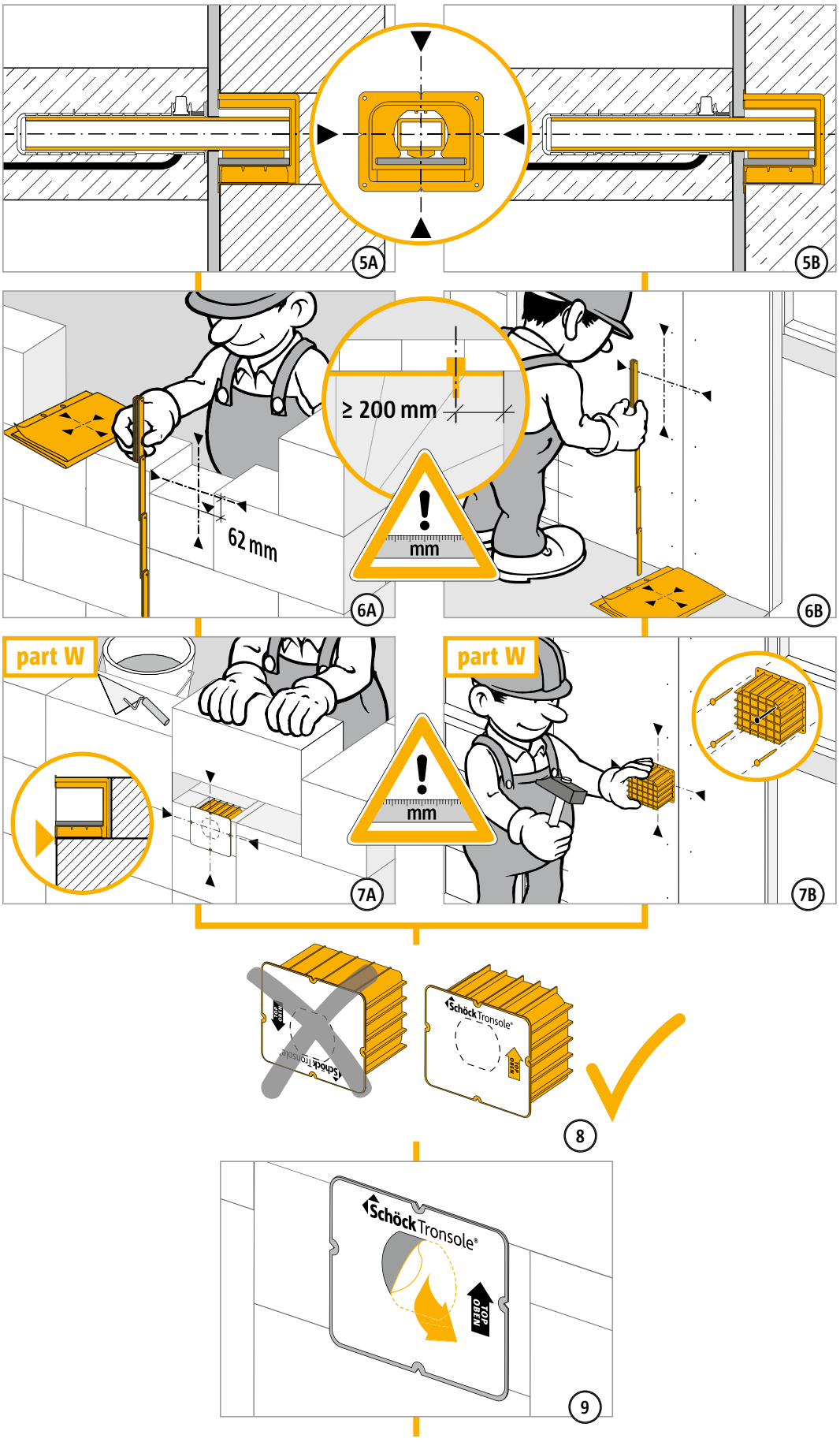
Installation

- The wall element of the Schöck Tronsole® type Q lies on a level full-faced support. Configuration of the support: Compressive strength class 20 and mortar group III,
- The stress impacting the masonry is calculated as follows: $\sigma_{Ed} = V_{Ed} / (110 \cdot 80)$ mm². With the maximum utilisation of 40.1 kN σ is$_{Ed}$ = 4.5 N/mm².
- With the installing of the staircase the height of the stairs, if required, is to be adjusted using pressure-resistant compensating plates under the wall element. The complete support surface of the wall element must be underlaid flush with the compensating plates.

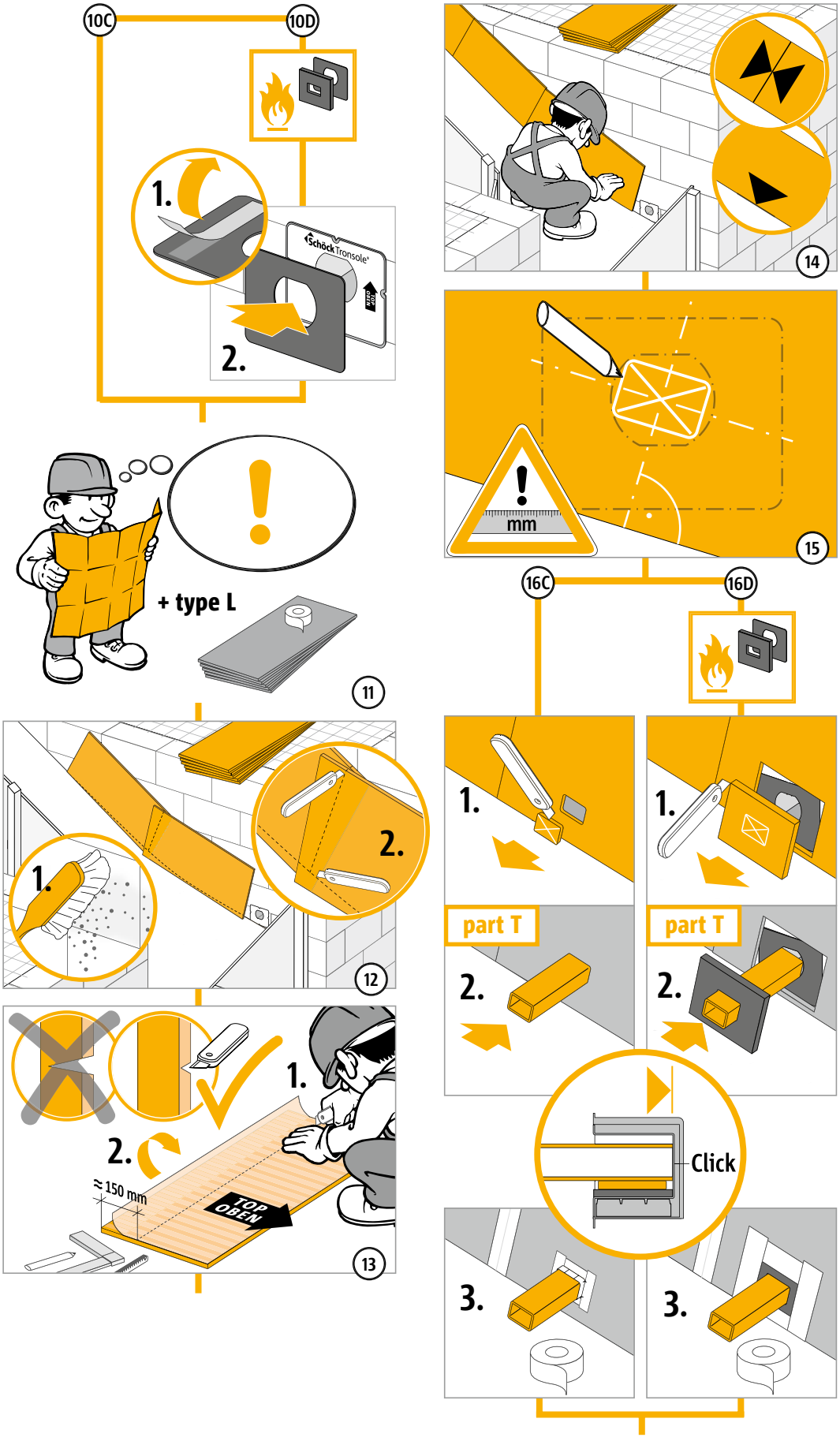
Installation instructions building site in-situ concrete



Installation instructions building site in-situ concrete



Installation instructions building site in-situ concrete



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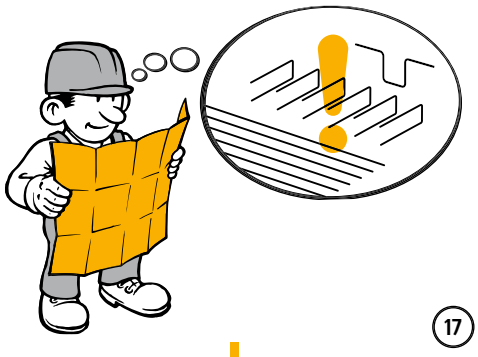
Installation instructions building site in-situ concrete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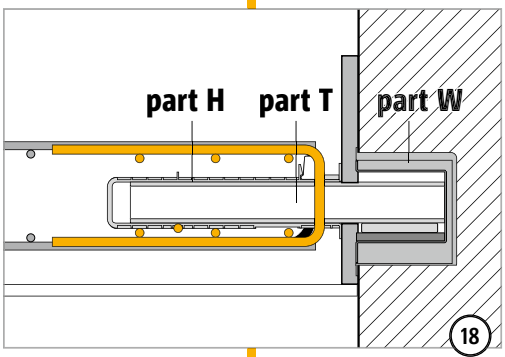

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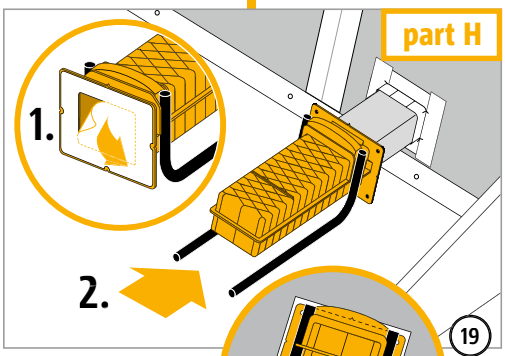

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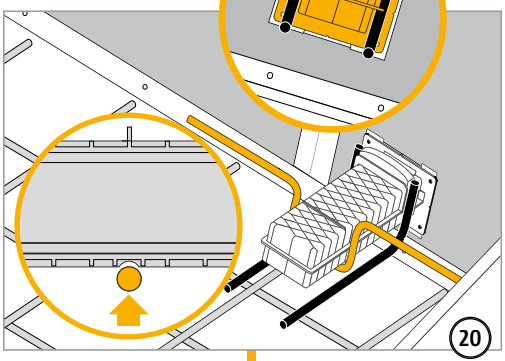
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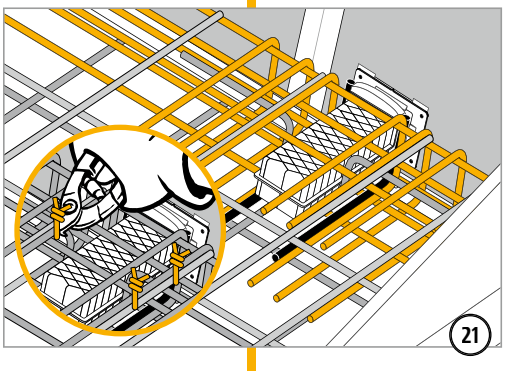
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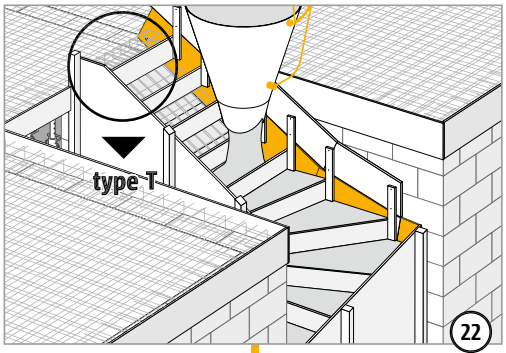

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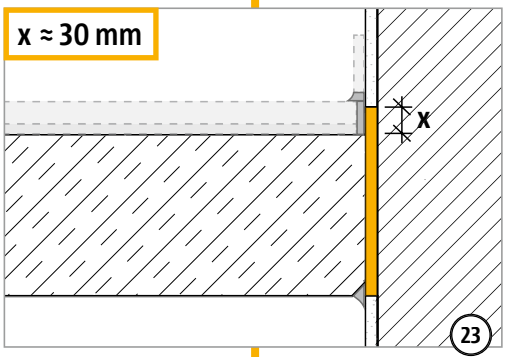

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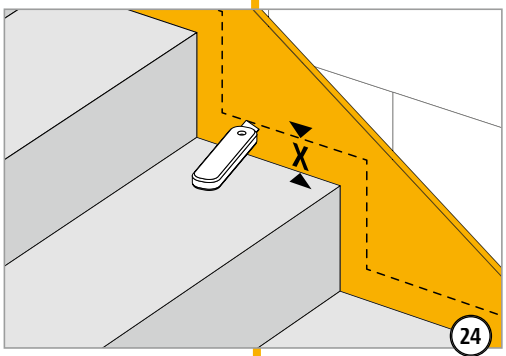

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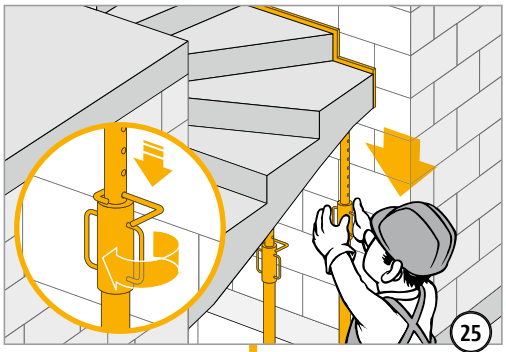
Hazard due to falling structural components with missing support. Turn down all construction supports slowly. Remove only load-free supports.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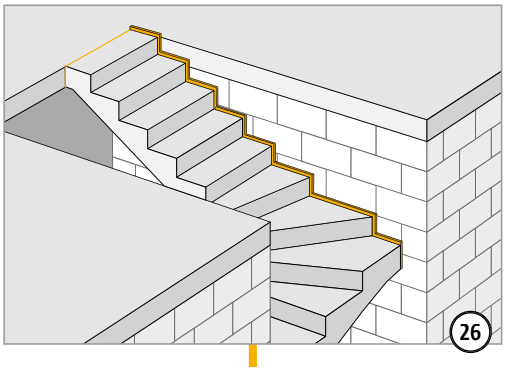
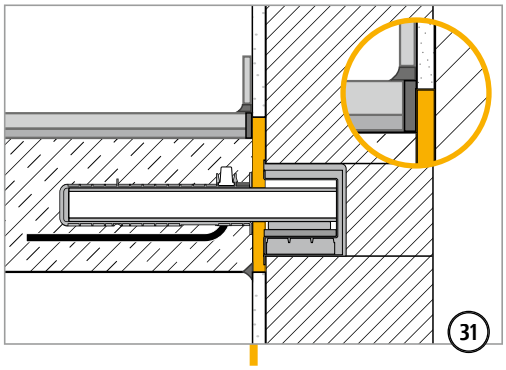
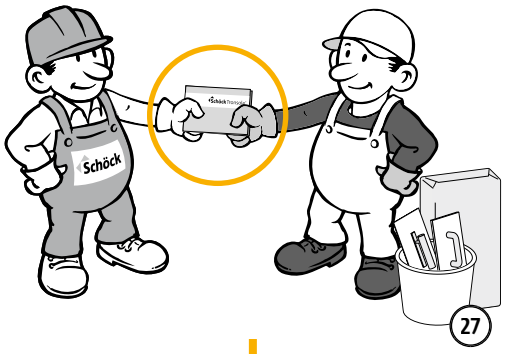
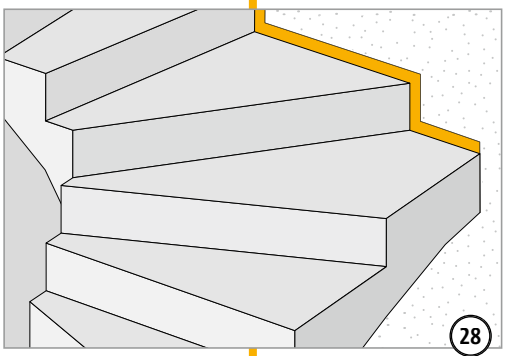
Q

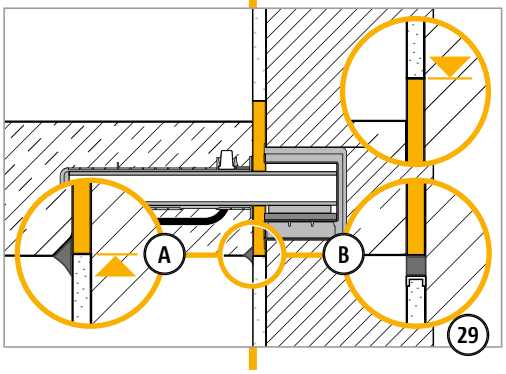
Installation instructions building site in-situ concrete

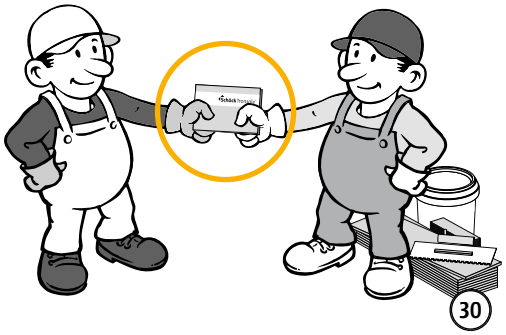






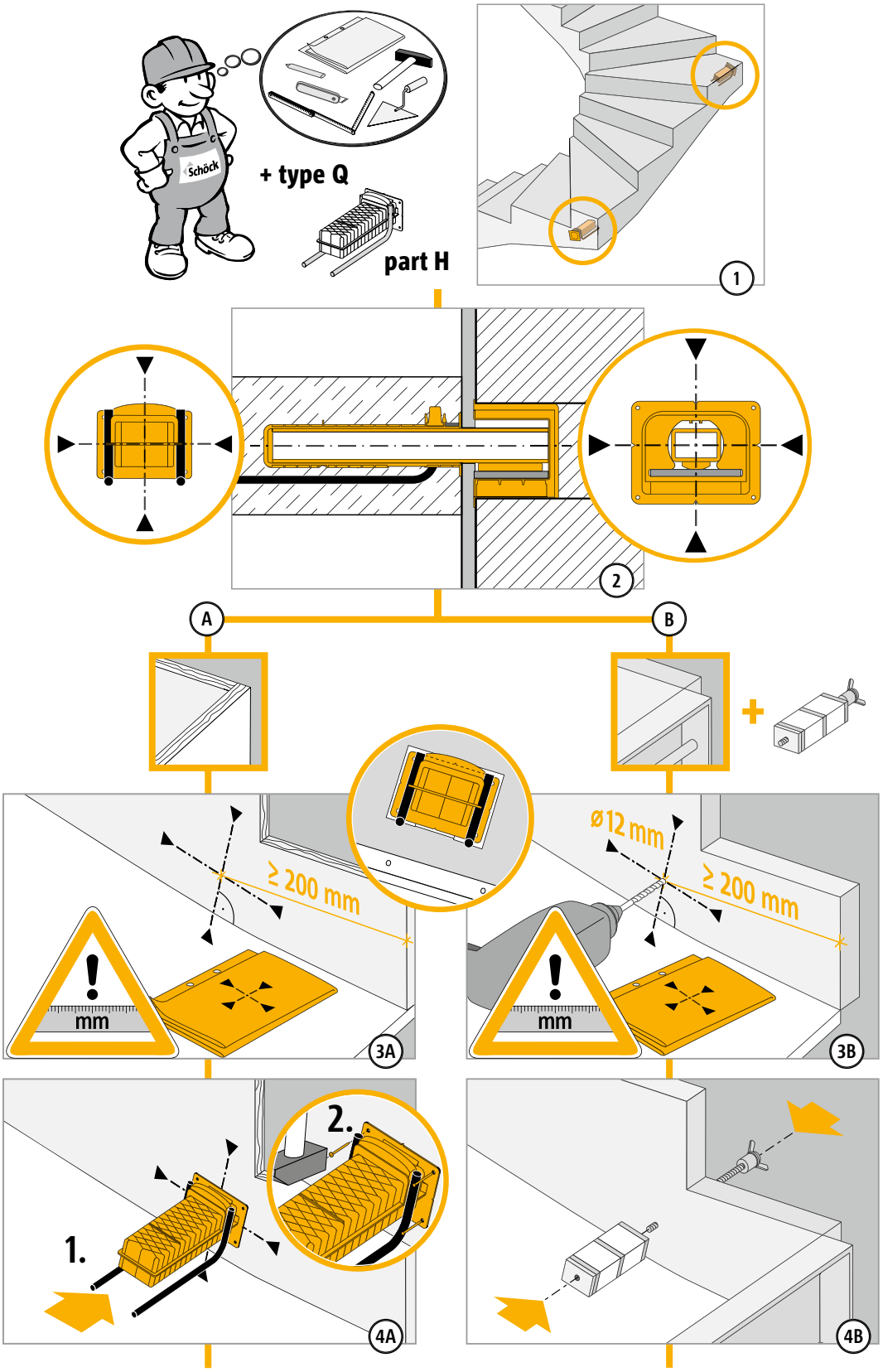




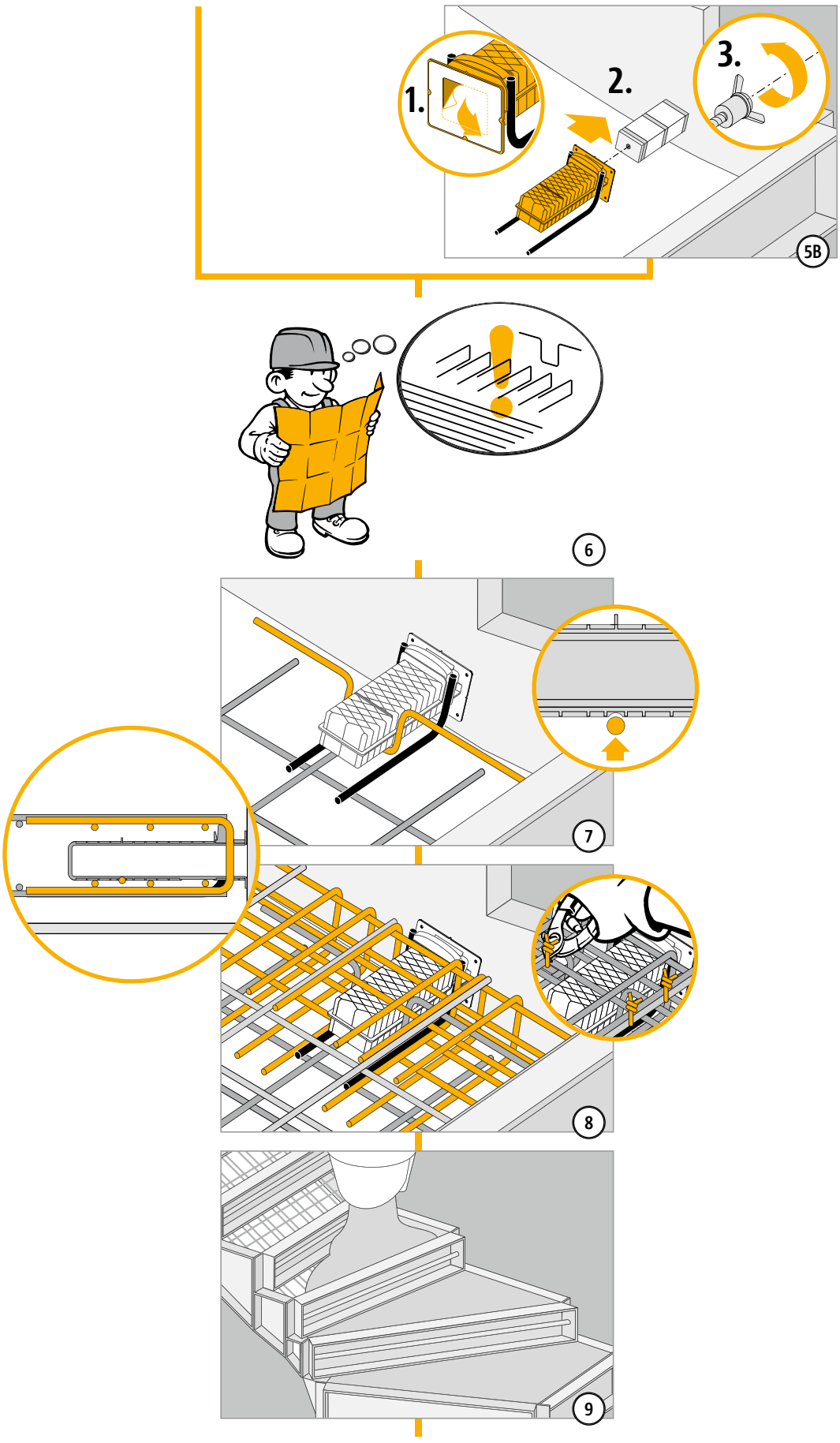


Q

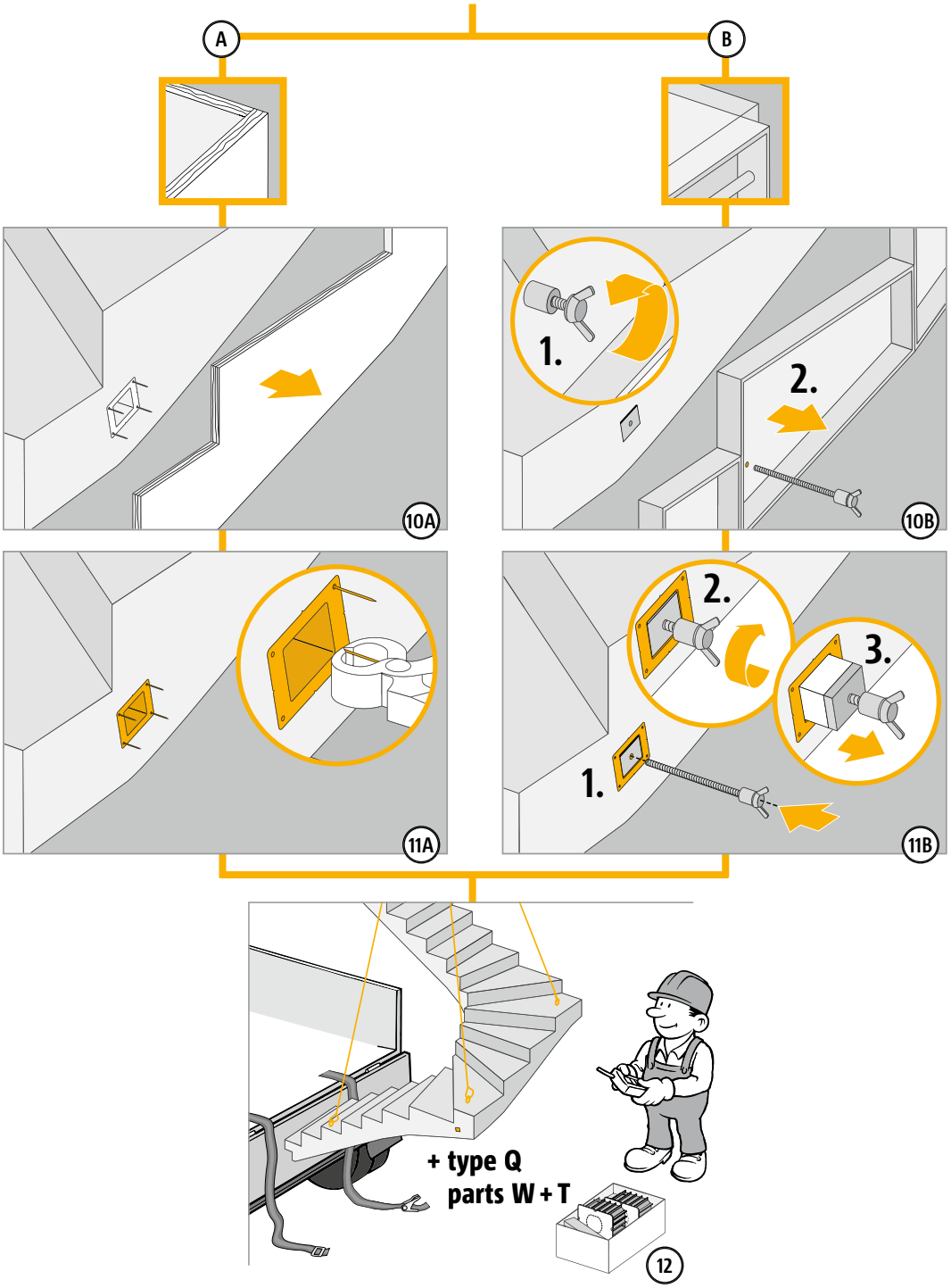
Installation instructions for prefabricating plant



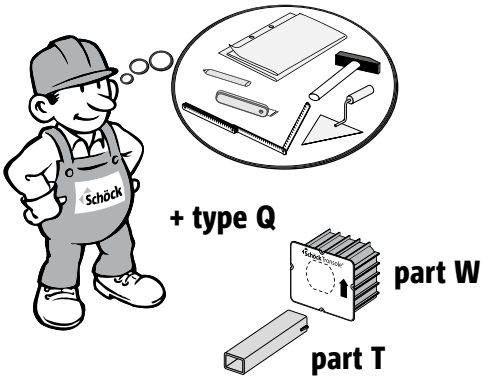
Installation instructions for prefabricating plant

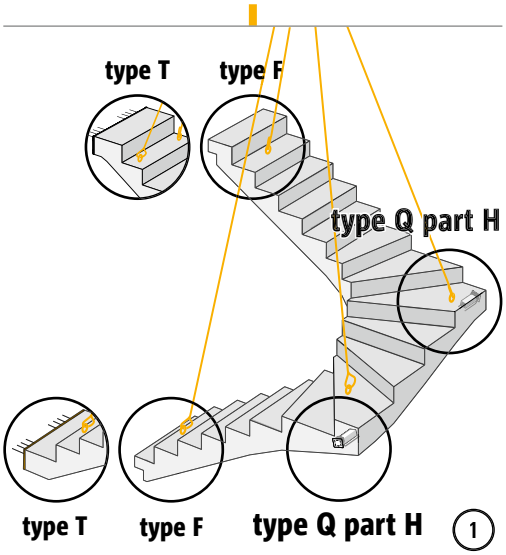


Installation instructions for prefabricating plant



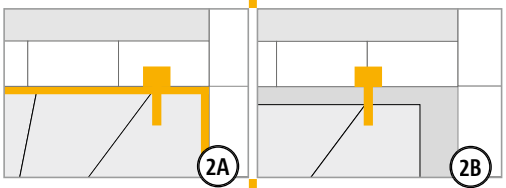
Installation instructions building site precast components

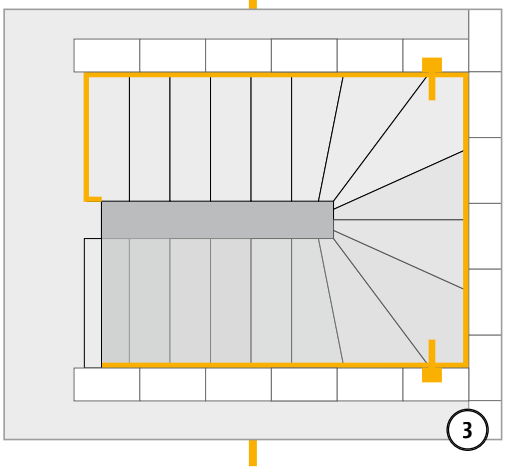


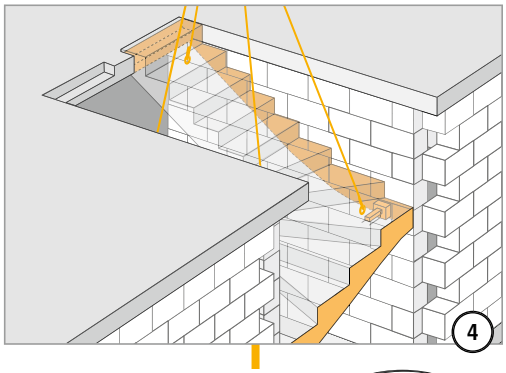


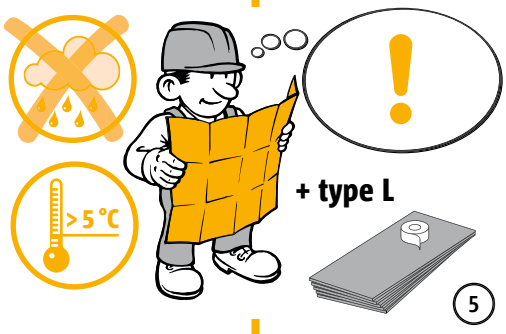
⚠ WARNING

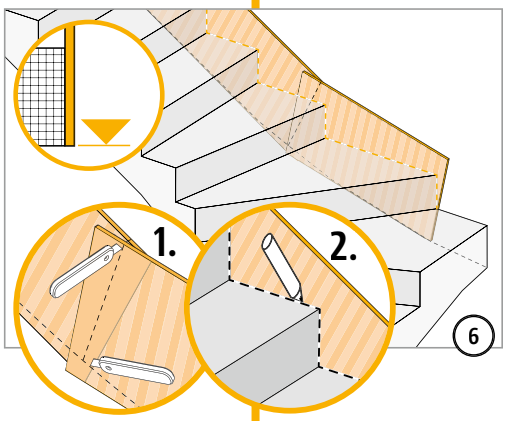
Hazard due to falling structural components with incomplete installation. All parts of the Tronsole® type Q (part W + T) must be used.

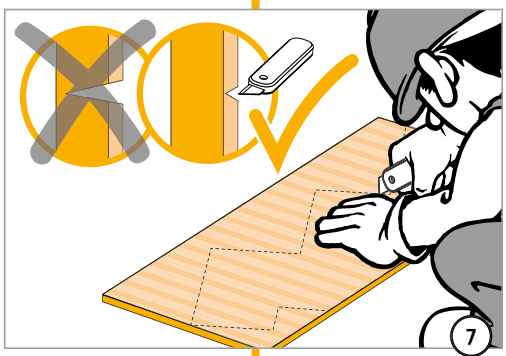


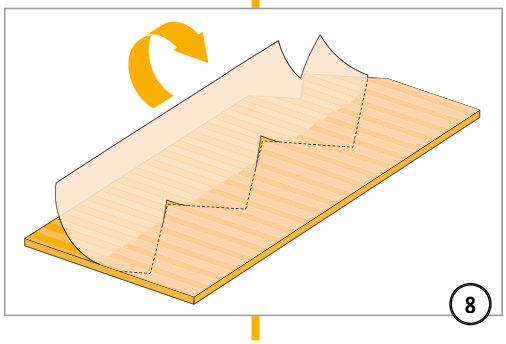






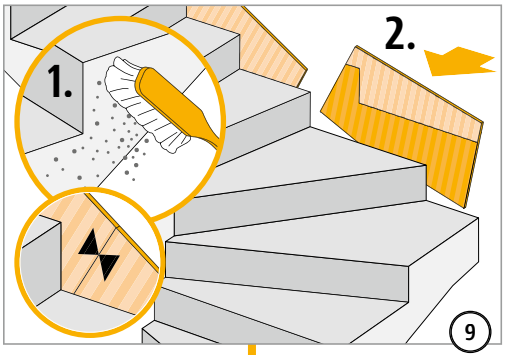


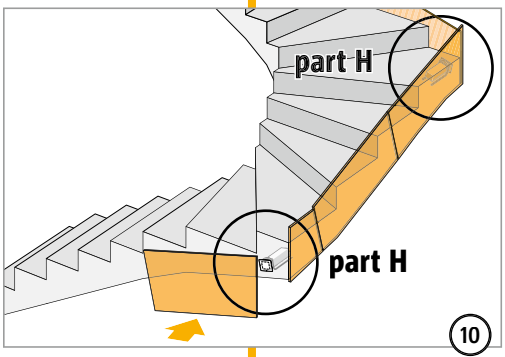


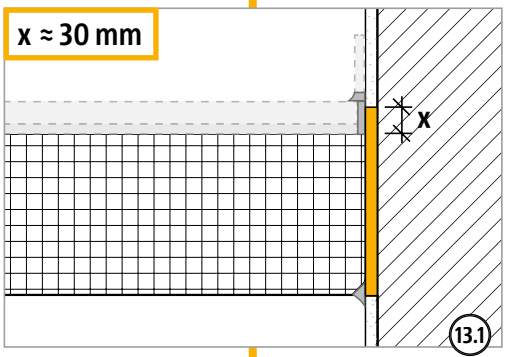


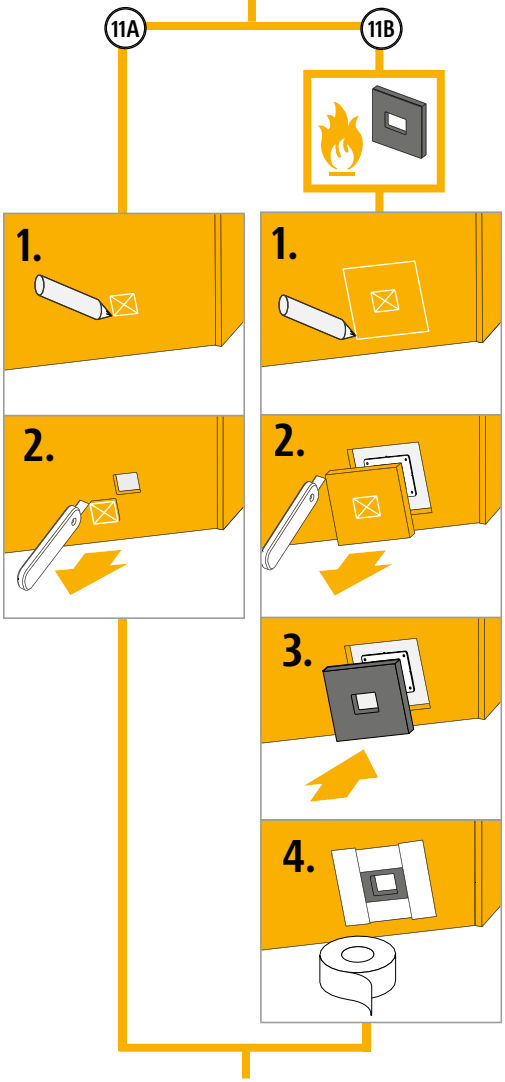
Q

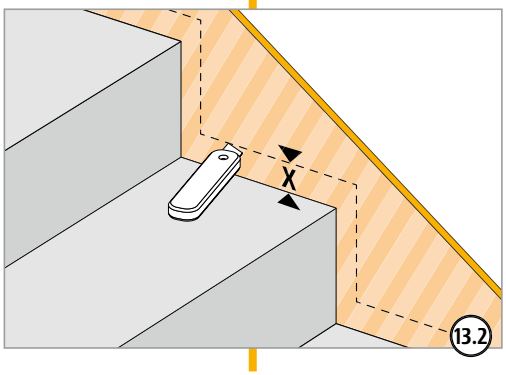
Installation instructions building site precast components











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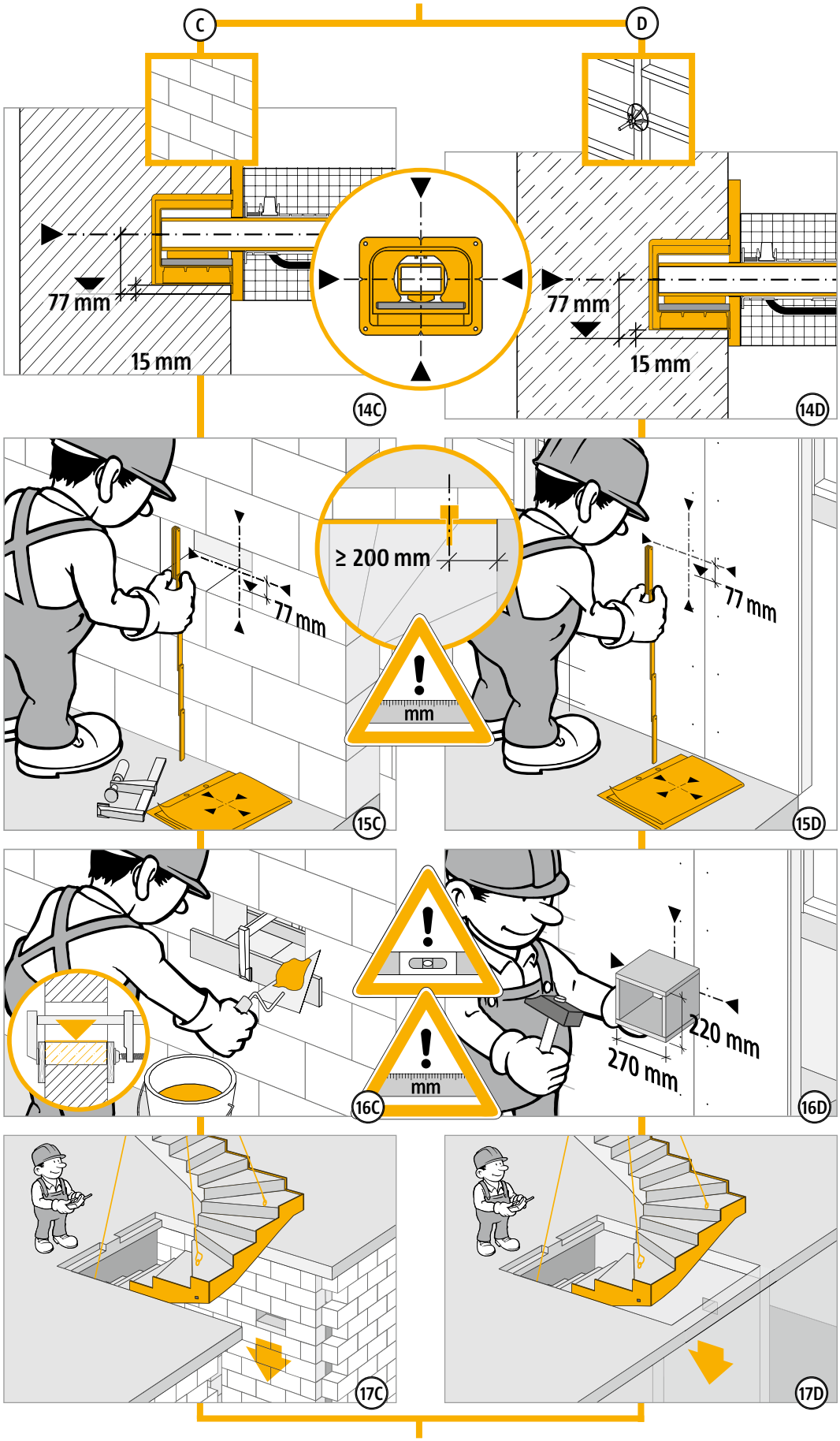
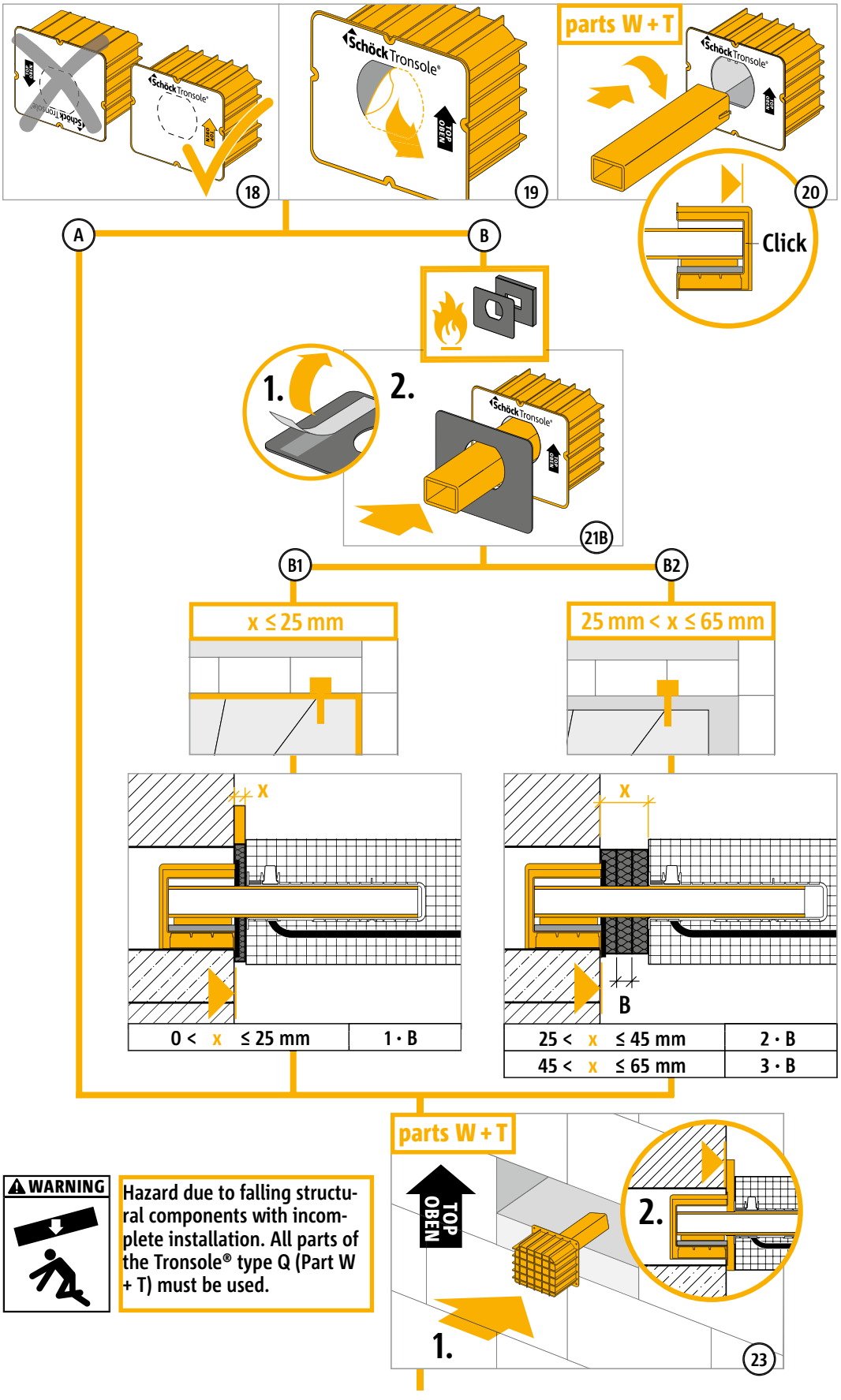
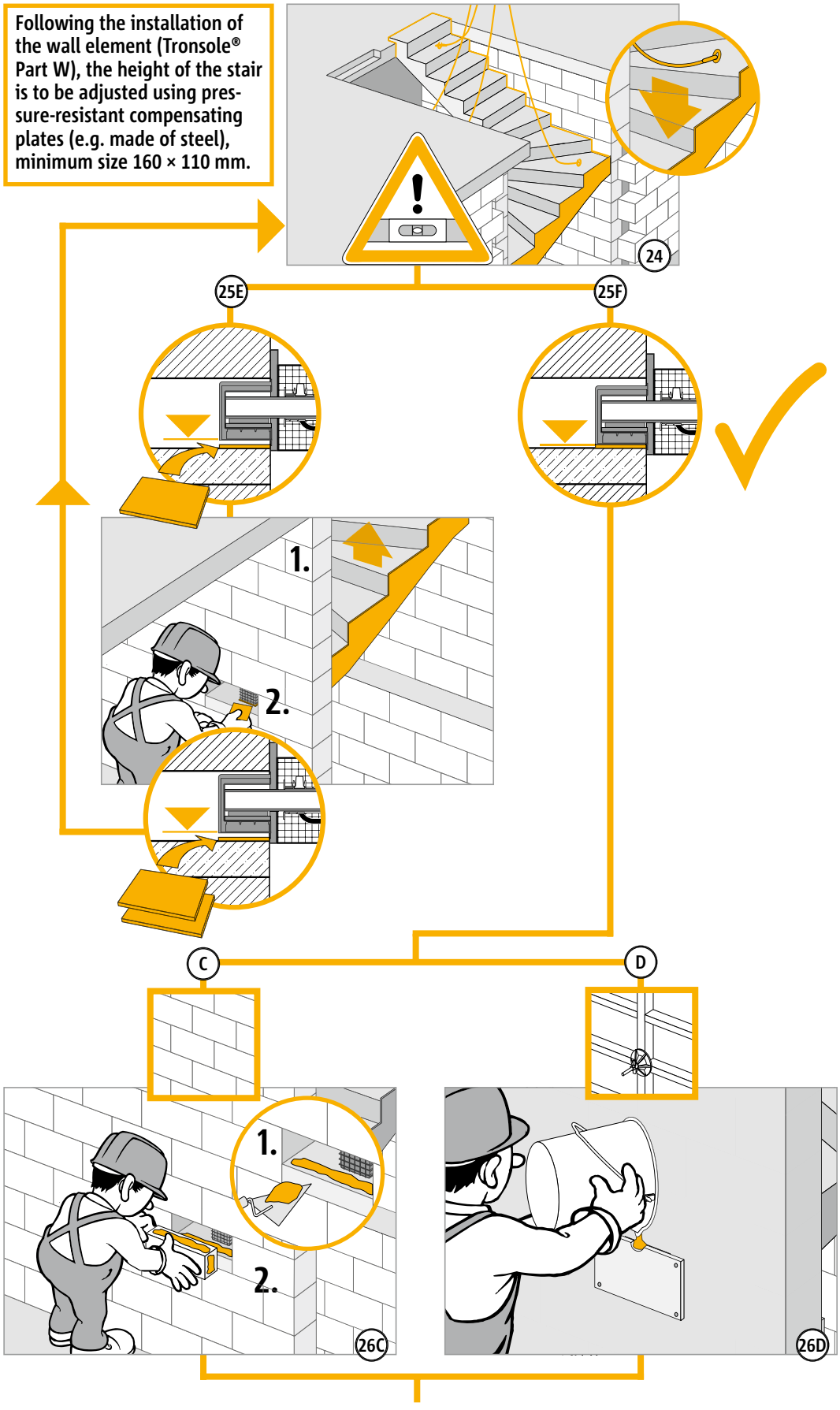
Installation instructions building site precast components



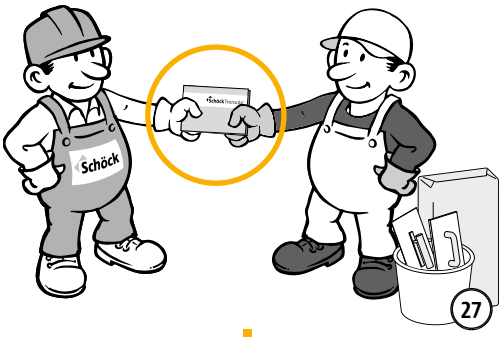
Installation instructions building site precast components

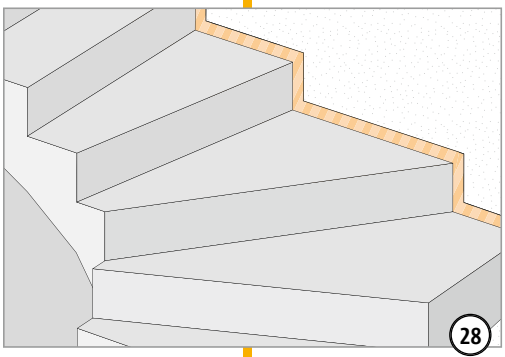


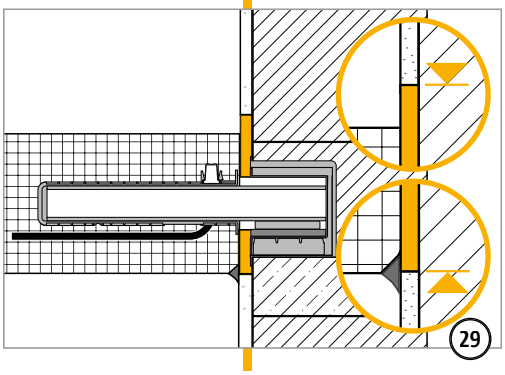
Installation instructions building site precast components

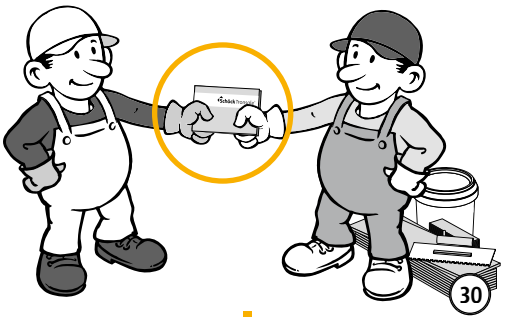


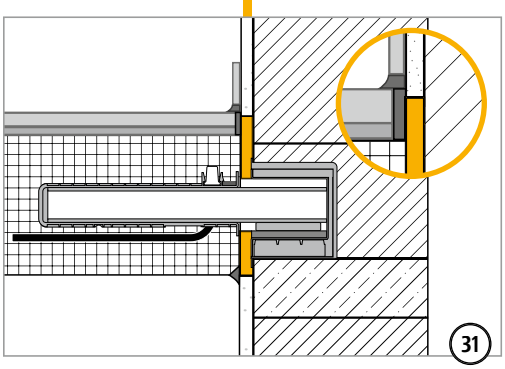
Installation instructions building site precast components







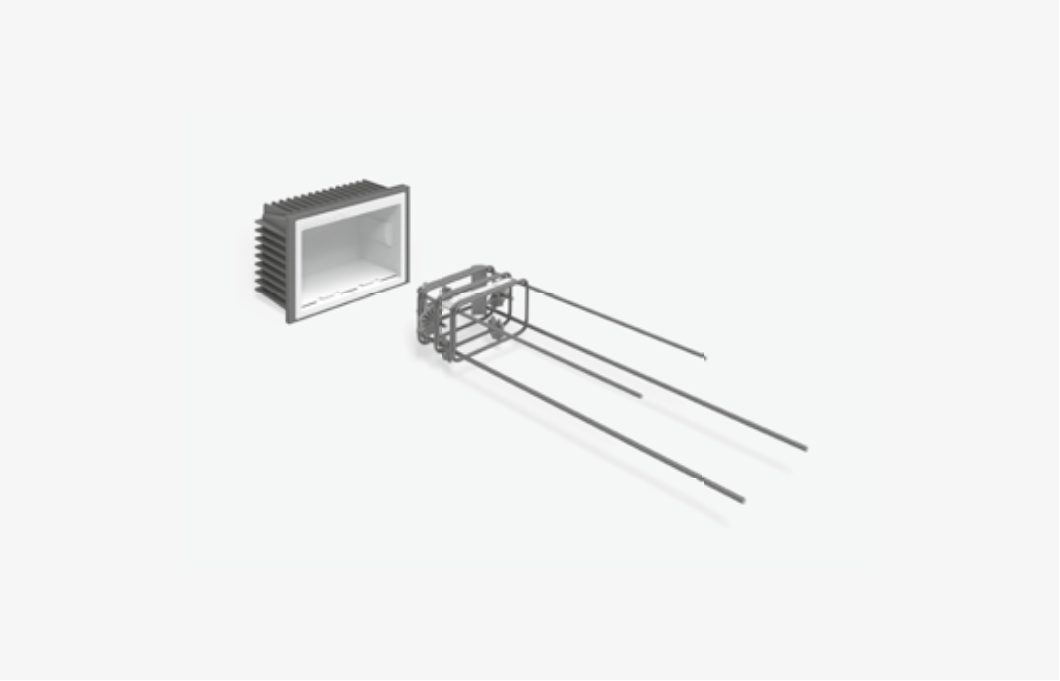




Check list

- ☐ Is the geometry of the structural component to be sound insulated matched to the measurements of the Schöck Tronsole® type Q?
- ☐ Have the effects on the Schöck Isokorb® connection been specified at design level?
- ☐ With the Tronsole® type Q is the minimum concrete strength taken into account according to the design table?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ Due to an R90 requirement are larger concrete covers and the resultant larger structural component heights taken into account?
- ☐ With a R90 requirement on the fire resistance class is the joint planned with a width of maximum 65 mm?
- ☐ With V_{Ed} at the slab edge of the landing, is the limiting value of the slab load-bearing capacity checked?
- ☐ Is the required on-site reinforcement, including the hat brackets, taken into account?

Schöck Tronsole® type Z



Schöck Tronsole® type Z
Serves the sound insulation of landings and staircase walls. Here, the landings can be implemented in in-situ concrete or as fully precast components. The staircase wall can be either masoned or concreted.

Product characteristics | Product design

Product characteristics

- Impact sound pressure level difference $\Delta L^*_{n,w} \geq 27$ dB, tested according to DIN 7396; Test report Nos. 91386-09;
- High quality and efficient Elodur® elastomer support for point connection
- Load-bearing element in accordance with type approval report No. S-N/130257
- One element height for all landing heights
- Fire resistance class R90 in accordance with Fire Protection Report GS 3.2/13-390-2
- Light load-bearing element including spacer for simple assembly optional

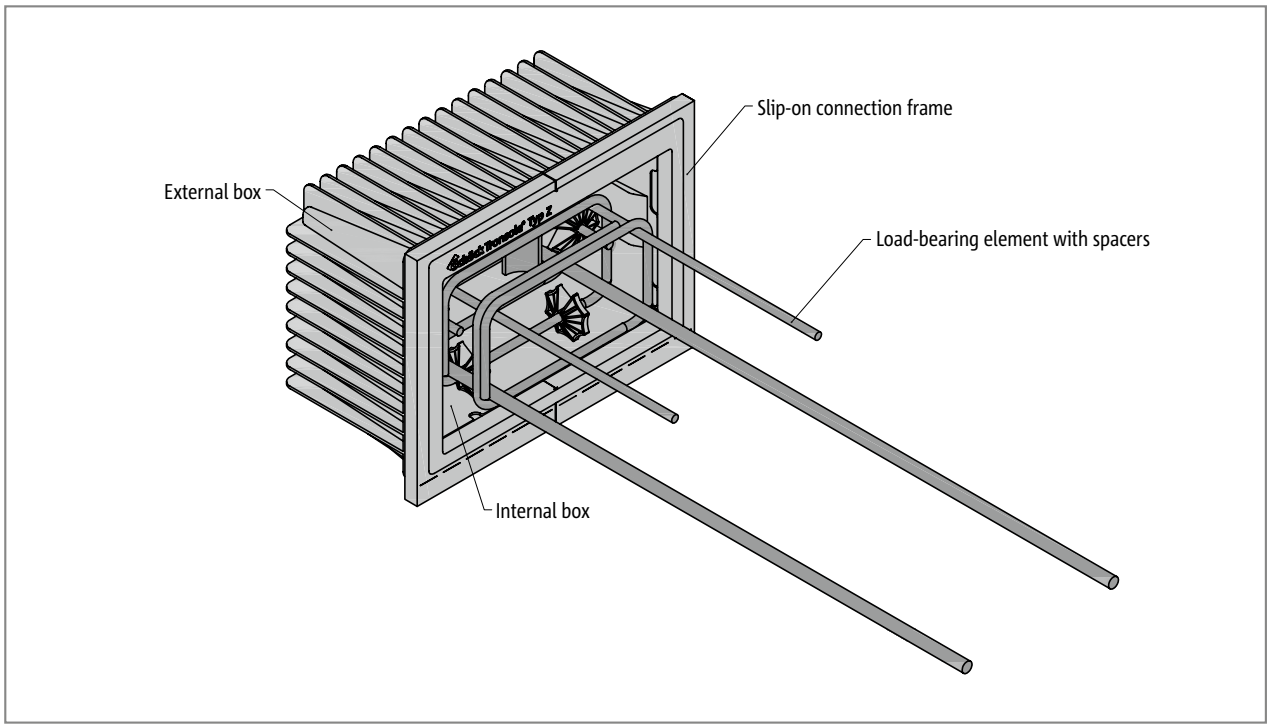
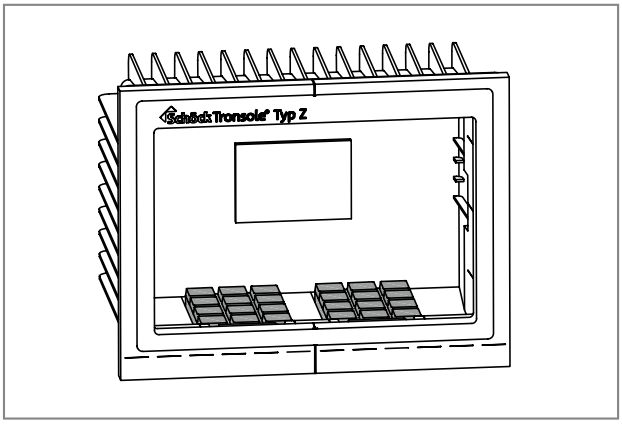


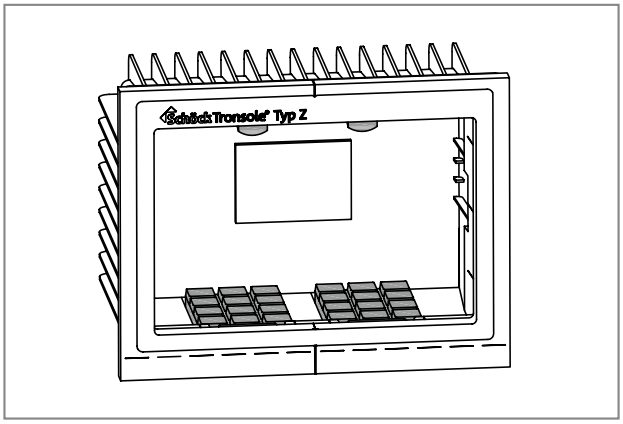
Fig. 108: Schöck Tronsole® type Z: Wall element, consisting of outer box, inner box, connection framework and integrated Elodur® elastomer, which are not visible in the diagram. The load-bearing element can be obtained optionally and is concreted into the landing.

Product selection | Type designations

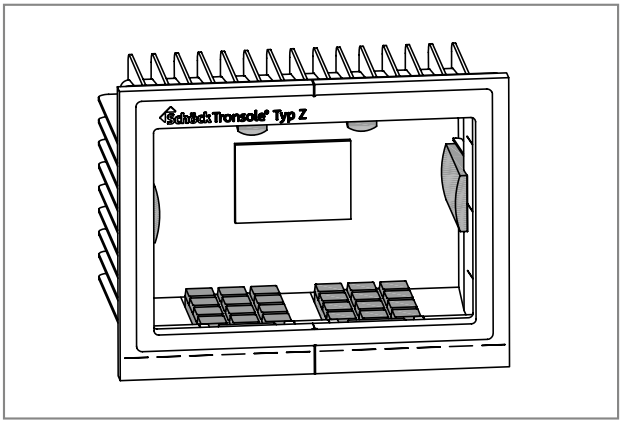
Schöck Tronsole® type Z-V



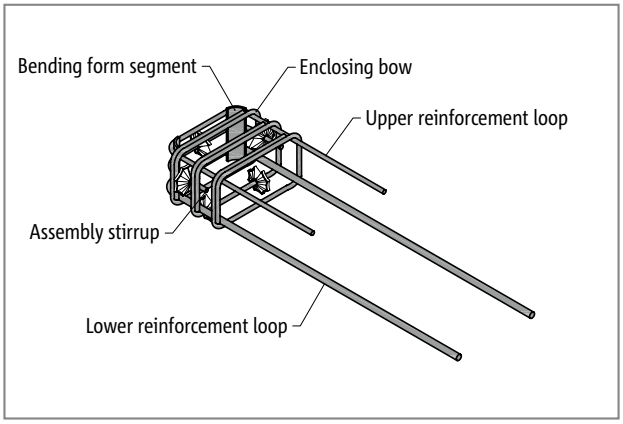
Schöck Tronsole® type Z-V+V



Schöck Tronsole® type Z-VH+VH



Schöck Tronsole® type Z part T



Schöck Tronsole® type Z variants

The design of the Schöck Tronsole® type Z can vary as follows due to different placement with Elodur® elastomer supports:

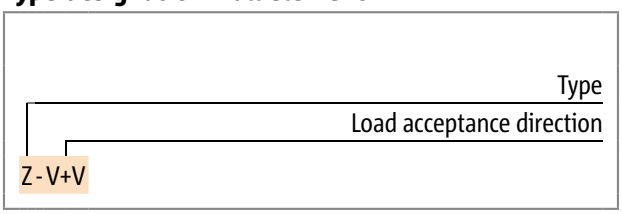
- Load acceptance direction:
  The type Z-V wall element receives a positive shear force $V_{Ed,z}$.
  The Elodur® elastomer support is located in the wall element of the Tronsole® type Z-V below.

  The wall element type Z-V+V receives positive and negative shear forces $V_{Ed,z}$.
  The Elodur® elastomer support is located in the wall element of the Tronsole® type Z-V+V below and above.

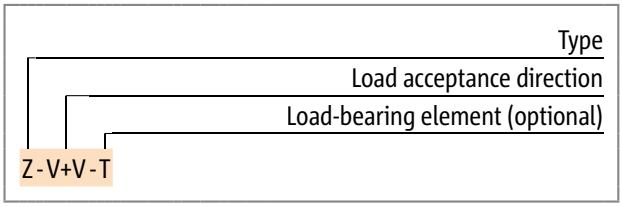
  The wall element type Z-Vh+VH, along with shear forces ± $V_{Ed,z}$ also receives lateral horizontal forces ± $V_{Ed,y}$.
  The Elodur® elastomer support is located in the wall element of the Tronsole® type Z-VH+VH below, above and laterally.

- Load-bearing element:
  The type-approved load-bearing element Schöck Tronsole® type Z part T is optionally available.

Type designation wall element



Type designation wall element with load-bearing element



Z

Manufacturing variants

Manufacturing variant wall element as stay-in-place formwork

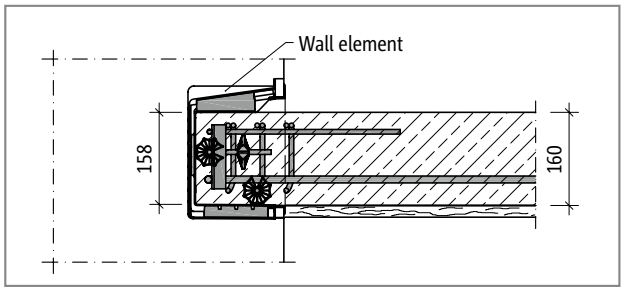


Fig. 109: Schöck Tronsole® type Z: Wall element as stay-in-place formwork

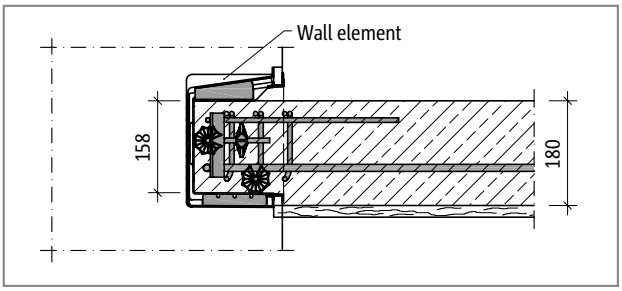


Fig. 110: Schöck Tronsole® type Z: Wall element as stay-in-place formwork; underside of the landing flush with the connection frame of the wall element

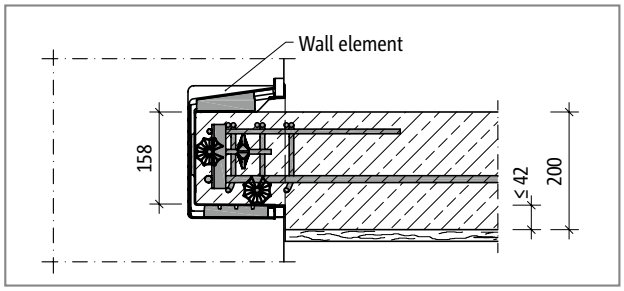


Fig. 111: Schöck Tronsole® type Z: Wall element as stay-in-place formwork; underside of the landing lower than the connection frame of the wall element

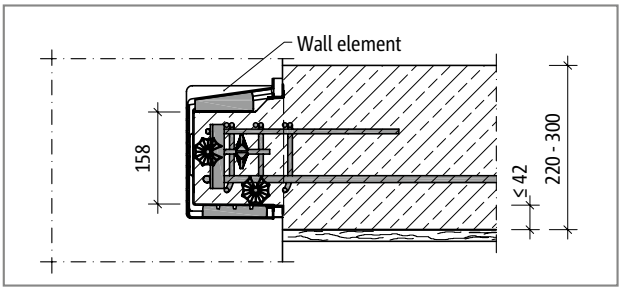


Fig. 112: Schöck Tronsole® type Z: Wall element as stay-in-place formwork; underside of the landing lower than the connection frame of the wall element

Manufacturing variant formwork construction in the prefabricating plant

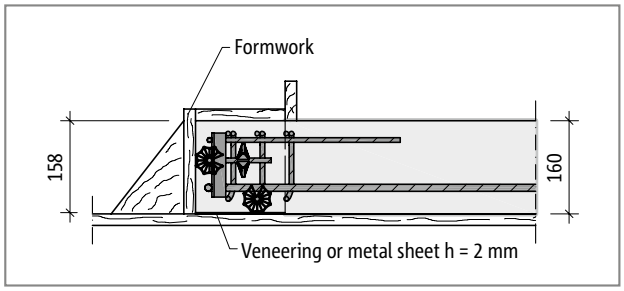


Fig. 113: Schöck Tronsole® type Z: Production of a support corbelt on the fully precast landing; landing slab thickness h = 160 mm

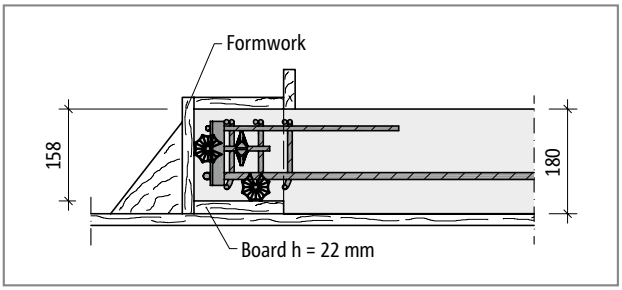


Fig. 114: Schöck Tronsole® type Z: Production of a corbel bracket on the fully precast landing; landing slab thickness h = 180 mm

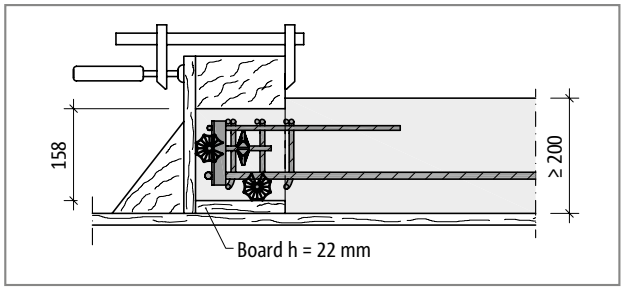


Fig. 115: Schöck Tronsole® type Z: Production of a corbel bracket on the fully precast landing; landing slab thickness h ≥ 200 mm

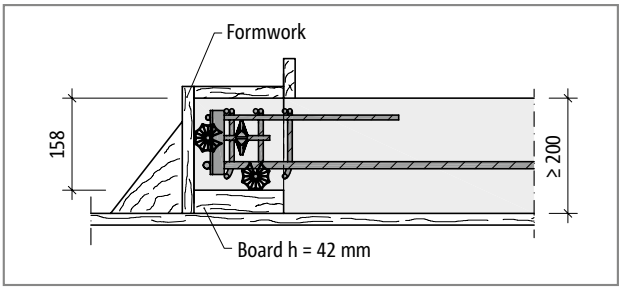


Fig. 116: Schöck Tronsole® type Z: Production of a corbel bracket on the fully precast landing with maximum height difference between the lower edge of the landing and the corbel; landing slab thickness h = 200 mm

Manufacturing variants

The Schöck Tronsole® type Z is used both for in-situ concrete as well as for fully precast landings. With in-situ concrete landings the wall element of the Tronsole® is used as stay-in-place formwork. With fully precast landings the corbel bracket of the landing is manufactured according to the dimensions presented in this technical information in order, following the hardening of the concrete, to be able to insert it into the wall element of the Tronsole®.

Installation cross section

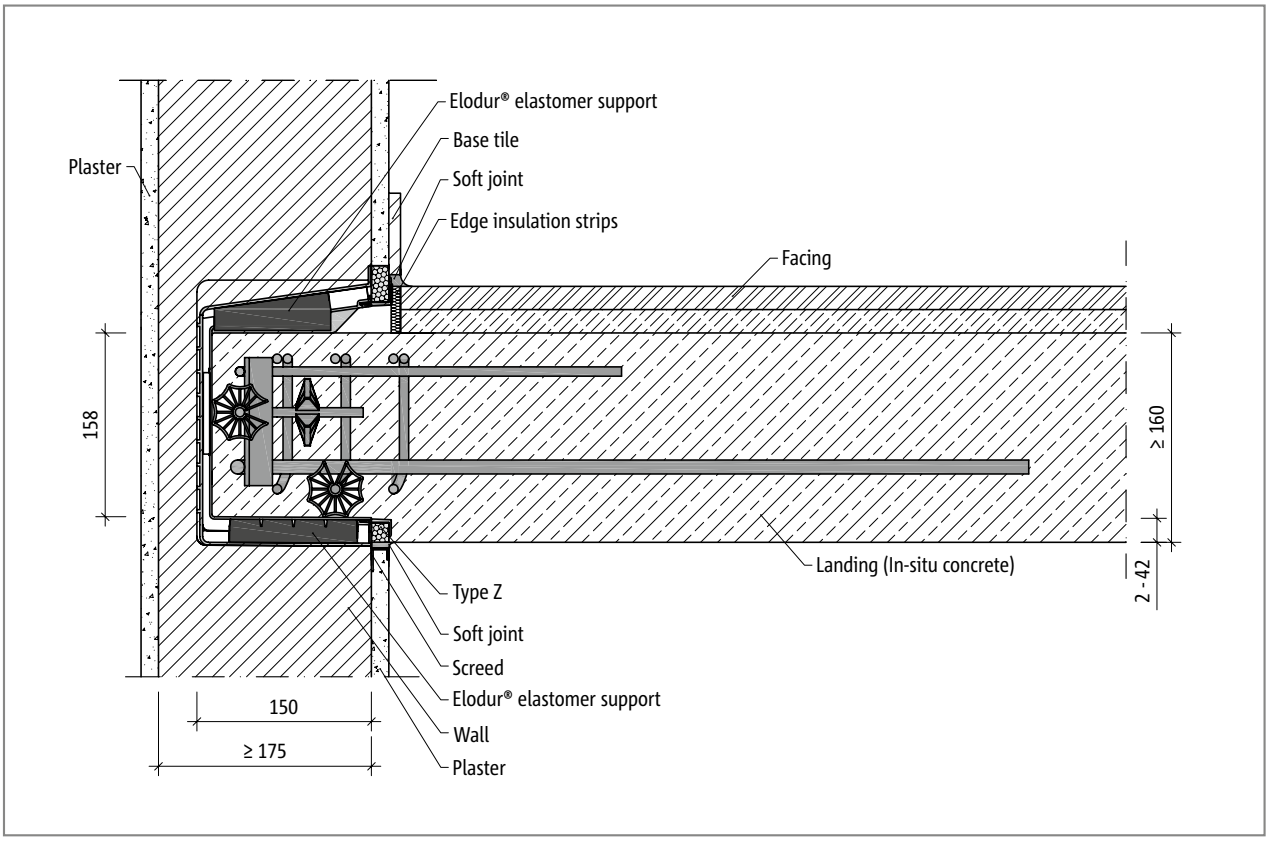


Fig. 117: Schöck Tronsole® type Z-V+V-T: Installation cross-section in-situ concrete landing

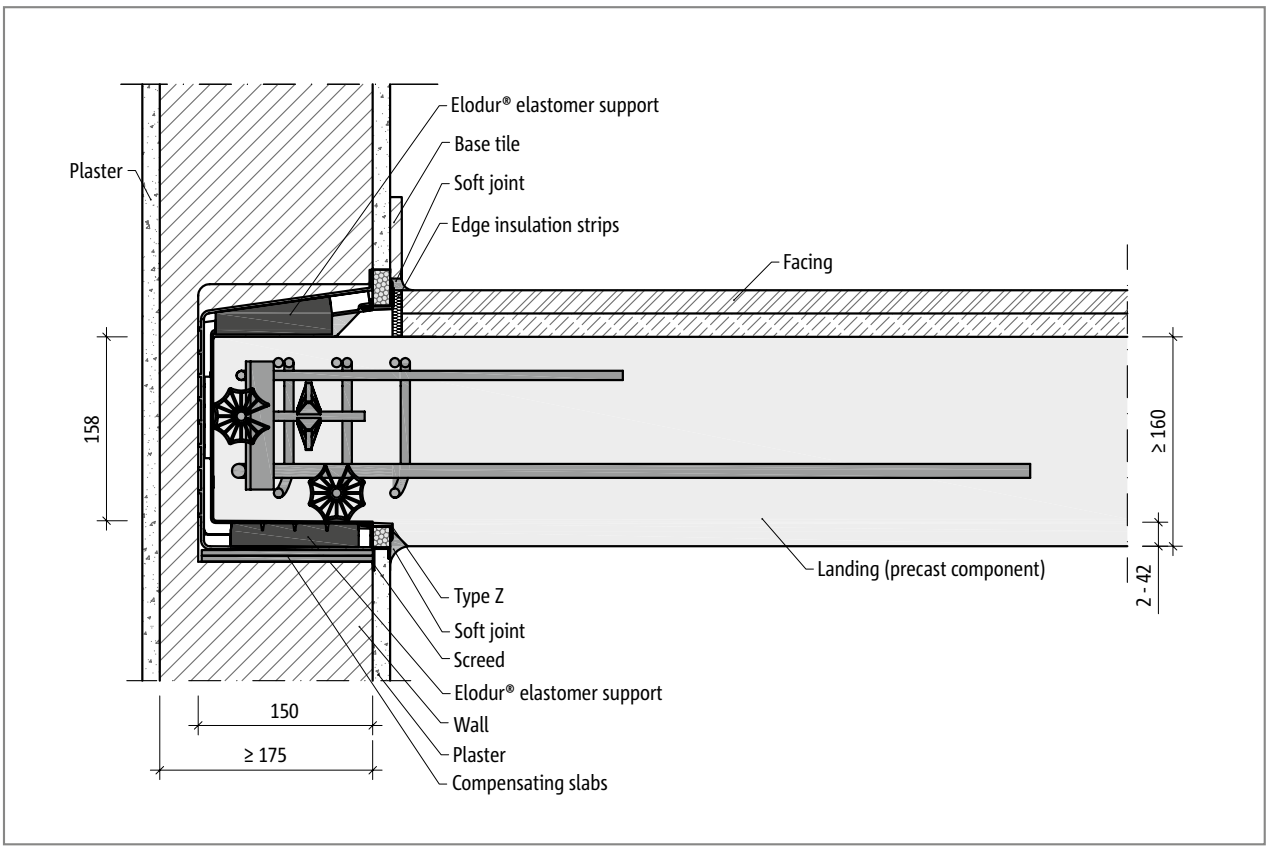


Fig. 118: Schöck Tronsole® type Z-V+V-T: Installation cross-section precast landing

Element arrangement

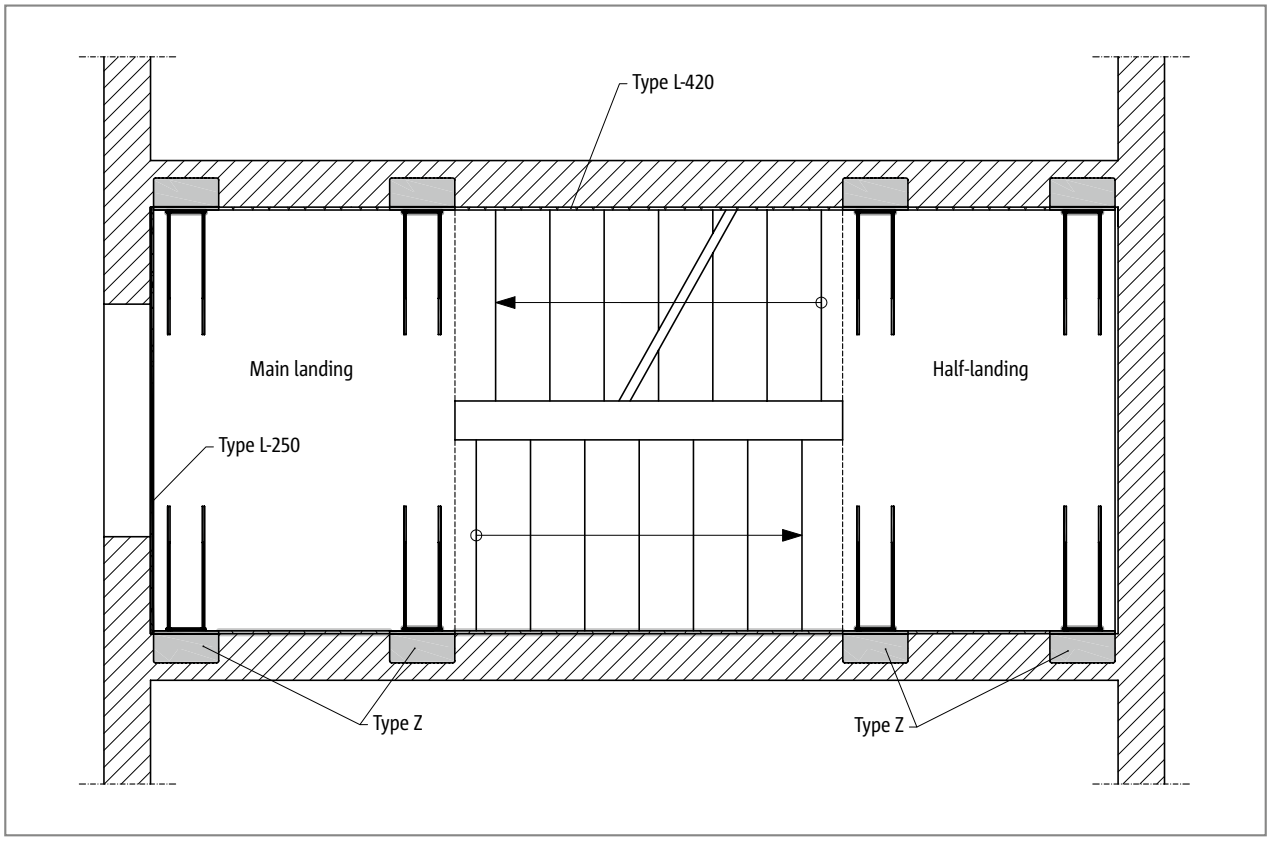


Fig. 119: Schöck Tronsole® type Z: Element configuration in plan view

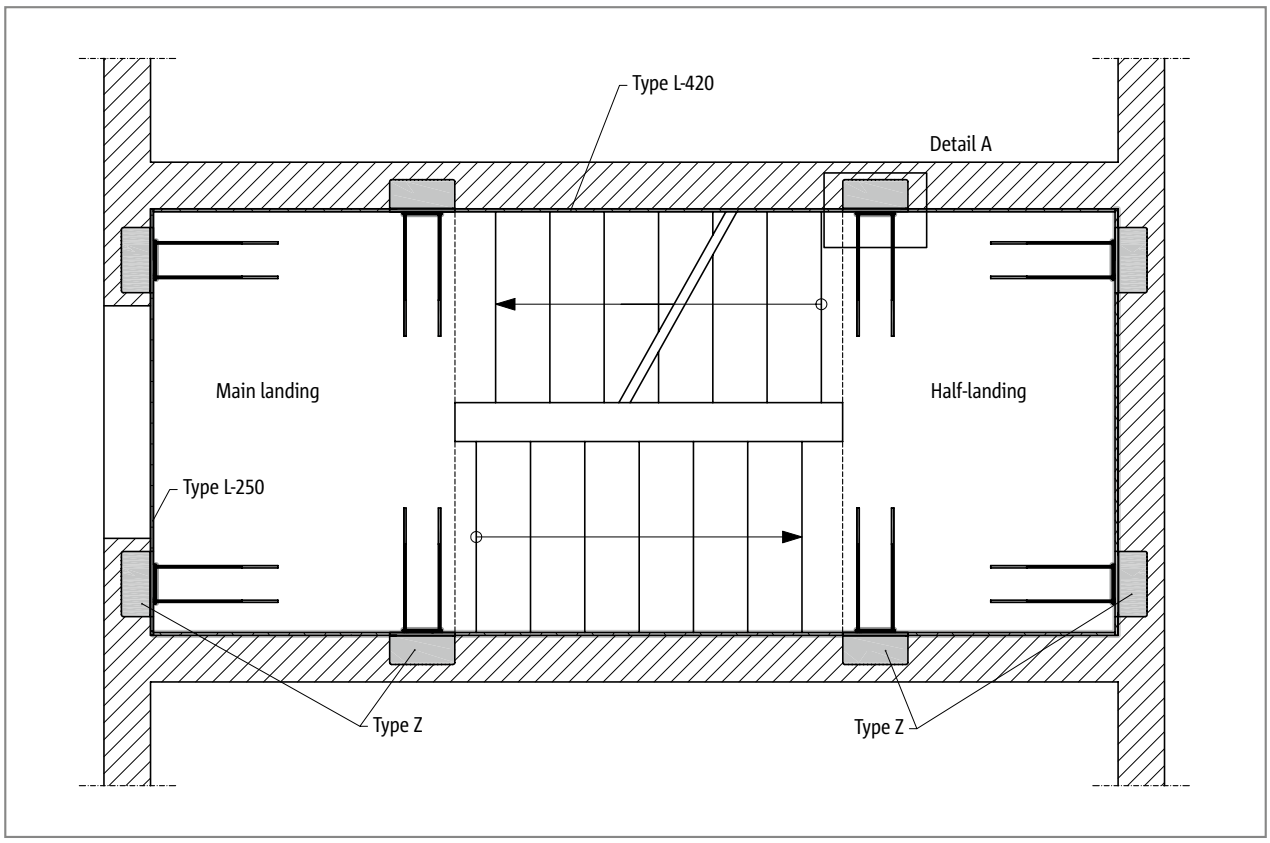


Fig. 120: Schöck Tronsole® type Z: Alternative element configuration in plan view

Element arrangement

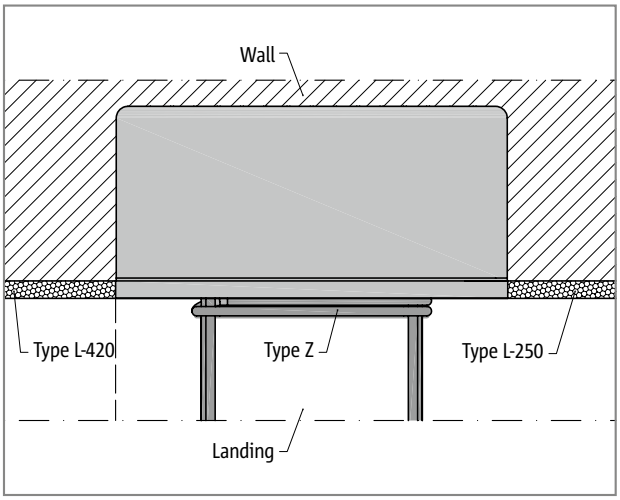


Fig. 121: Schöck Tronsole® type Z: Element configuration, Detail A

Element arrangement

In order to achieve a favourable distribution of the support forces, a 4 point support of the landing on two opposite sides or on three sides is recommended.

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).

Product description

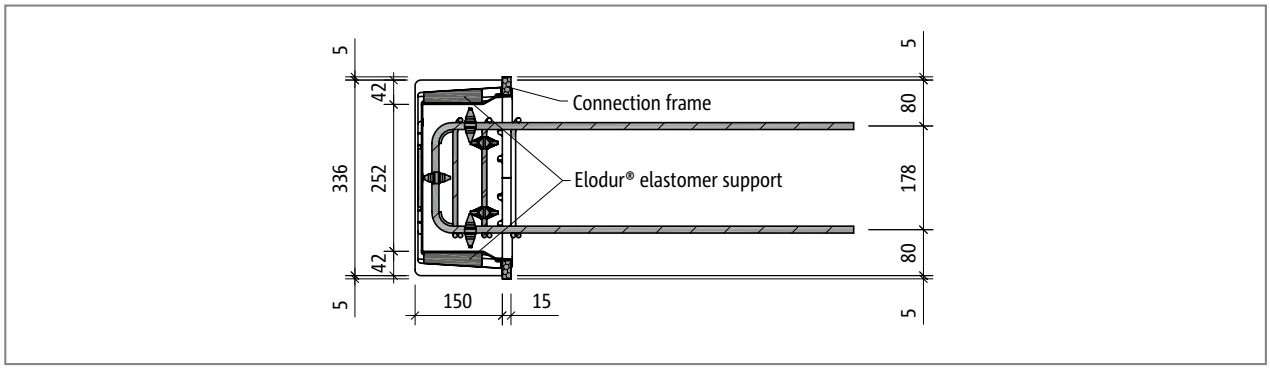


Fig. 122: Schöck Tronsole® type Z-VH+VH-T: Horizontal cross-section

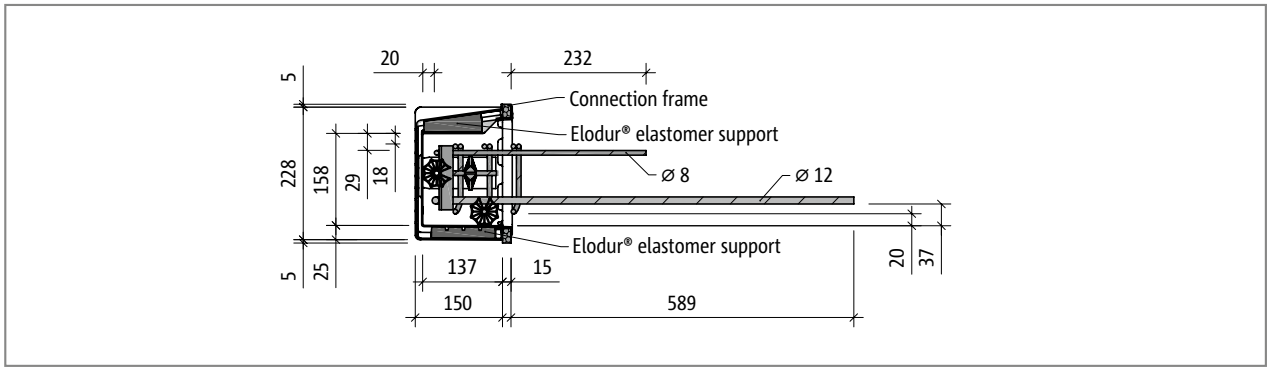


Fig. 123: Schöck Tronsole® type Z-V+V-T respectively type Z-VH+VH-T: Vertical cross-section

Z

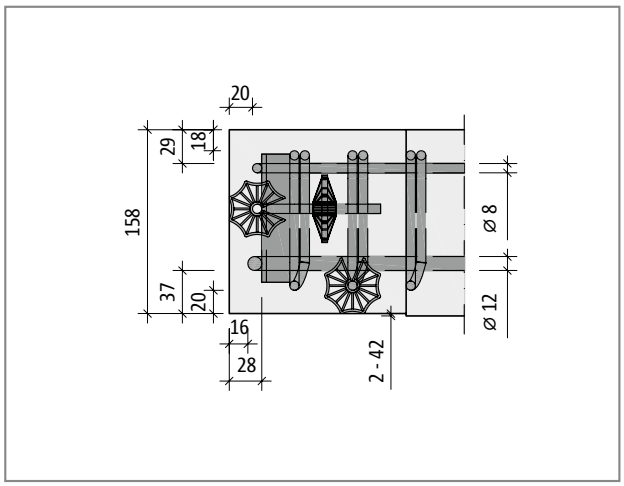


Fig. 124: Schöck Tronsole® type Z: Side view of a concrete landing with integrated load-bearing element

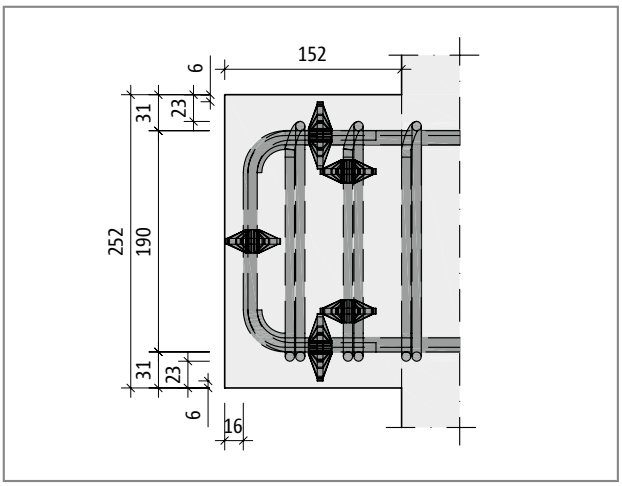


Fig. 125: Schöck Tronsole® type Z: Plan view of a concrete landing with integrated load-bearingelement

Product information

- The connecting frame of the wall element of the Tronsole® type Z is a plug-on type.

Design | On-site reinforcement

Schöck Tronsole® type	Z-V	Z-V+V	Z-VH+VH
Design values with	Concrete strength class ≥ C20/25		
$V_{Rd,z}$ [kN/element]	75.0	75,0/-15,0	75,0/-15,0
$V_{Rd,y}$ [kN/element]	-	-	±15.0

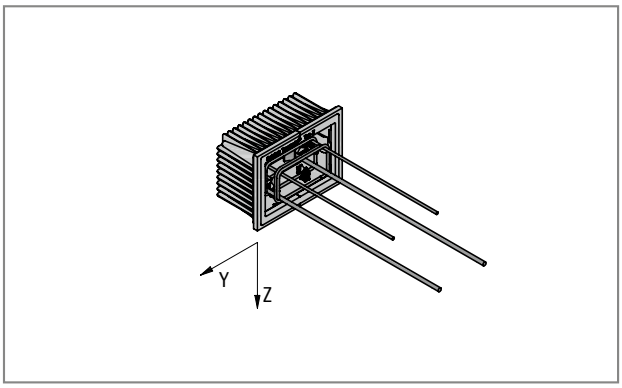


Fig. 126: Schöck Tronsole® type Z: Sign rule for the design

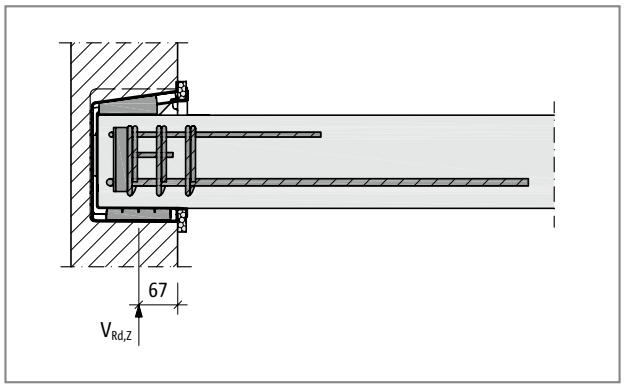


Fig. 127: Schöck Tronsole® type Z: Representation of the active line of the reaction force in the wall

Design

The reinforcement cage-like load-bearing element of the Schöck Tronsole® type Z is concreted into the landing and transmits shear forces to the staircase walls via the concrete corbel and the therefrom resultant offset moments.
For the bearing surface of the Tronsole®, with the maximum loading of 75 kN, at least the compression strength class 20 in combination with mortar group III (f_k = 6.0 N/mm²) is required as masonry. With lower compression strength classes a concrete pressure pad under the wall element can be used, with which the permitted pressing is maintained.
The positive shear force $V_{Ed,z}$ is transmitted via two Elodur® elastomer supports into the wall element of the Tronsole® type Z with a surface area of 110 mm × 80 mm.
A structural verification is to be produced for the reinforced concrete structural elements adjacent on both sides of the Schöck Isokorb®. The shear force resistance of the (landing) slab is to be verified. With a connection using Schöck Isokorb® type Z a freely rotatable support (moment joint) is to be assumed as static system.

Notes on design

- The stress impacting the masonry is calculated as follows: $\sigma_{Ed} = V_{Ed} / (2 \cdot 110 \cdot 80)$ mm². With the maximum utilisation of 75 kN σ is$_{Ed}$ = 4.26 N/mm².
- With the predefined concrete strengths h consider the minimum requirements based on the design.
- Exposure classs XC1 is assumed for the landing.
- According to DIN EN 1992-1-1 and DIN EN 1992-1-1/NA with exposure class XC1 the following nominal concrete cover results:
  In-situ concrete landing: c_{nom} = 20 mm.
  Prefabricated landing: c_{nom} = 15 mm.
- Using the load-bearing element with in-situ concrete the following applies for the concrete cover in the area of the corbel c_{nom} = 15 mm.
- The Schöck Tronsole® type Z supports under mainly static loading.
- Under both lower Elodur® elastomer supports of the Tronsole® type Z one can assume a uniform support pressing.
- The height offset between the lower edges of the landing and the concrete corbel is limited to a maximum 42 mm in order, in any case, to enable the formation of an overlap connection of the load-bearing element with the lower landing reinforcement.

On-site reinforcement

- The tensile reinforcement of the load-bearing element is to overlap with the on-site reinforcement in adjacent landing.
- With this the overlap length starts at the transition of the corbels for the landing.
- The free edges on the landing at both sides of the Tronsole® type Z are to be secured using ties.

Deflection

Deformation of the Elodur® elastomer support of the Tronsole® type Z

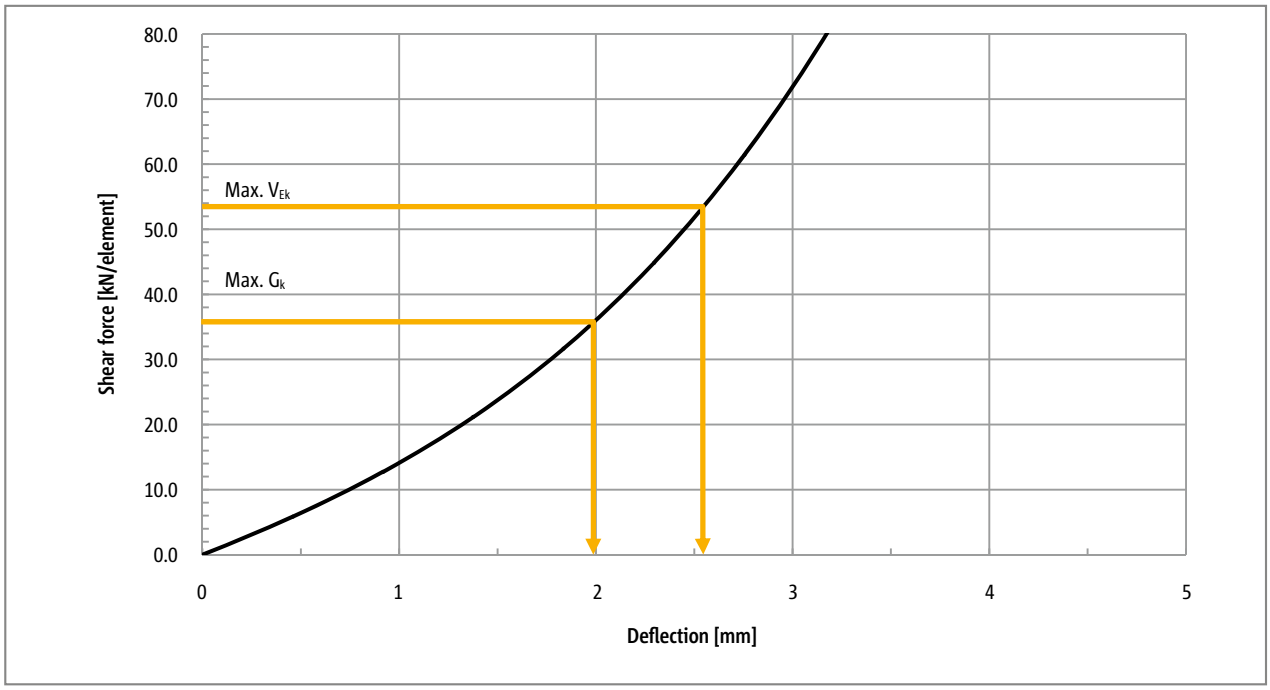


Fig. 128: Schöck Tronsole® type Z: Deformation of the Elodur® elastomer support

Notes on deformation

- With deflection, it is understood to be the vertical deformation of the Elodur® elastomer support under vertical shear force load.
- Max. V_{Ek} = Max. V_{Ed}/γ, whereby γ= 1.4
- γ = 1.4 applies under the assumption that Max. V_{Ed} is made up of two thirds from own weight and one third from live load.
- Thus Max. is V_{Ek} the maximum service load and the maximum own weight is Max. G_k = 2/3 · Max. V_{Ek}.

Precast construction

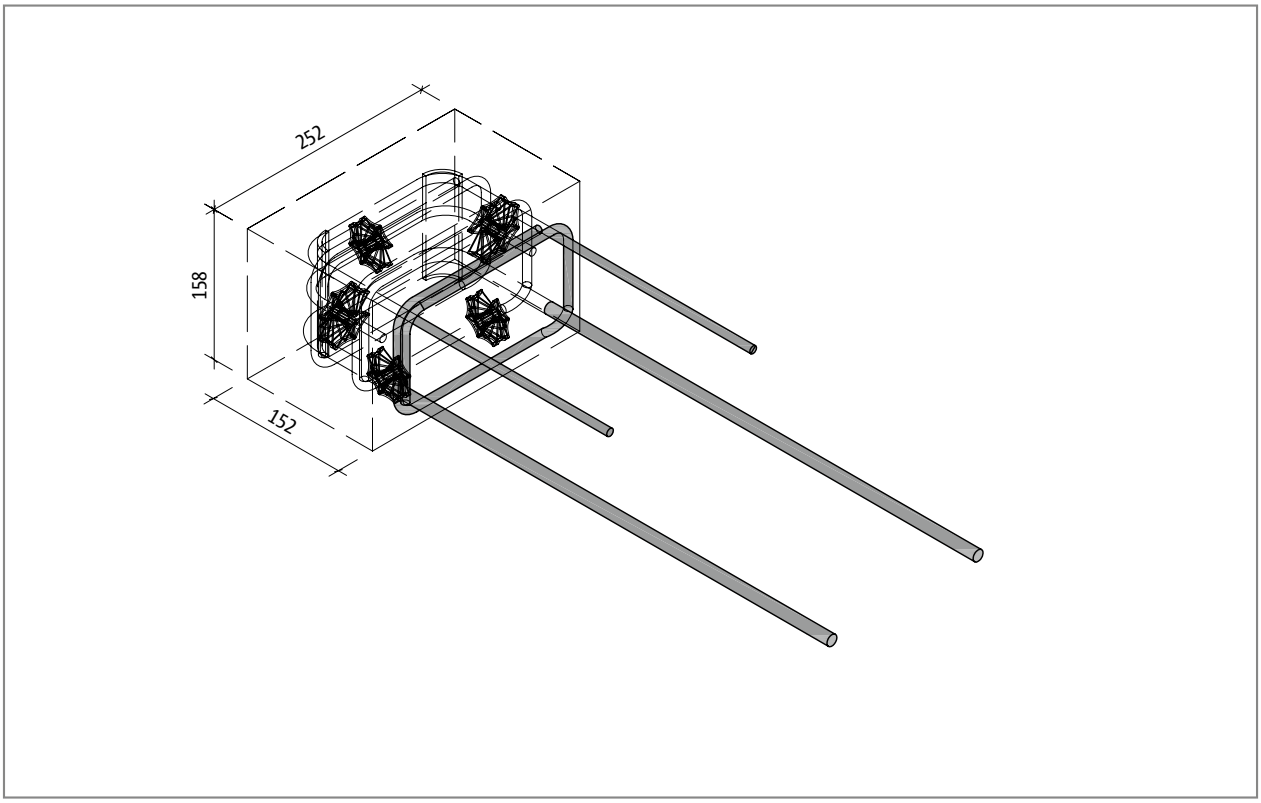


Fig. 129: Schöck Tronsole® type Z: Dimensions of the corbel support to be manufactured in the prefabrication plant

Precast part construction

- The limit deviations of the prefabricated support bracket for the acceptance of the wall element of the Tronsole® type Z are subject to the general tolerances according to DIN ISO 2768 - c.
- The corbel depth of 152 mm takes into account a 15 mm wide joint between wall and landing alongside the corbel brackets.
- With negative fabrication of landings using the load-bearing element of the Tronsole® type Z on-site spacers are required in order to achieve the necessary concrete cover on the concrete corbel.
- With the installing of the staircase the height of the stairs, if required, is to be adjusted using pressure-resistant compensating plates under the wall element. The complete support surface of the wall element must be underlaid flush with the compensating plates.

Fire protection configuration | Materials

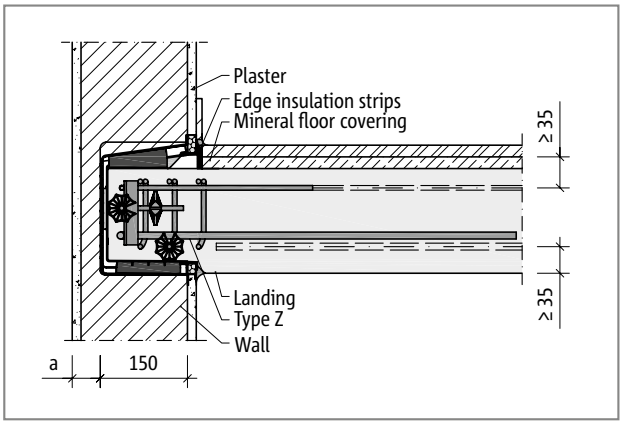


Fig. 130: Schöck Tronsole® type Z: Fire protection configuration

Fire protection

According to DIN 4102-4, Table 5, joints between the structural components ≤ 30 mm are not taken into account. The structural component surfaces of the landing in the area of the neighbouring wall are considered as not flame treated as the corbel support with the staircase wall thermotechnically forms one unit

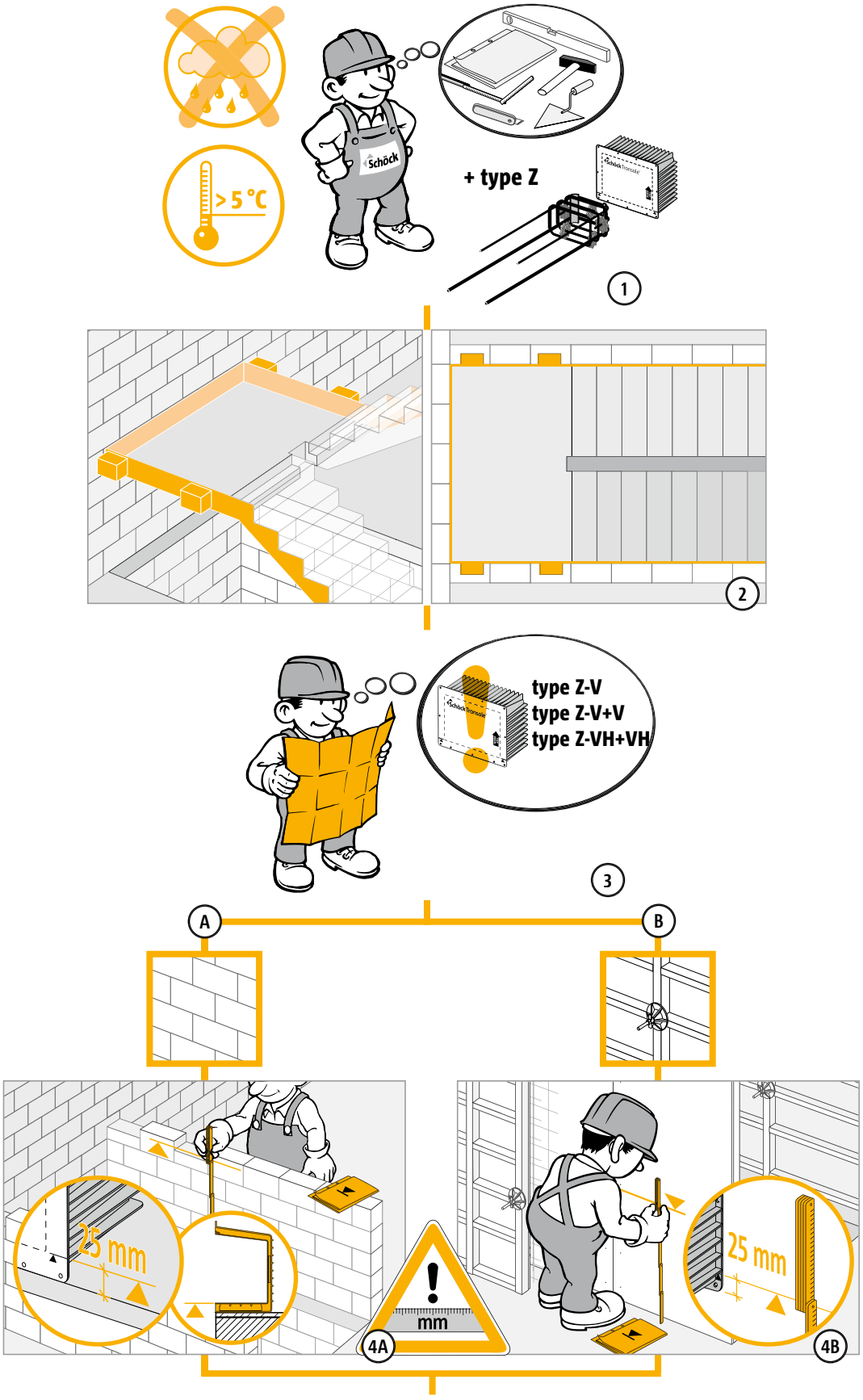
Fire protection

- A minimum spacing u = 35 mm of the lower load-bearing reinforcement, with load-bearing elements of the Tronsole® type Z with $c_{v,l} \geq 37 + 12/2 = 43$ mm, is met.
- The neighbouring structural elements must satisfy the same building supervisory requirements on the fire resistance capability as the connection area itself.
- For fire protection dimensioning of the reinforced concrete slabs DIN EN 1992-1-2 together with DIN EN 1992-1-2/NA is to be applied.
- The fire protection classification of the staircase wall is not disturbed by the wall element if a backing of at least 40 mm masonry blocks (a ≥ 40 mm) is carried out. A mineral render may be added to the thickness.

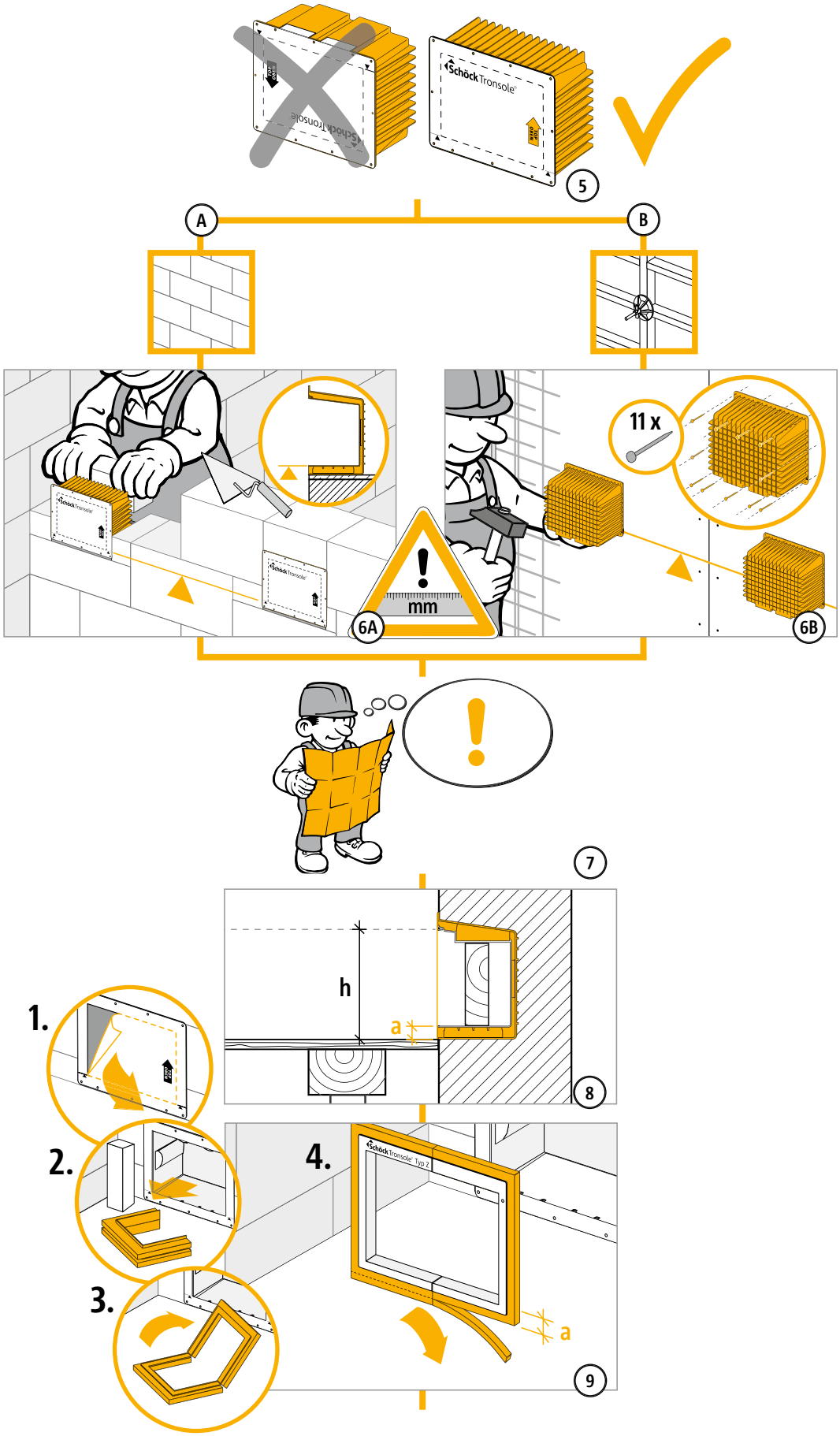
Materials and construction materials

Schöck Tronsole® type Z	Material
External box	Polystyrene
Internal box	Polystyrene
PE foam insert	PE foam according to DIN EN 14313
Hinged plastic profile	ABS according to DIN EN ISO 2580-1
Connection frame	PE foam according to DIN EN 14313
Elastomer support	Polyurethane according to DIN EN 13165
Reinforcement of the load-bearing element	Reinforcing steel B500B according to DIN 488-1
Bending form segment	S 235 JR

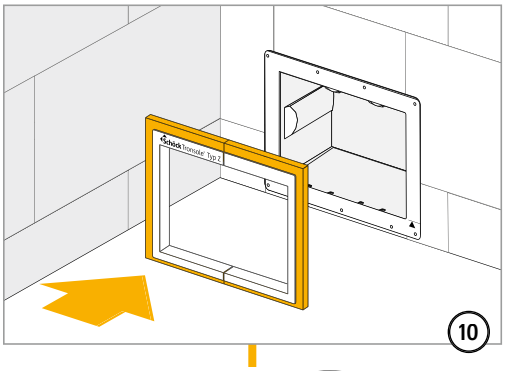
Installation instructions building site in-situ concrete

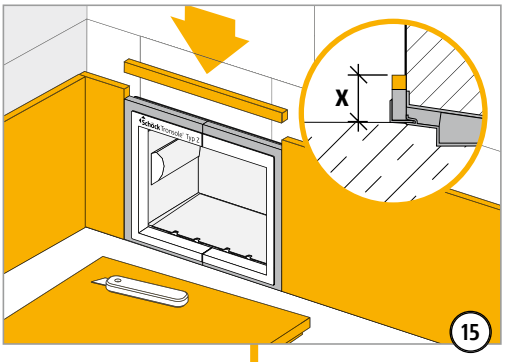


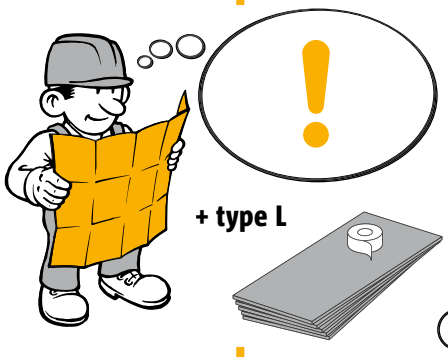
Installation instructions building site in-situ concrete

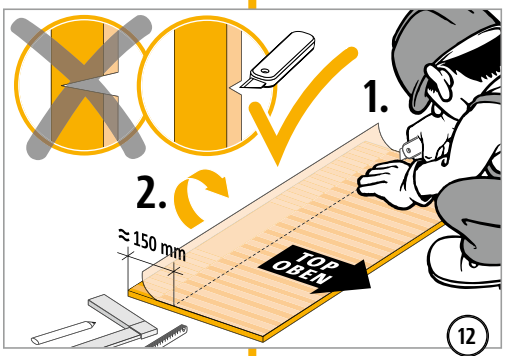


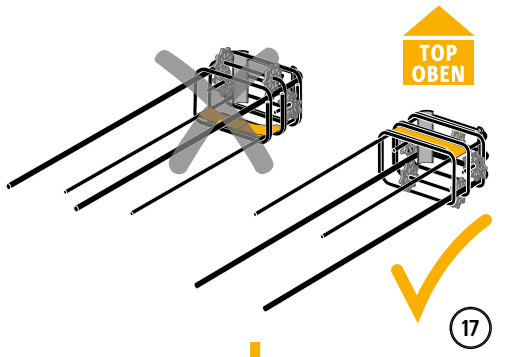
Installation instructions building site in-situ concrete

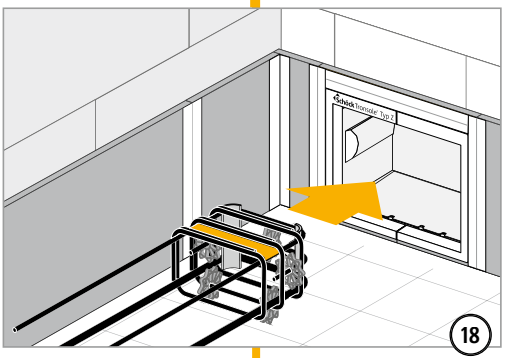


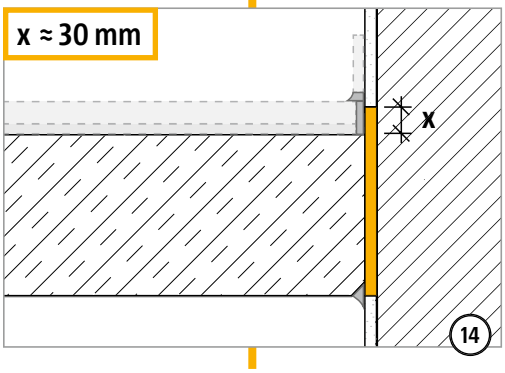


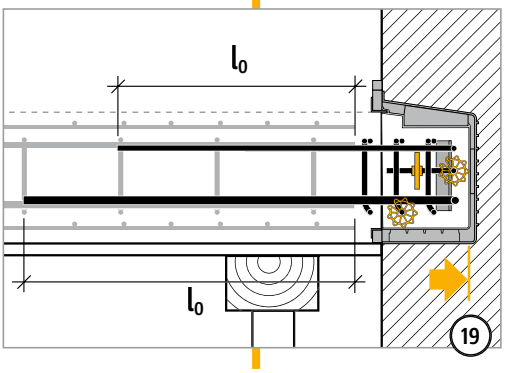




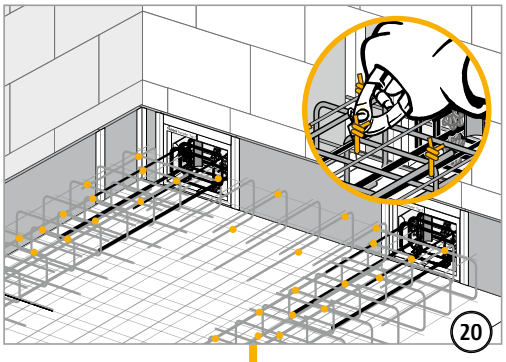


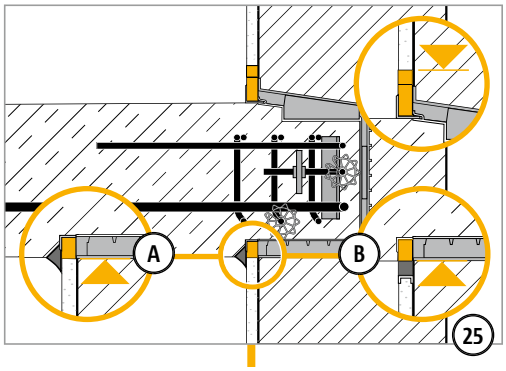


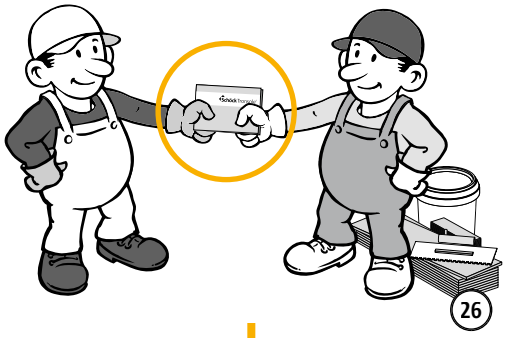


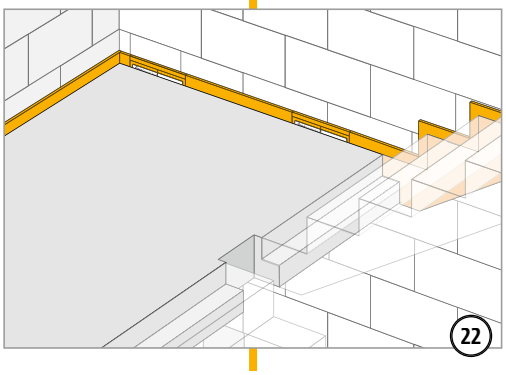


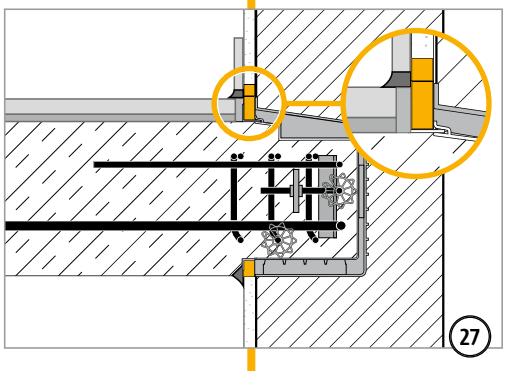
Installation instructions building site in-situ concrete

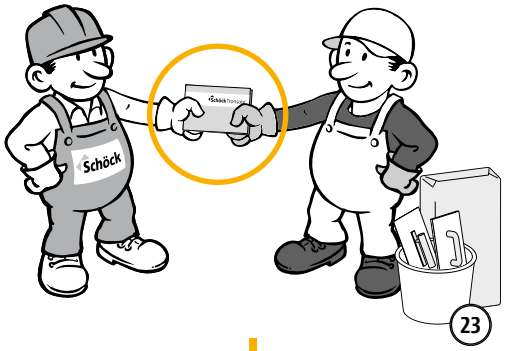


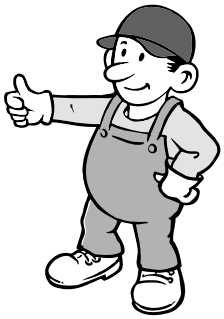


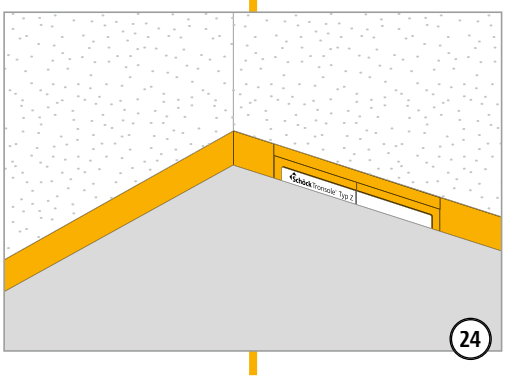




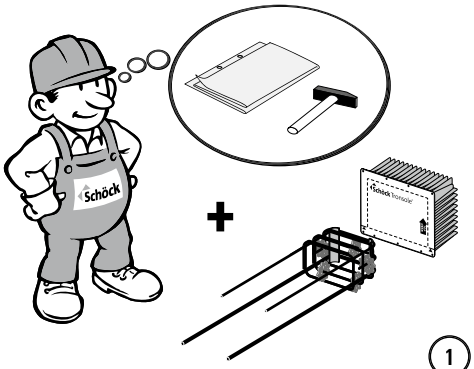








Installation instructions for prefabricating plant



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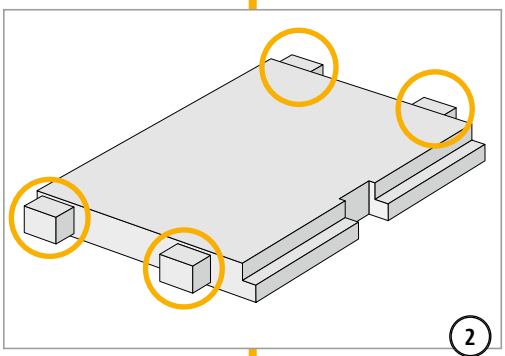

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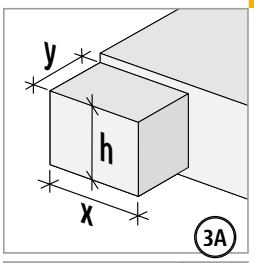

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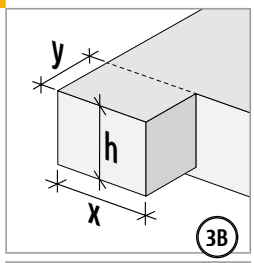

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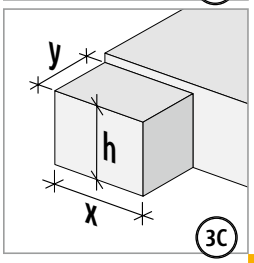

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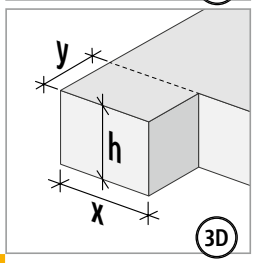
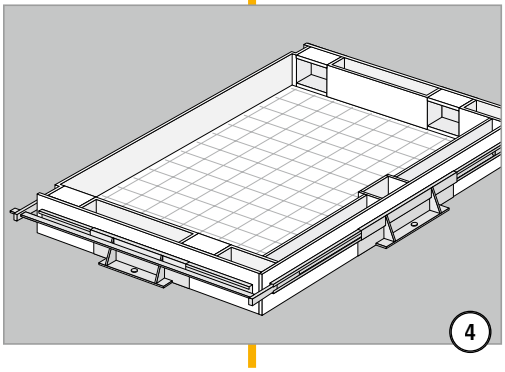


3D

h = 158 mm
x = 252 mm
y = 152 mm



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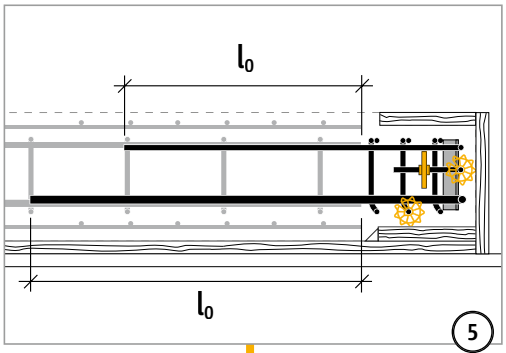

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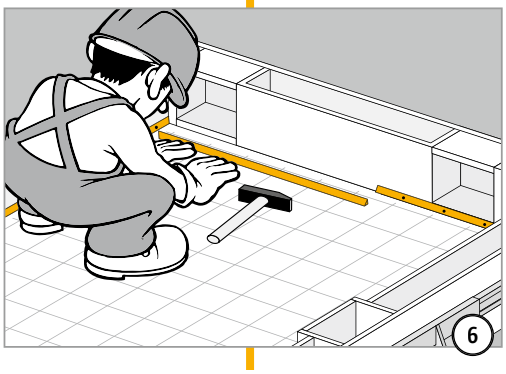

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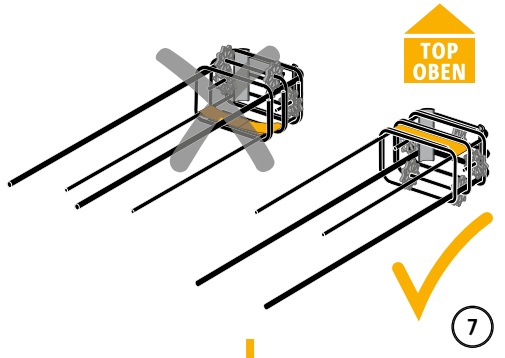

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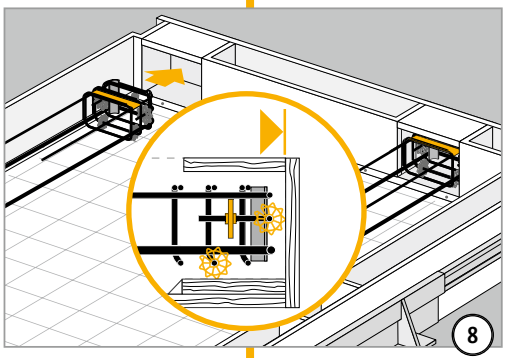

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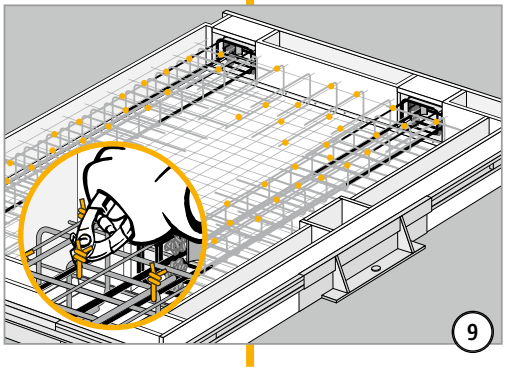

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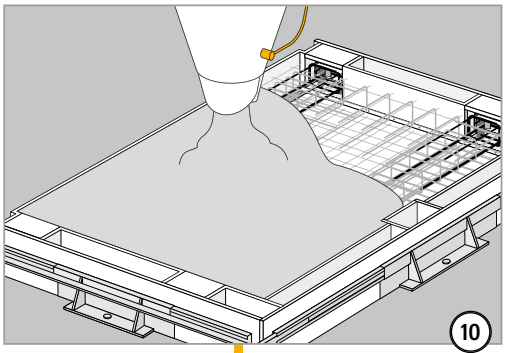
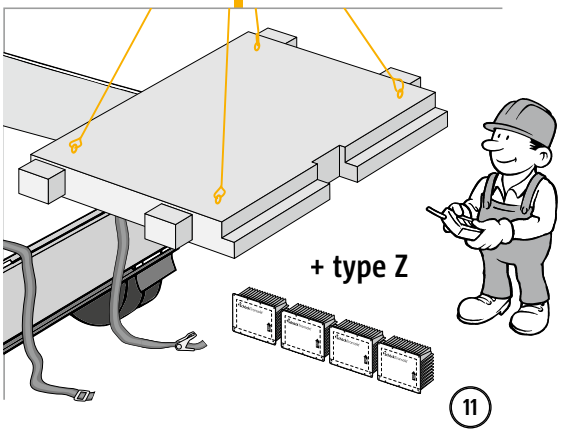
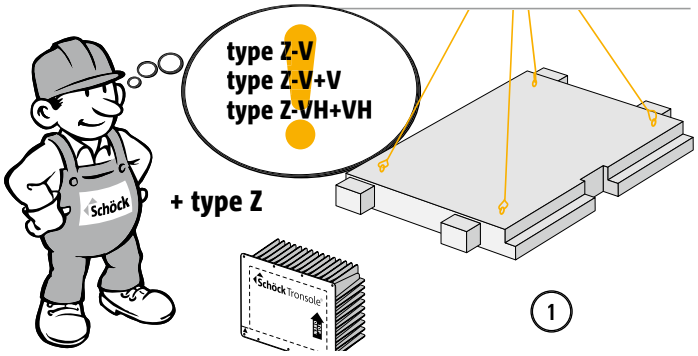
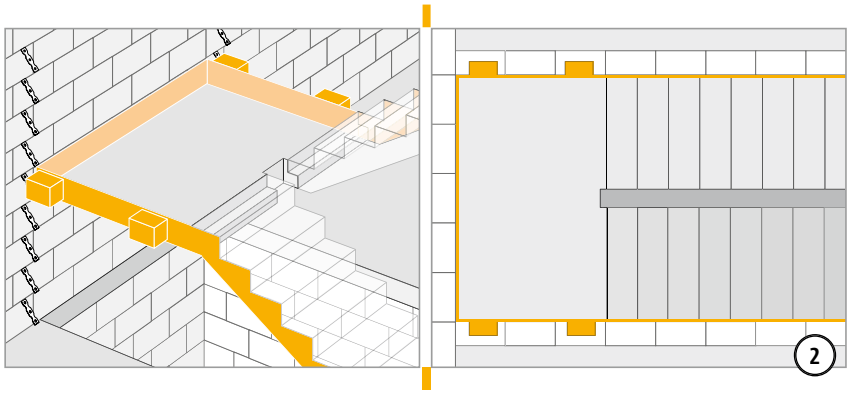
Installation instructions for prefabricating plant

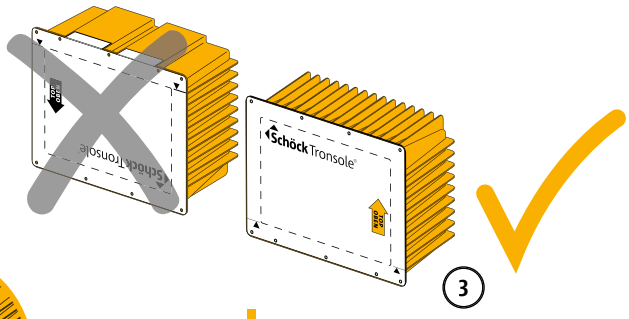


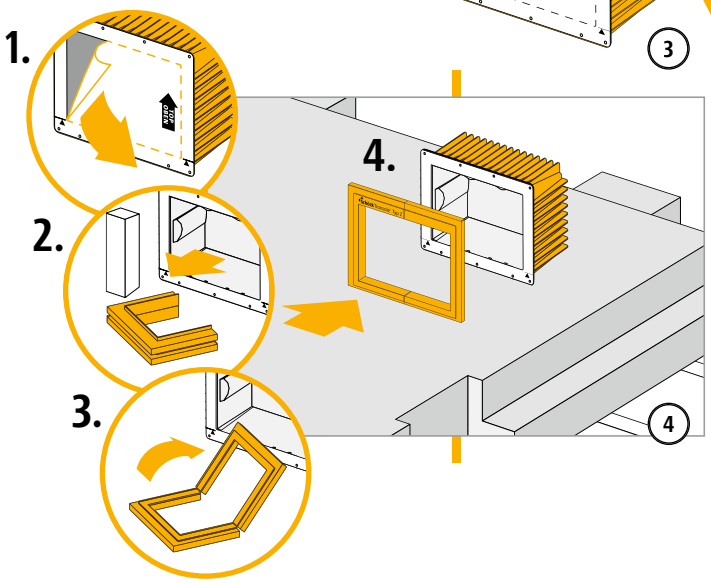


Installation instructions building site precast components









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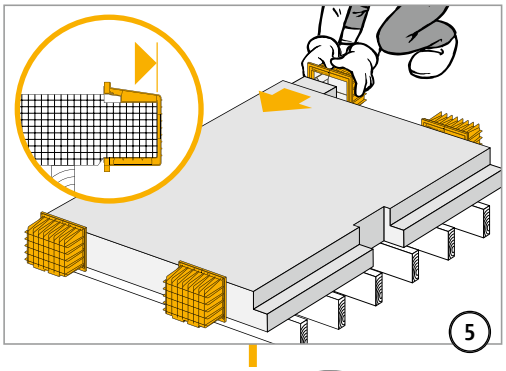
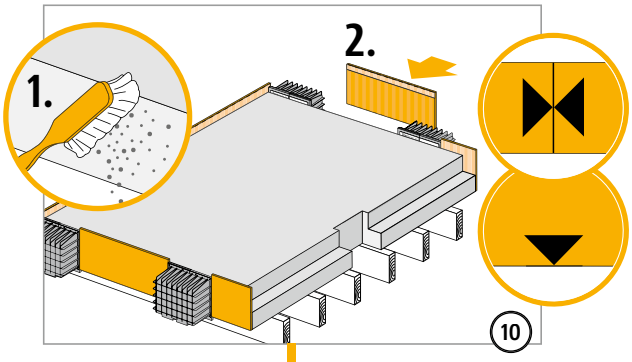
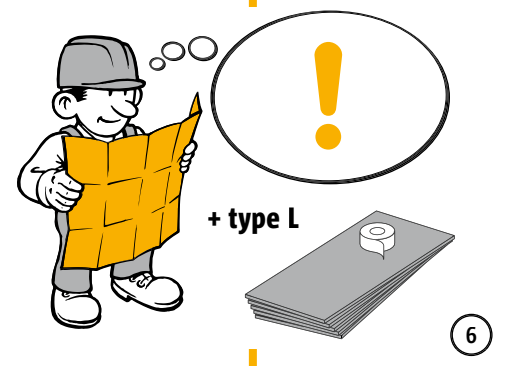
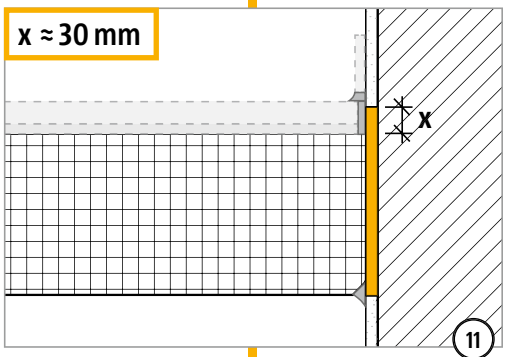
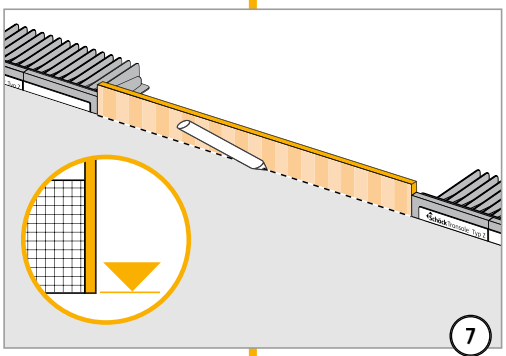
Installation instructions building site precast components

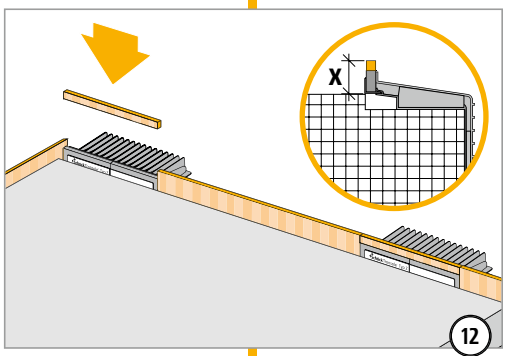


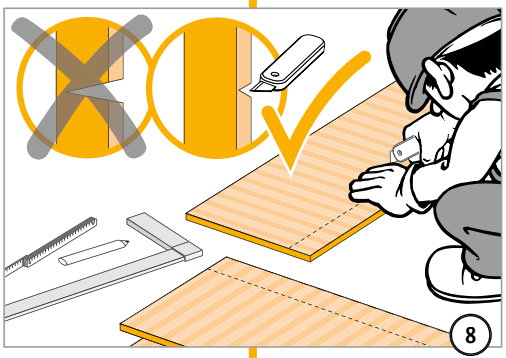


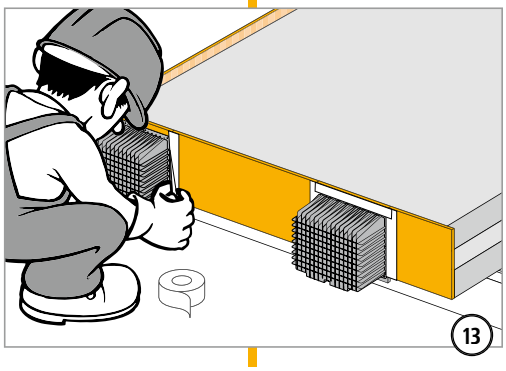


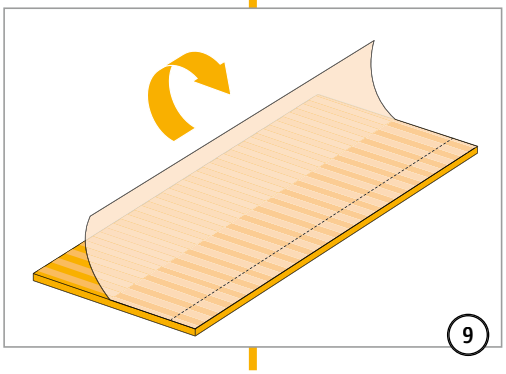


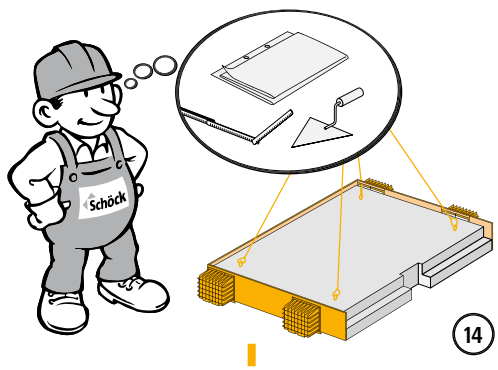




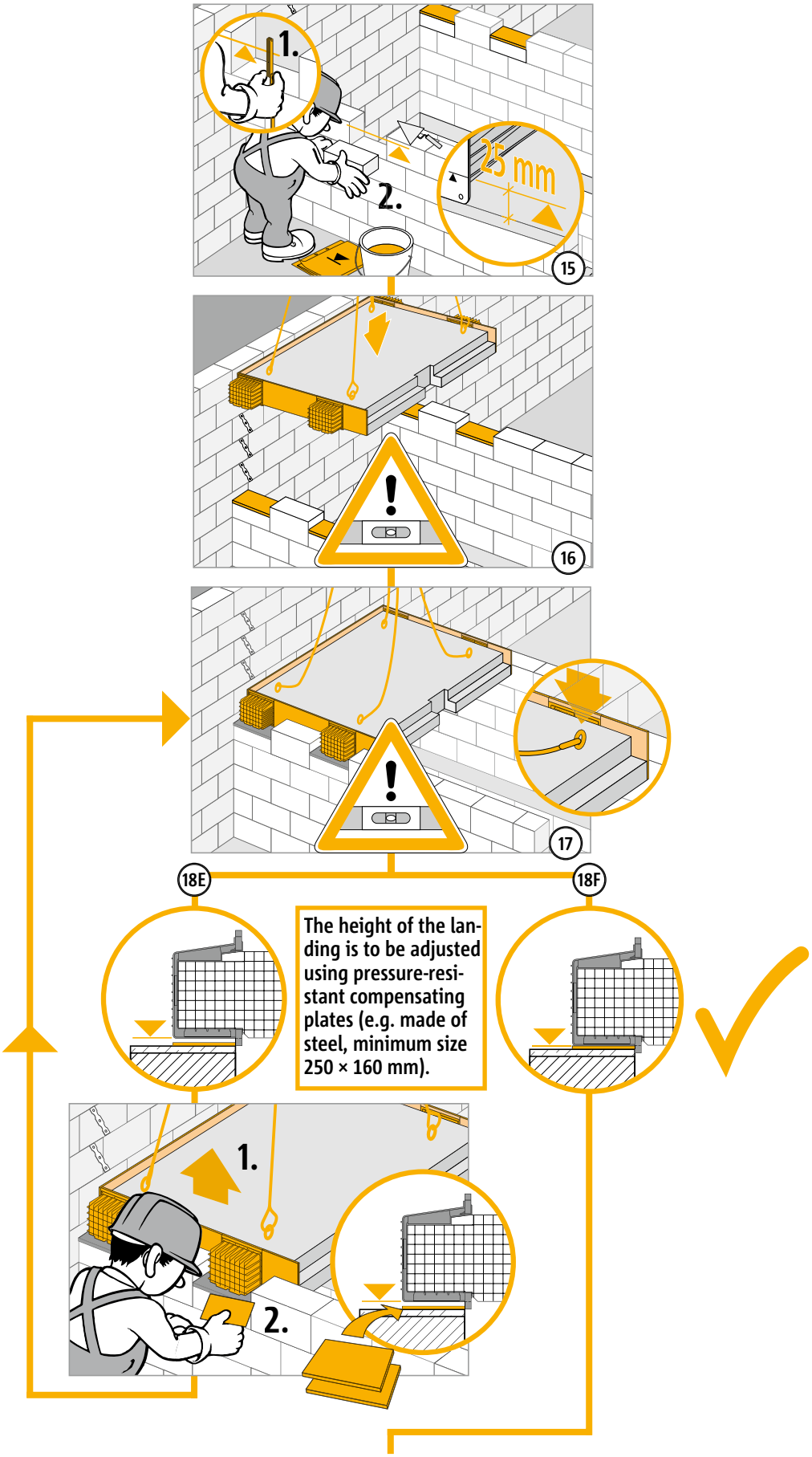




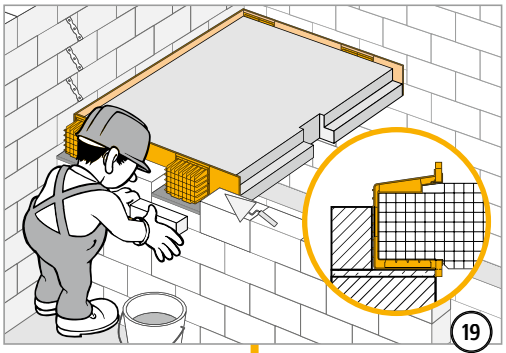


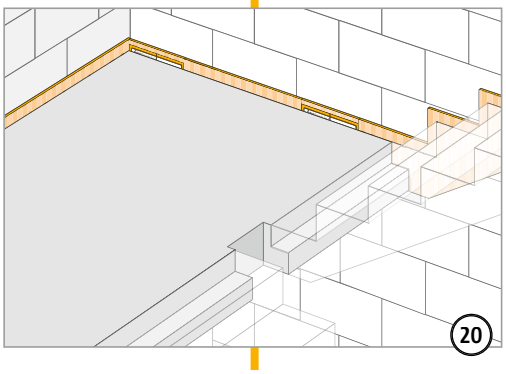


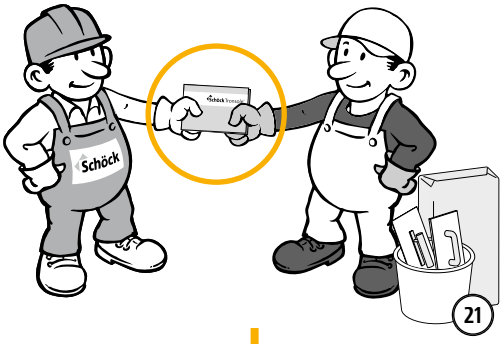
Installation instructions building site precast components

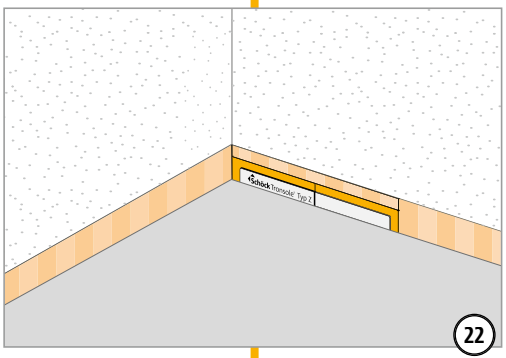


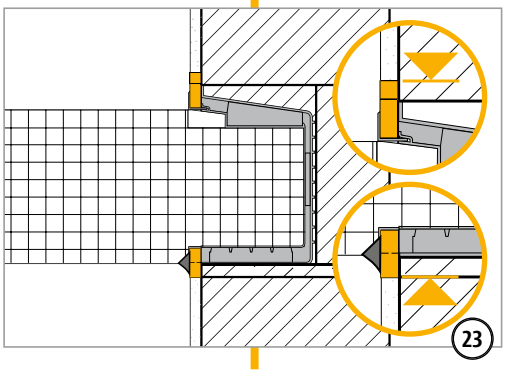
Installation instructions building site precast components

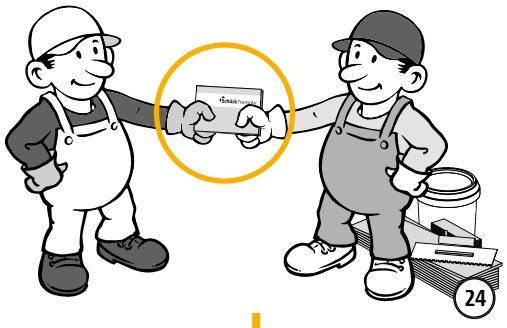


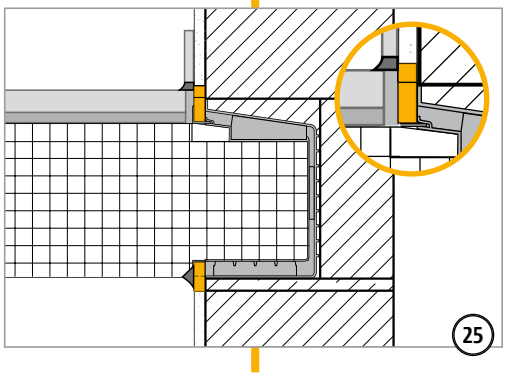












Z

Check list

- ☐ Is the geometry of the structural component to be sound insulated matched to the measurements of the Schöck Tronsole® type Z?
- ☐ Have the effects on the Schöck Isokorb® connection been specified at design level?
- ☐ Is the minimum concrete strength ≥ C20/25 taken into account with the use of the load-bearing element of the Schöck Tronsole® type Z?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ With the use of the Schöck Tronsole® type Z and concurrent fire protection requirements on the room closure is a minimum wall width (including exterior rendering) of 160 mm met?
- ☐ With V_{Ed} at the slab edge of the landing, is the limiting value of the slab load-bearing capacity checked?
- ☐ Are planned existing horizontal loads resp. lifting forces, which can be conducted away via the Schöck Tronsole® type Z, taken into account?

Schöck Tronsole® type B with type D

Schöck Tronsole® type B with Tronsole® type D
The Schöck Tronsole® type B serves the sound insulation of stair flight and floor slab. Tronsole® type D can be employed for structural positional security. The stair flight can be manufactured for both in-situ concrete as well as in precast construction.

Product characteristics | Product design

Product characteristics Tronsole® type B

- Impact sound pressure level difference $\Delta L^*_{n,w} \leq 30$ dB with type B-V2; $\Delta L^*_{n,w} \geq 32$ dB with type B-V1, tested according to DIN 7396; Test reports Nos. 91386-04 to 91386-06;
- High quality and efficient Elodur® elastomer support for linear connection
- Firm attachment to prefabricated stair flight using adhesive assembly tape
- High quality and easily cut PE foam panel

Product characteristics Tronsole® type D

- Influence on the impact soundproofing is already contained in the acoustic characteristic value of type B
- Dowel for structural positional security between stair flight and floor slab
- Made of high-quality stainless steel with elastomer cap.
- Optional installation sleeve

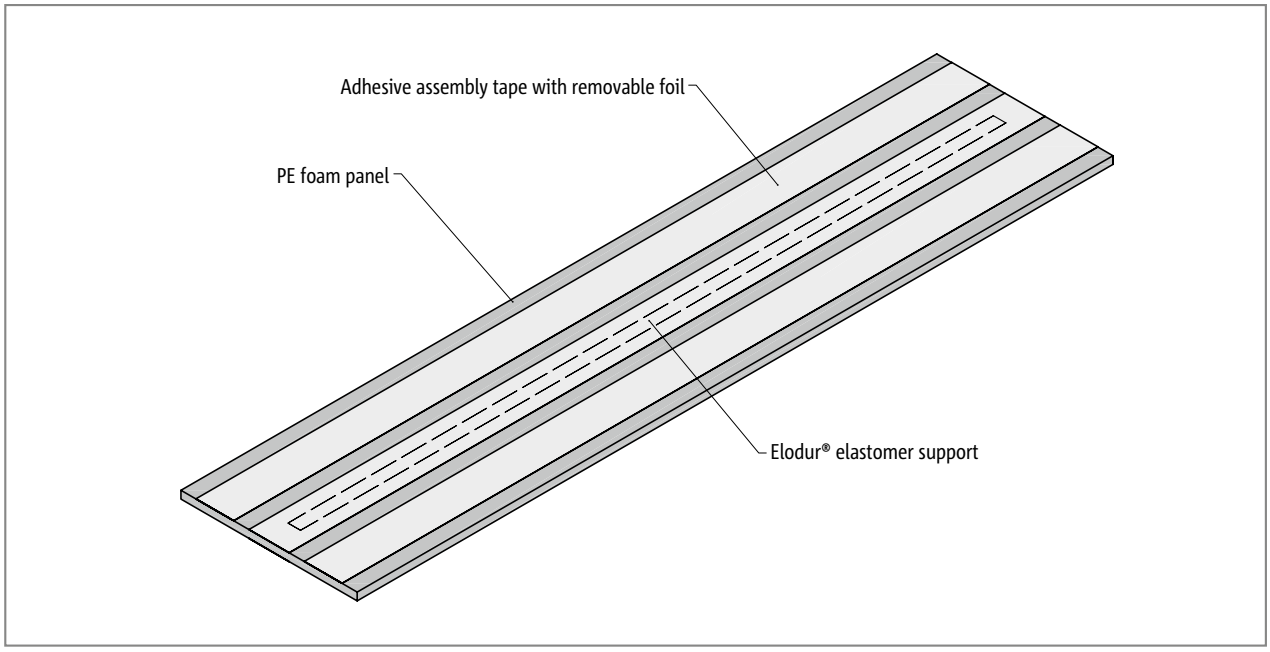


Fig. 131: Schöck Tronsole® type B

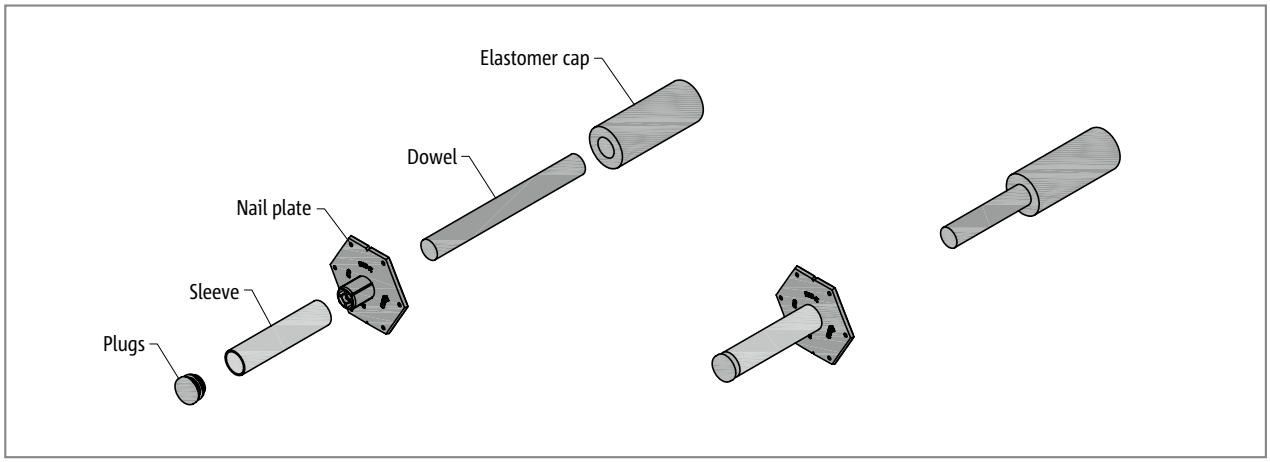


Fig. 132: Schöck Tronsole® type D-H:

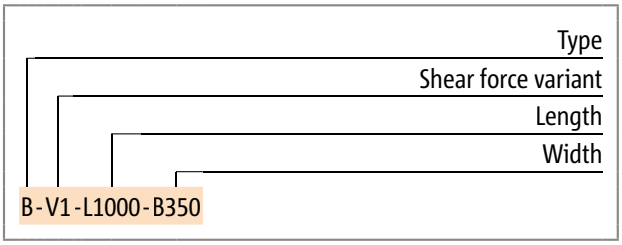
Product selection | Type designations | Special designs

Schöck Tronsole® type B Variants

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

- Shear force load-bearing level:
  Type B-V1, shear force load-bearing level 1, elastomer support width b = 25 mm
  Type B-V2, shear force load-bearing level 2, elastomer support width b = 35 mm
  Type BS-V3, shear force load-bearing level 3, elastomer support width b = 2 x 25 mm (special type on request)
- Length:
  Type B-V1: L = 1000 mm, 1100 mm, 1200 mm, 1300 mm and 1500 mm
  Type B-V2: L = 1000 mm, 1100 mm, 1200 mm and 1500 mm
- Width:
  Type B Width: B = 350 mm and 600 mm

Type designation in planning documents

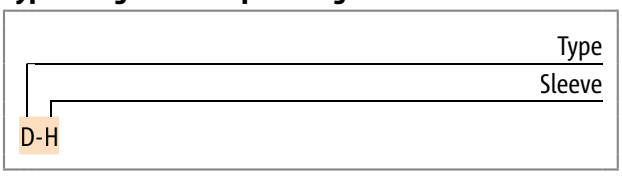


Schöck Tronsole® type D variants

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

- Sleeve:
  Schöck Tronsole® type D is offered optionally with a sleeve.:

Type designation in planning documents



Special designs

The Schöck Tronsole® type B can be cut to length on site. Furthermore, the special dimensions of the Tronsole®, which differ from the standard product variants presented in the information, can be requested from Schöck Application Technology.

Installation cross section

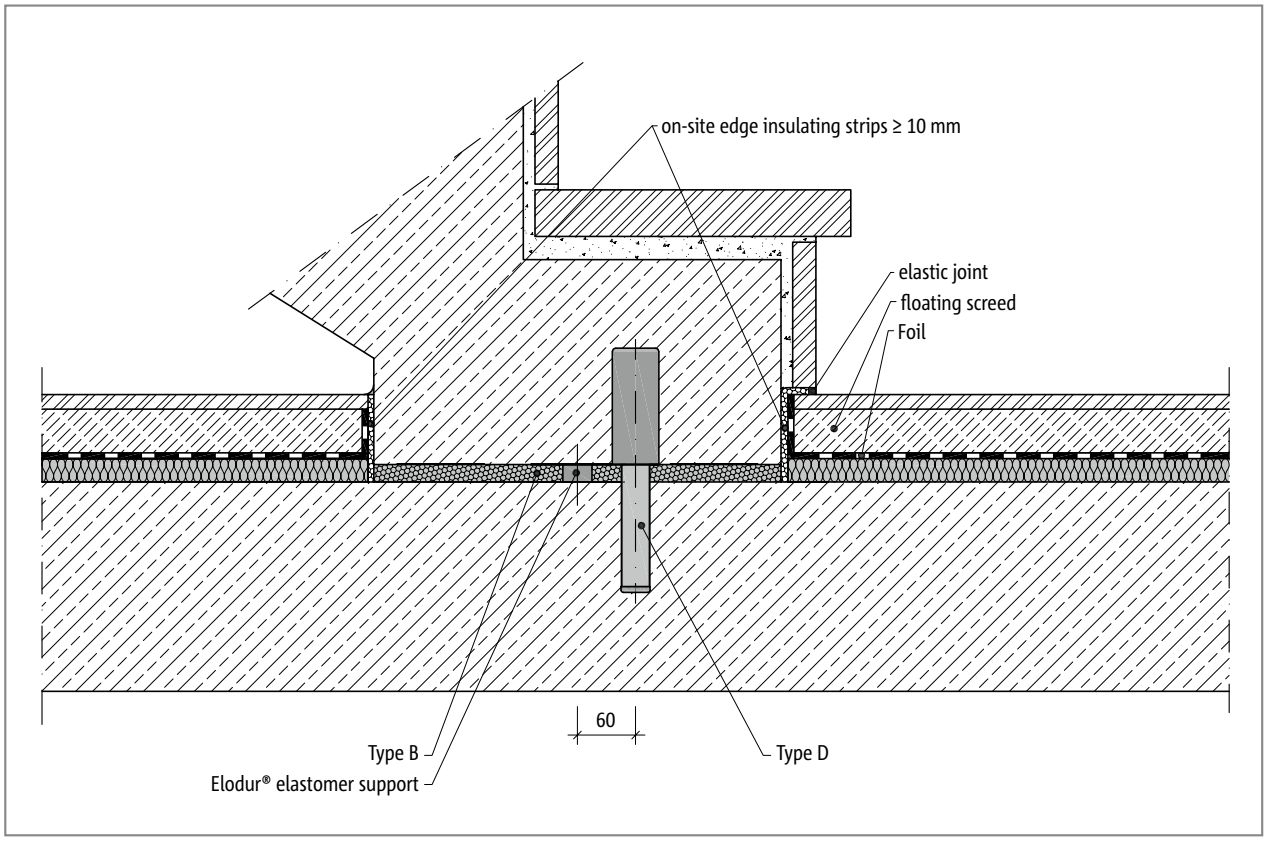


Fig. 133: Schöck Tronsole®Type B + type D: Installation cross-section

Element arrangement

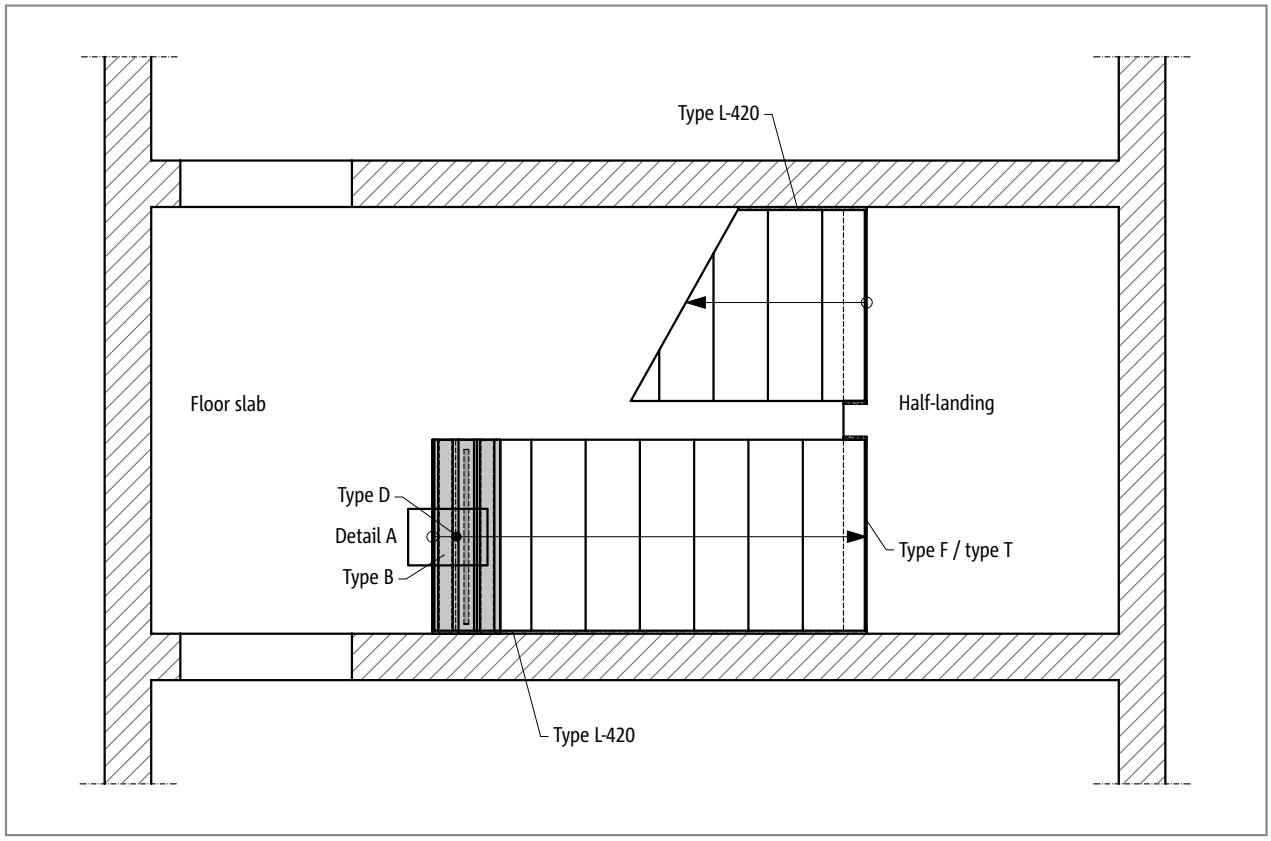


Fig. 134: Schöck Tronsole®Type B + type D: Element configuration in plan view

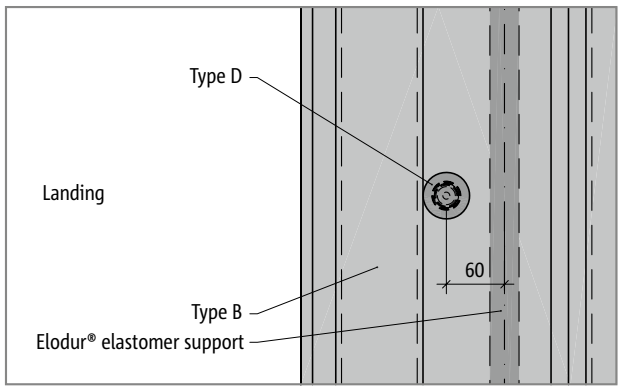


Fig. 135: Schöck Tronsole®Type B + type D: Detail A

Element arrangement

- The given acoustic insulation values apply in combination with the Tronsole® type L-420 or with a sufficiently wide air joint (50 mm).
- The use of the Schöck Tronsole® type T or with corbel formation using Type F is suitable for the sound insulation of stair flight and landing/ floor slab. The Tronsole® type F, T and B can be combined on a stair flight.
- The Schöck Tronsole® type D offers structural positional security of the bottom of the stairs. It is combined with the Schöck Tronsole® type B.

Product description

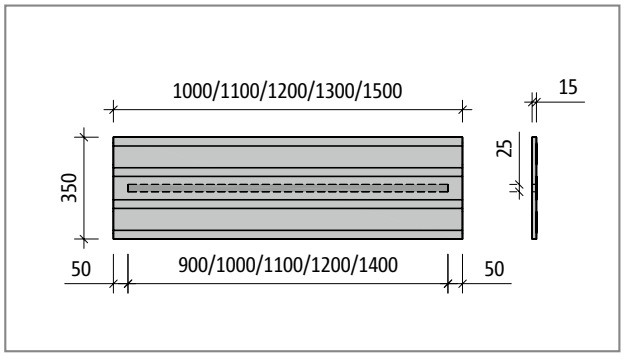


Fig. 136: Schöck Tronsole® type B-V1-L...-B350: Product layout

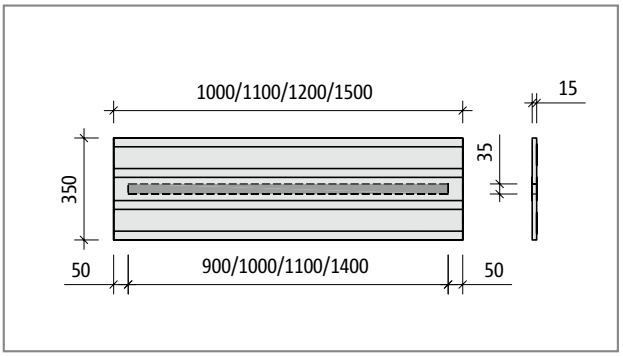


Fig. 137: Schöck Tronsole® type B-V2-L...-B350: Product layout

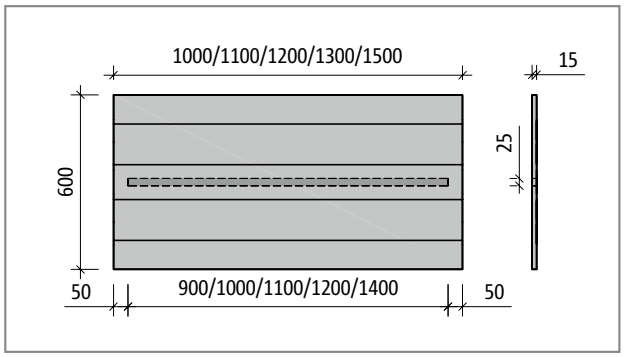


Fig. 138: Schöck Tronsole® type B-V1-L...-B600: Product layout

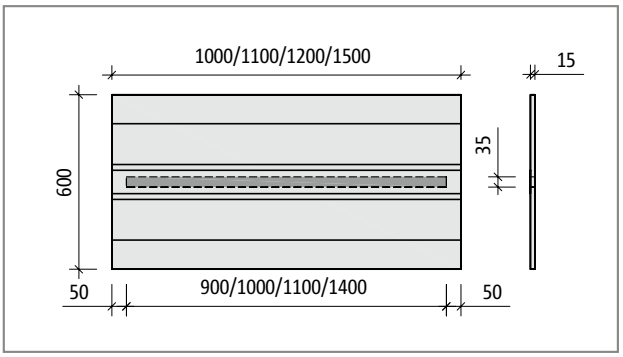


Fig. 139: Schöck Tronsole® type B-V2-L...-B600: Product layout

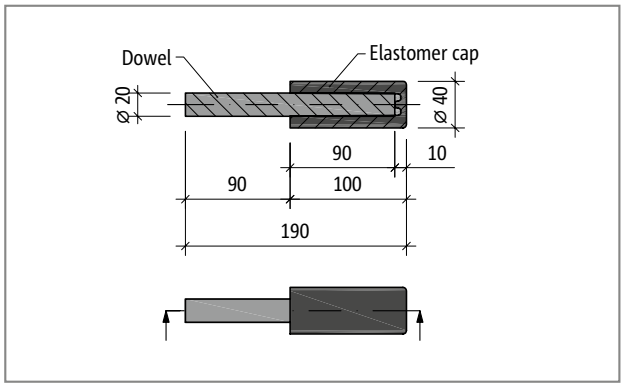


Fig. 140: Schöck Tronsole® type D: Product layout

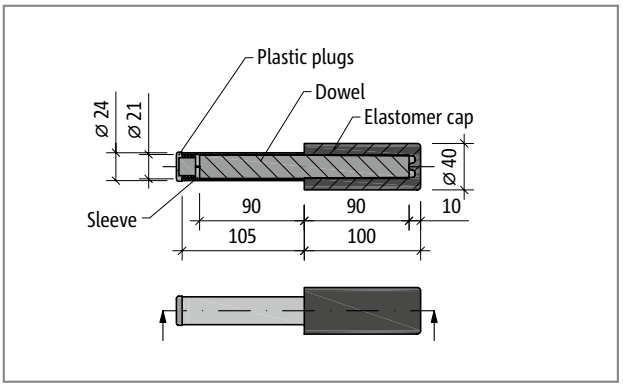


Fig. 141: Schöck Tronsole® type D-H: Product layout

Design

Design table

Schöck Tronsole® type	B-V1	B-V2
$v_{Rd,z}$ [kN/m]	42.4	59.3
$v_{Rd,x}$ [kN/m]	±3.8	±3.8
$v_{Rd,y}$ [kN/m]	±3.8	±3.8

Schöck Tronsole® type	B-V1	B-V2
Tronsole® length L [mm]	1000, 1100, 1200, 1300, 1500	1000, 1100, 1200, 1500
Tronsole® Thickness [mm]	15	
Elodur® elastomer support, length L_E [mm]	L - 100	
Elodur® elastomer support, thickness [mm]	15	
Elodur® elastomer support, width [mm]	25	35

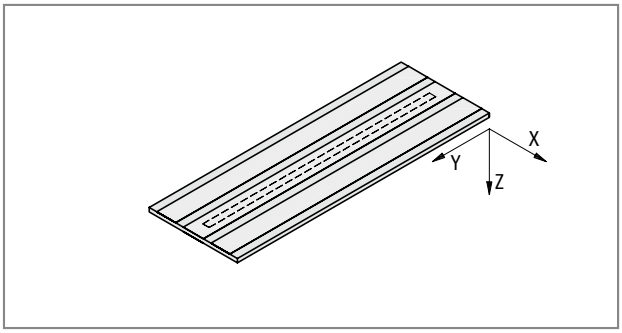


Fig. 142: Schöck Tronsole® type B: Sign rule for the design

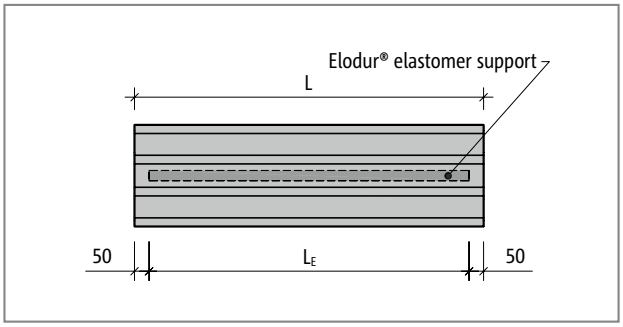


Fig. 143: Schöck Tronsole® type B Representation of lengths L and L_E; the length of the Elodur® elastomer support is always 10 cm shorter than the length of the Tronsole®.

Notes on design

- The Elodur® elastomer support serves exclusively for the transmission of vertical forces and small horizontal forces.
- The PE foam panel of the Tronsole® type B, with correct installation, specifies the central position of the Elodur® elastomer support. The adherence to this position prepares the basis for the design.

On-site reinforcement

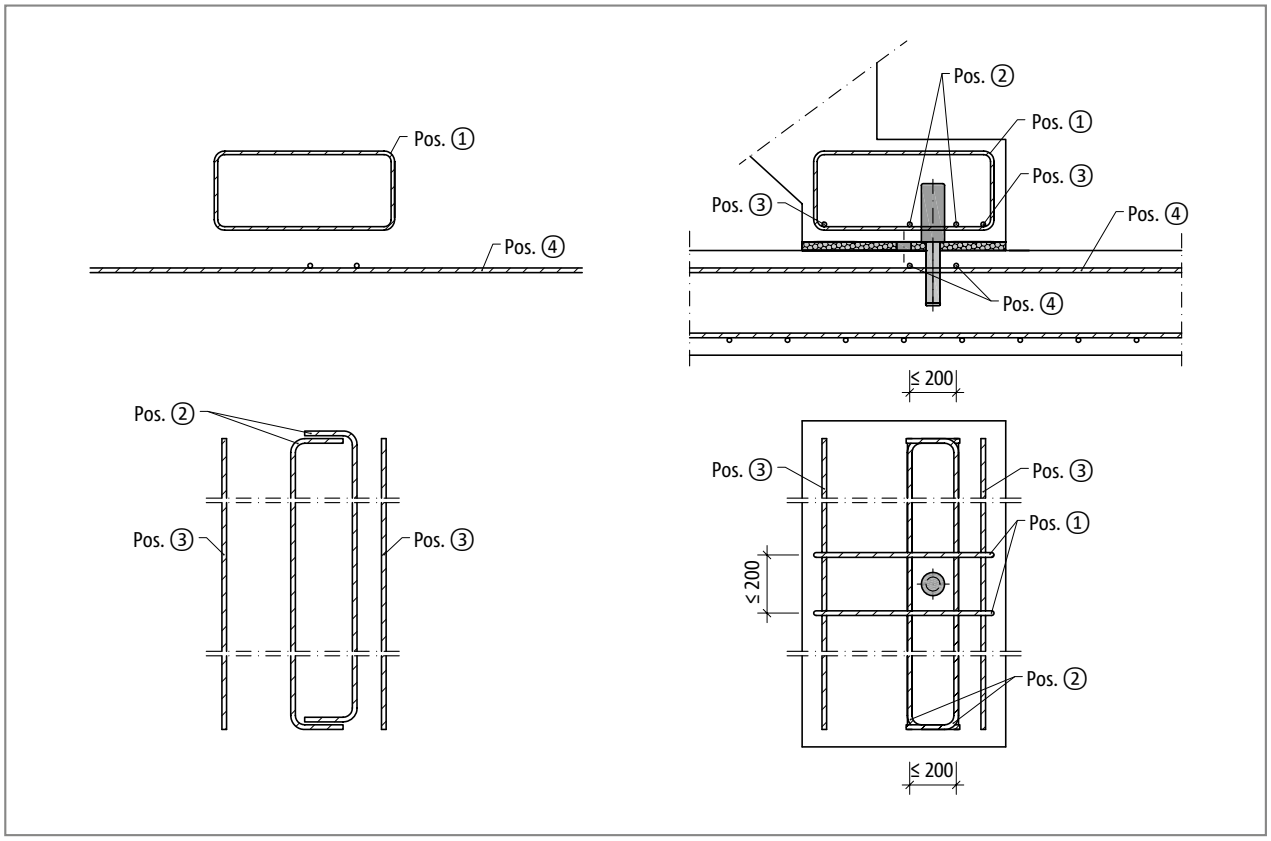


Fig. 144: Schöck Tronsole® type D: On-site reinforcement

Schöck Tronsole® type		D
On-site reinforcement	**Location**	**Exposure class XC1, concrete strength ≥ C25/30**
Pos. 1 closed stirrup		
Pos. 1	on the stair side	2 • H8
Pos. 2 Transverse reinforcement with end hooks on both sides		
Pos. 2	on the stair side	2 • H8
Pos. 3 steel rods in transverse direction of the stairs		
Pos. 3	on the stair side	2 • H8
Pos. 4 Bar steel parallel and transverse to the stair flight		
Pos. 4	Floor slab, above	2 • 2 • H8

On-site reinforcement

- The on-site reinforcement Pos. 1, Pos. 2. as well as Pos. 4 are to be arranged respectively in pairs around the Tronsole® type D. In the layout the separation of the stirrup resp. bar of an item should be maximum 200 mm.
- An existing upper slab reinforcement can be added to Pos. 4.

Deflection | Fire protection

Deformation of the Elodur® elastomer support of the Tronsole® type B-V1

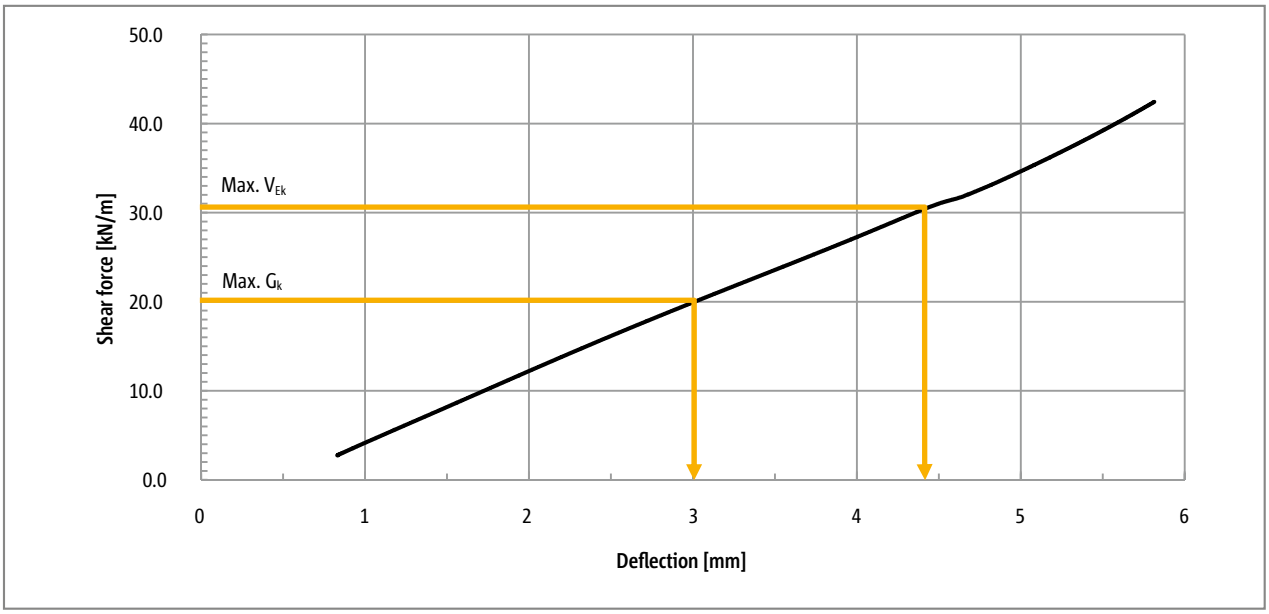


Fig. 145: Schöck Tronsole® type B-V1: Deformation of the Elodur® elastomer support

Deformation of the Elodur® elastomer support of the Tronsole® type B-V2

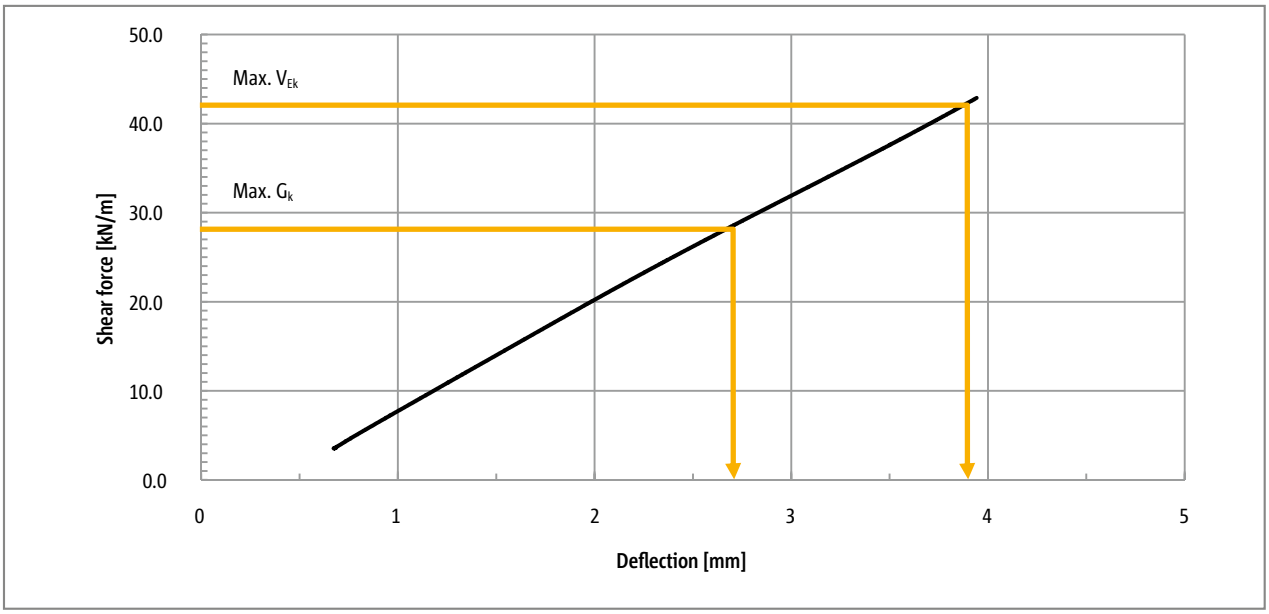


Fig. 146: Schöck Tronsole® type B-V2: Deformation of the Elodur® elastomer support

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 .
- Max. V_{Ek} = Max. V_{Ed}/γ, whereby $\gamma = 1.4$
- $\gamma = 1.4$ applies under the assumption that Max. V_{Ed} is made up of two thirds from own weight and one third from live load.
- Thus Max. is V_{Ek} the maximum service load and the maximum own weight is Max. $G_k = 2/3 \cdot$ Max. V_{Ek}.

Fire protection

With the Tronsole® type D one is concerned with a static, non-relevant impact soundproofing element. Therefore the fire resistance class relates to the surrounding reinforced concrete components.

Fire protection

- The Tronsole® type B conforms with building materials class B2 according to DIN 4102.

Materials | Installation

Materials and construction materials

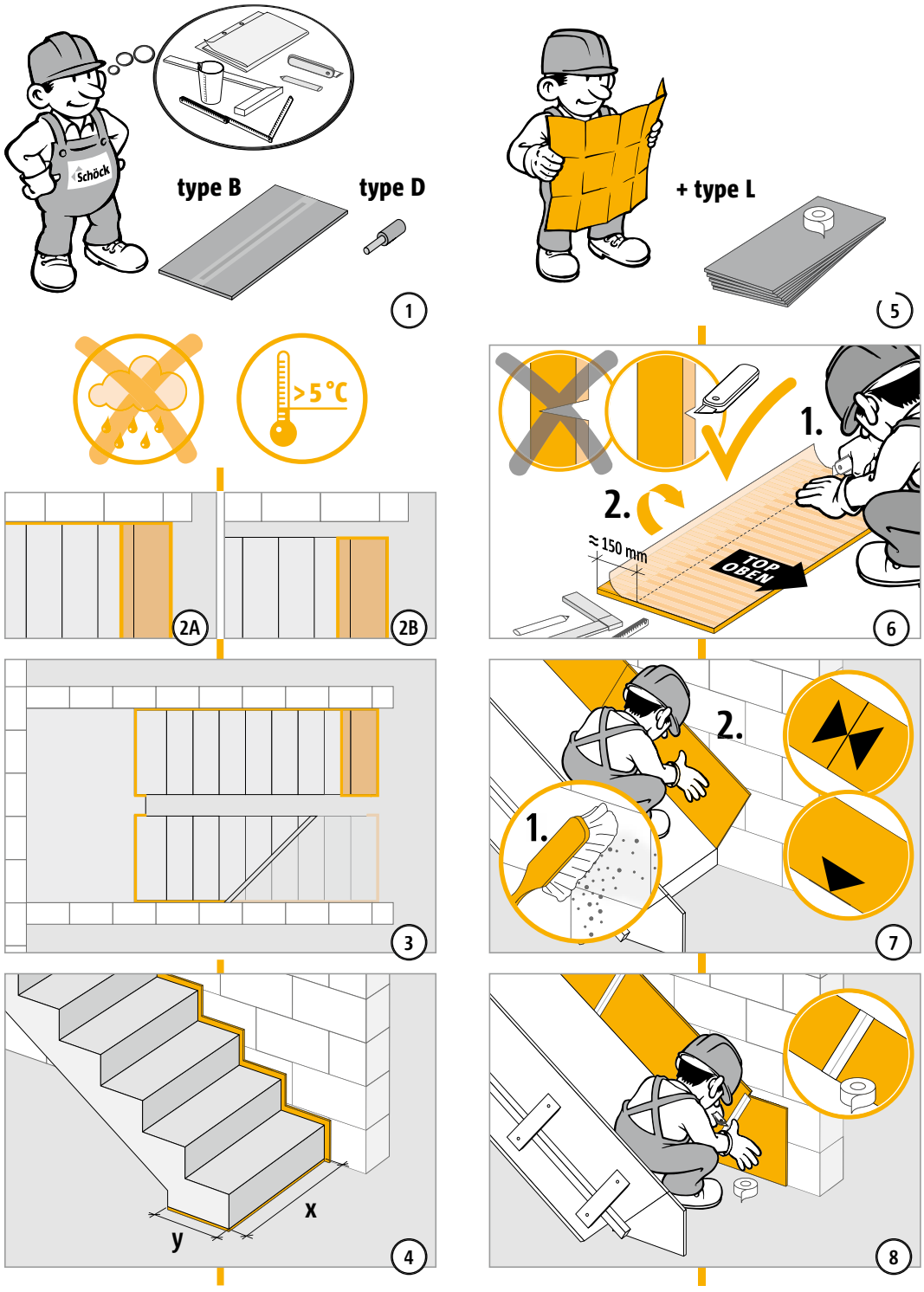
Schöck Tronsole® type B	Material
PE foam panel	PE foam according to DIN EN 14313
Elastomer support	Polyurethane according to DIN EN 13165

Schöck Tronsole® type D:	Material
Stainless steel dowel	S690, Material No. 1.4362
Elastomer cap	Polyurethane according to DIN EN 13165
Stainless steel sleeve	Material No 1.4404

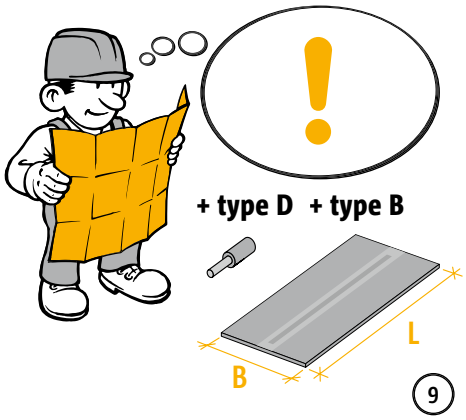
Installation

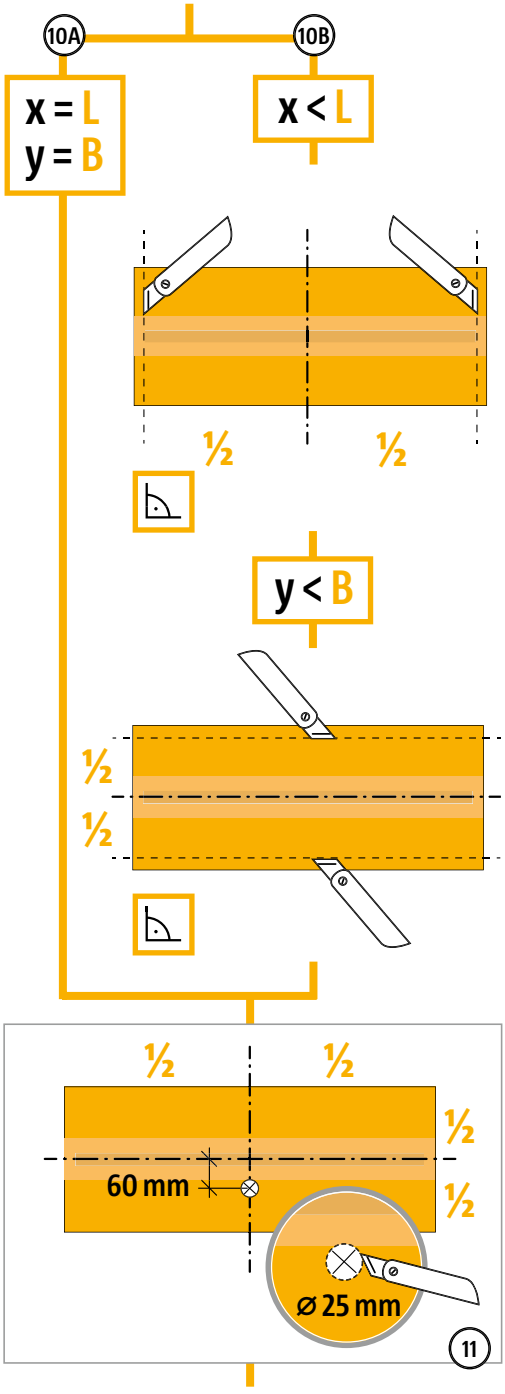
- The Schöck Tronsole® type B has double-sided assembly adhesive tapes for securing to the bottom of the dry and dust-free precast stair flight.
- With the employment of in-situ stairs the Tronsole® type B lies on the floor slab between the edge formwork.
- The PE foam panels can be cut by hand using a simple cutting tool. As the PE foam panel at both ends of the linear elastomer support projects by 50 mm, the Tronsole® type B can be easily shortened without interfering with the elastomer support.
- With the cutting to length of the Tronsole® type B care is to be taken that the projection of the PE foam panels over the elastomer support is shortened to the same length on both sides, in order to retain the central position of the elastomer support.
- An acoustic bridge-free configuration limits the employment of on-site edge insulation strips on the sides of the foot of the stairs.
- The sleeve for the Tronsole® type D, which can be obtained optionally, can be used as stay-in-place formwork in the precast stair flight or in the floor.
- The Tronsole® type D (without sleeve) requires a block-out or the integration of the dowel in the hardened concrete of the floor slab.

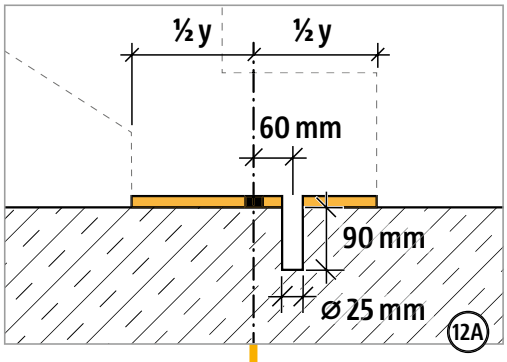
Installation instructions for building site in-situ concrete

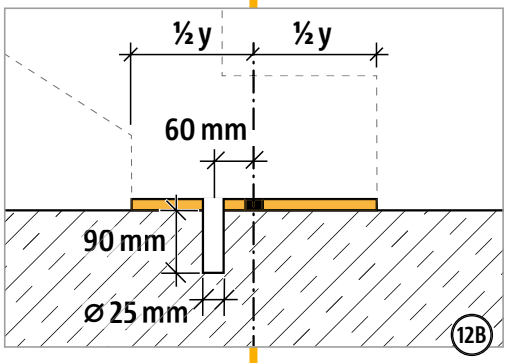


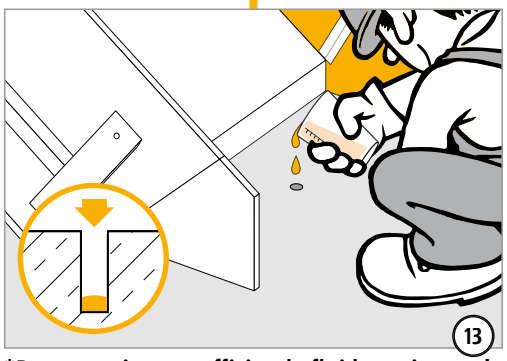
Installation instructions for building site in-situ concrete



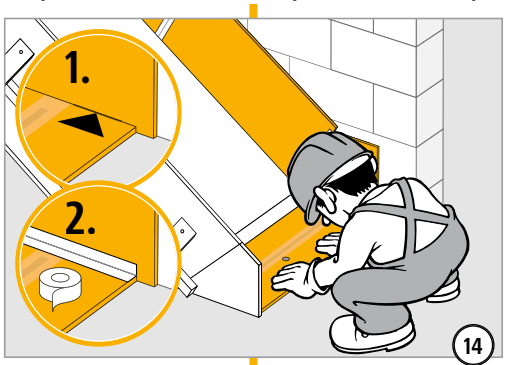


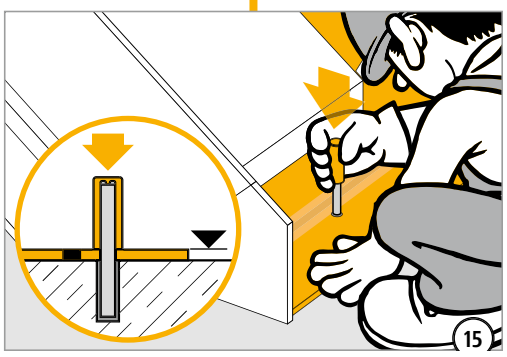




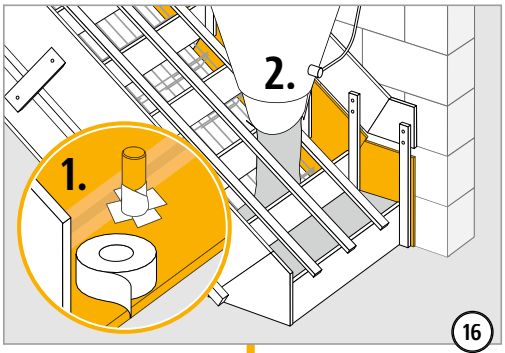


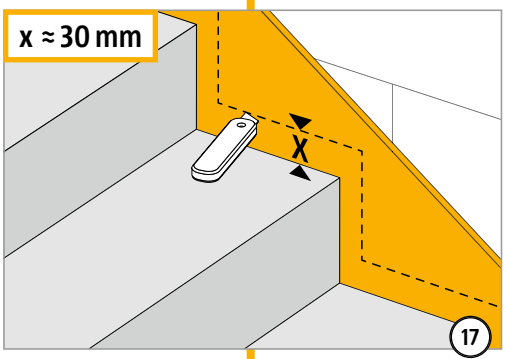
*Pay attention to sufficiently fluid consistency!

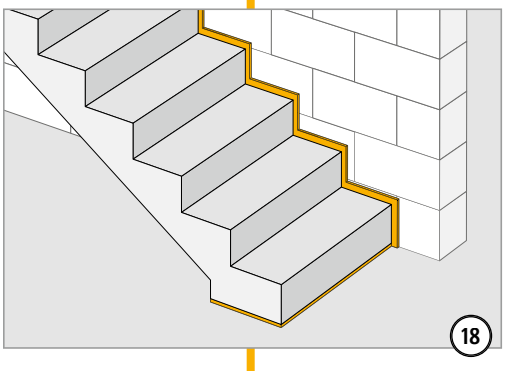


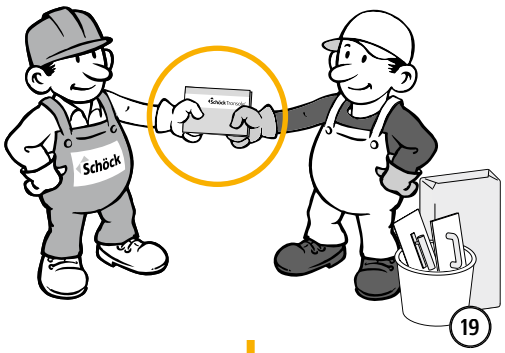


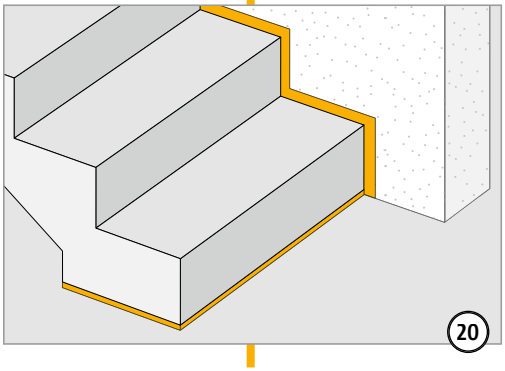
Installation instructions for building site in-situ concrete

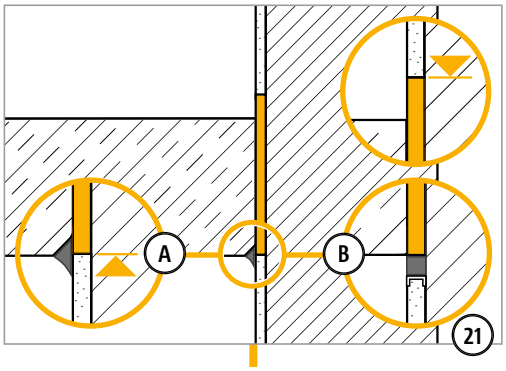


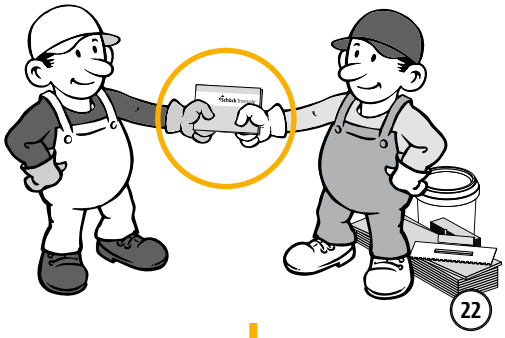


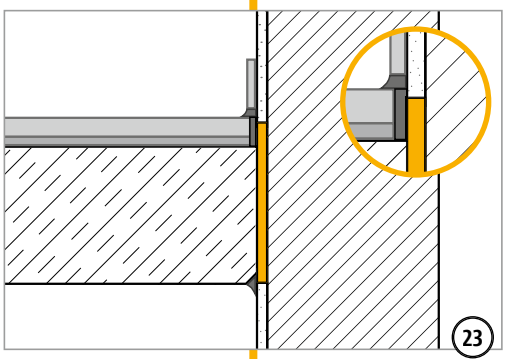


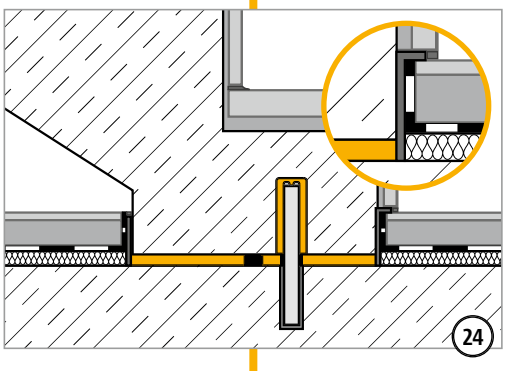




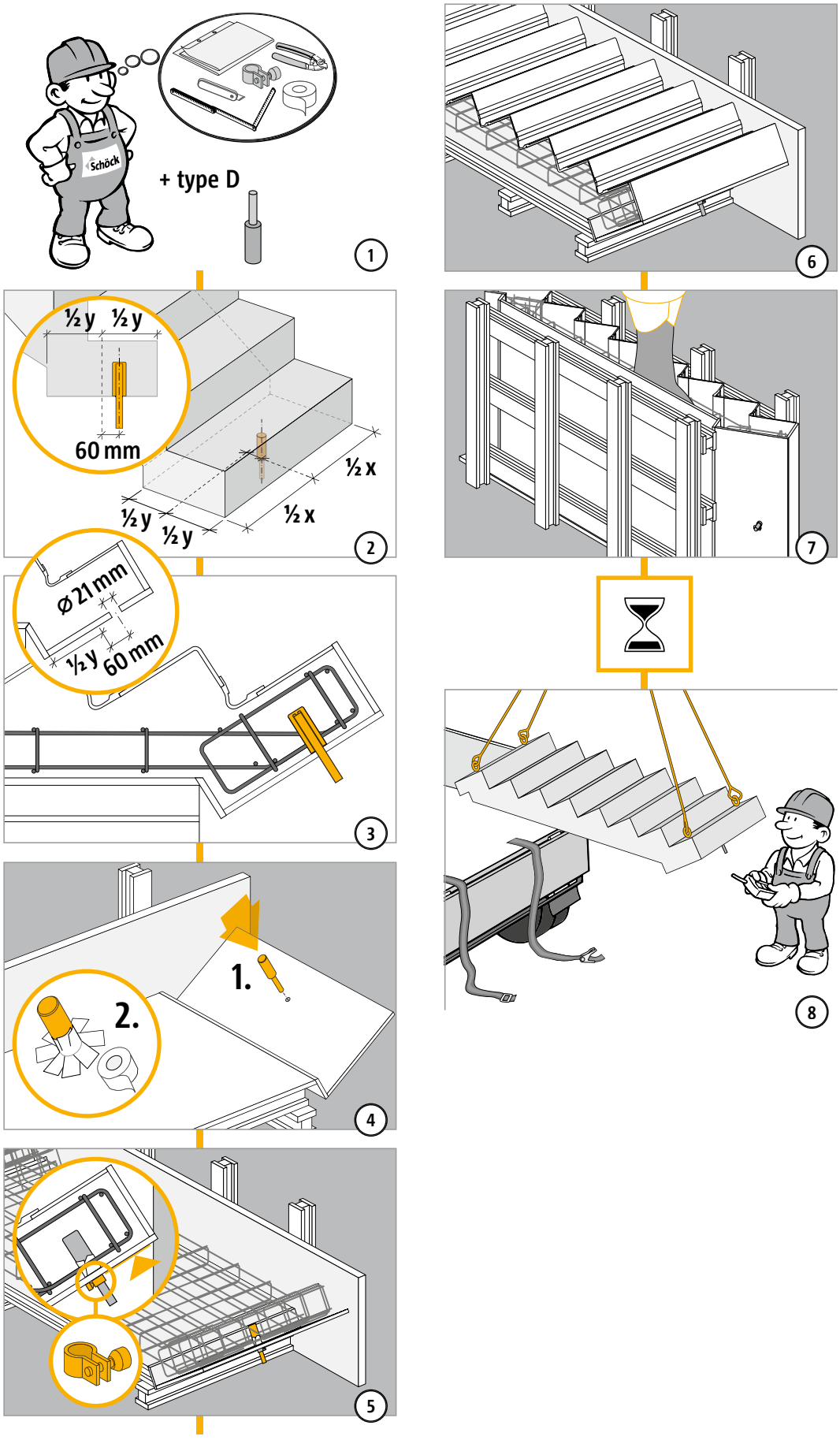




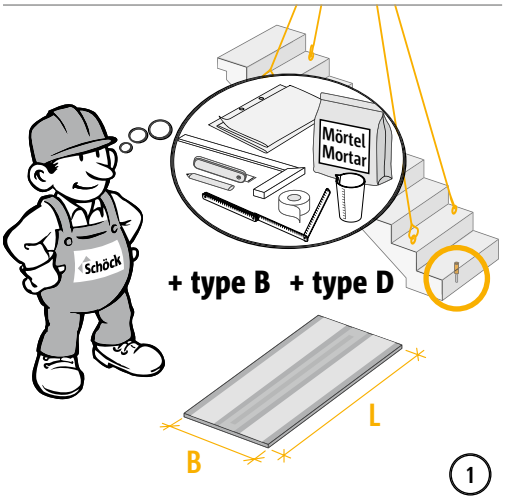


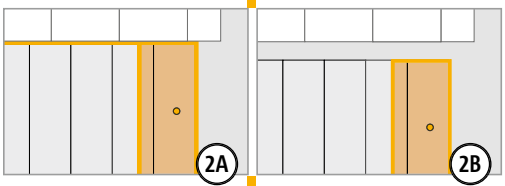


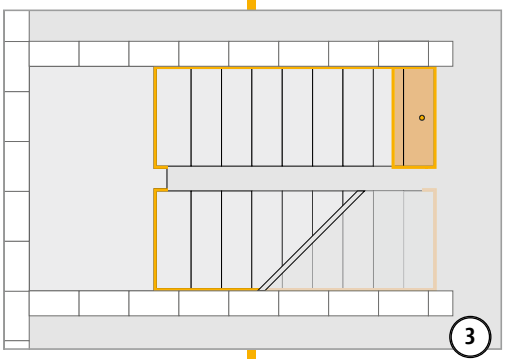
Installation instructions for prefabricating plant

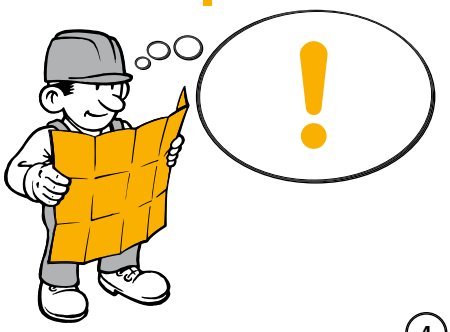


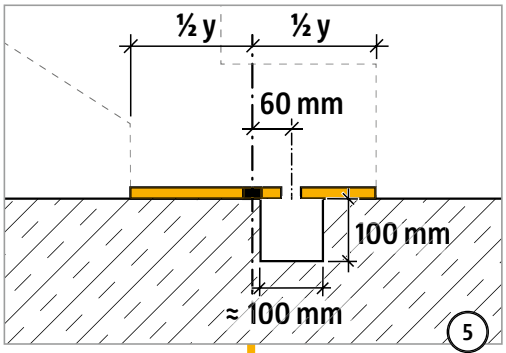
Installation instructions building site precast components

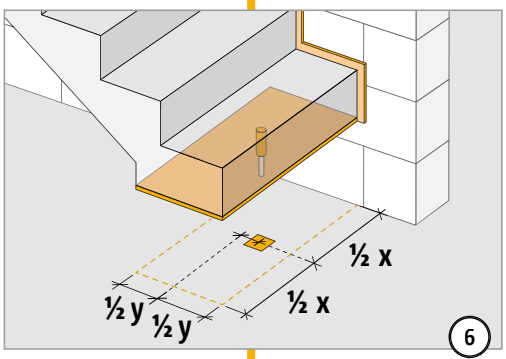


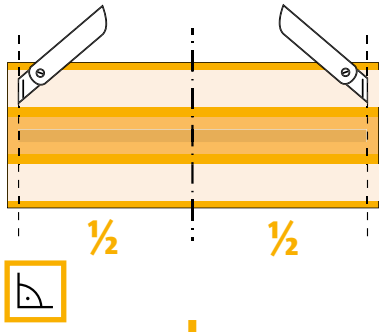


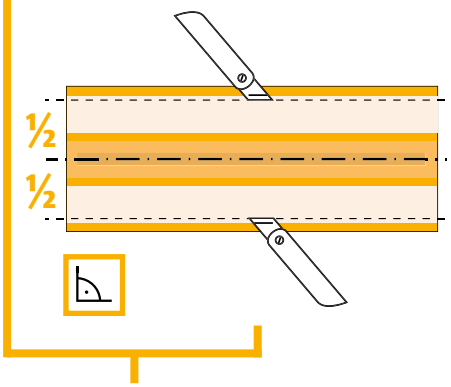




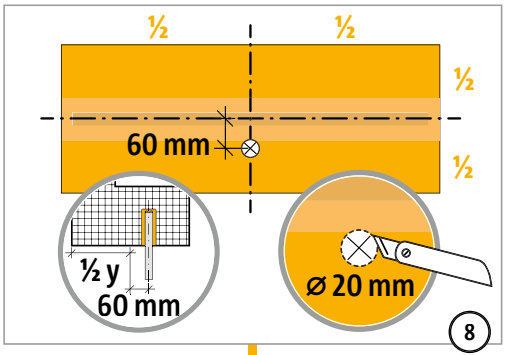


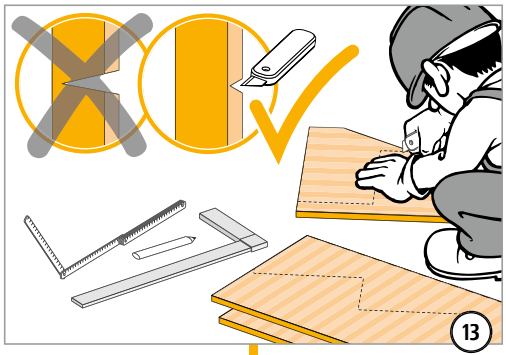


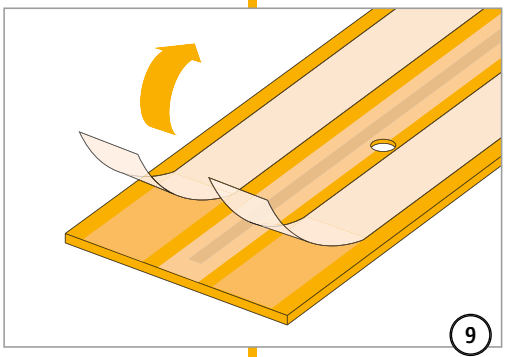


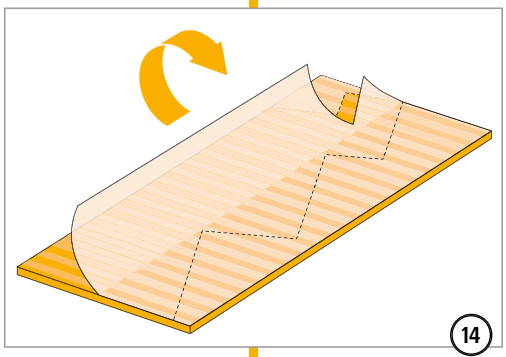


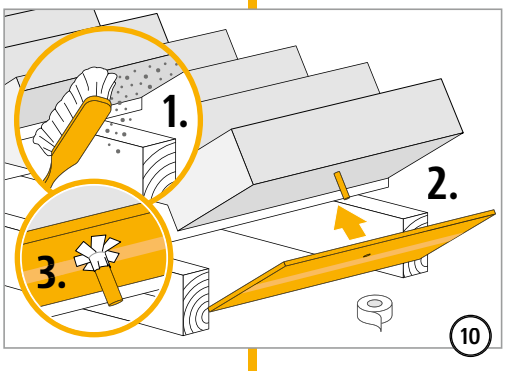
Installation instructions building site precast components

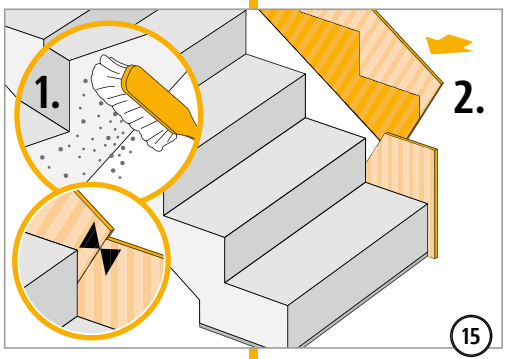


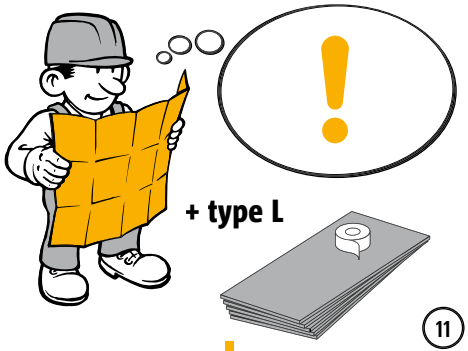


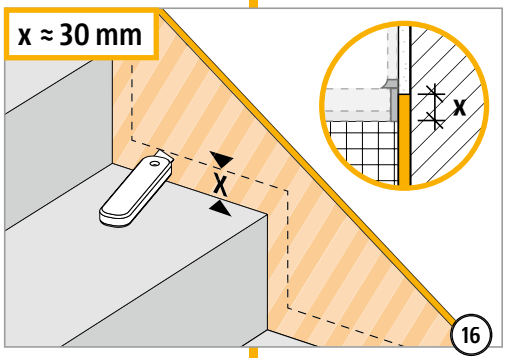


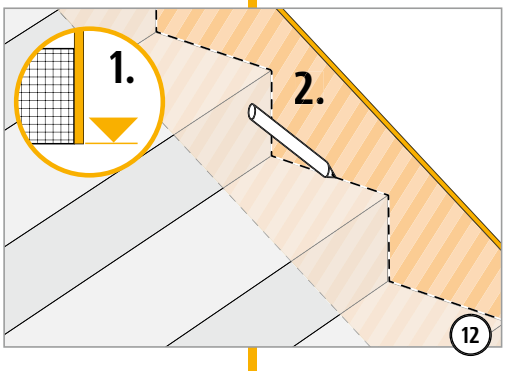


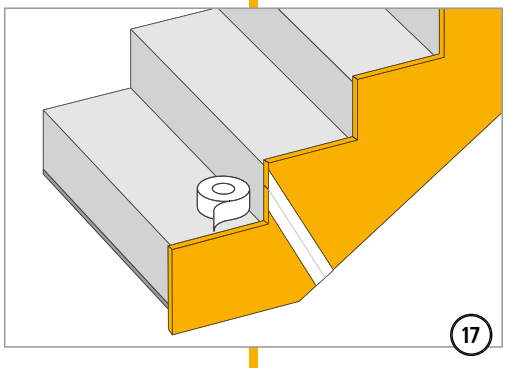






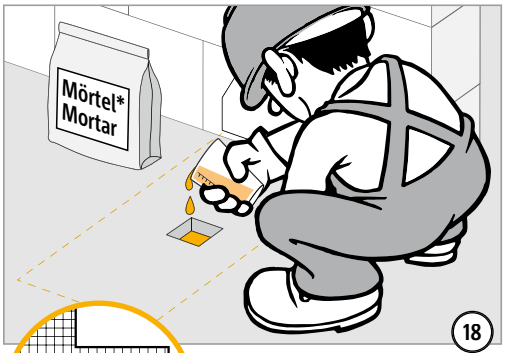




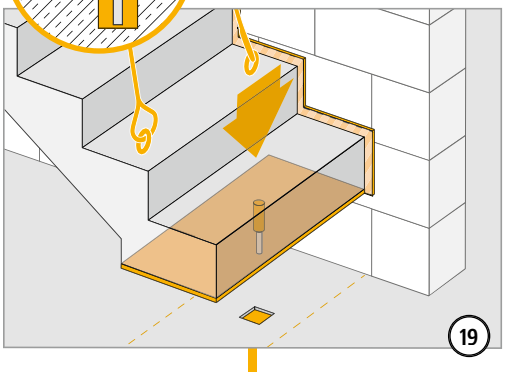


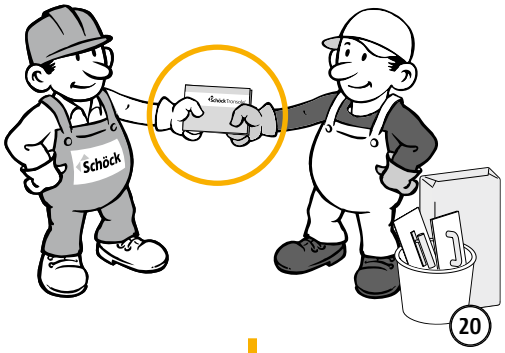
B, D

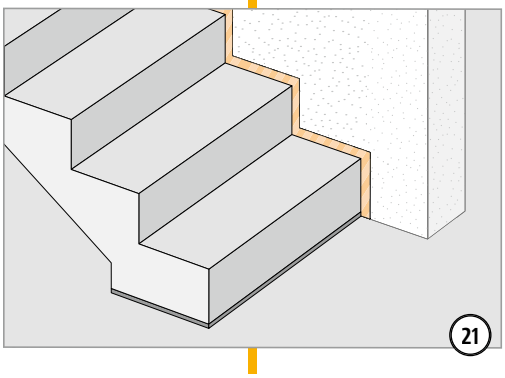
Installation instructions building site precast components

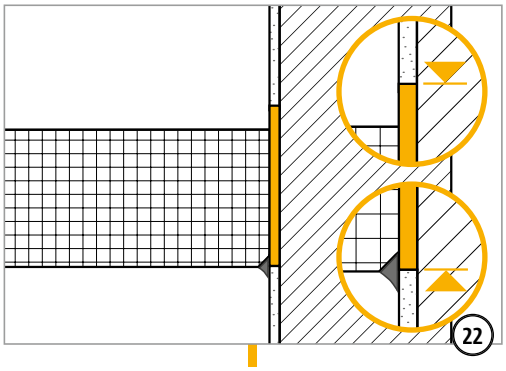


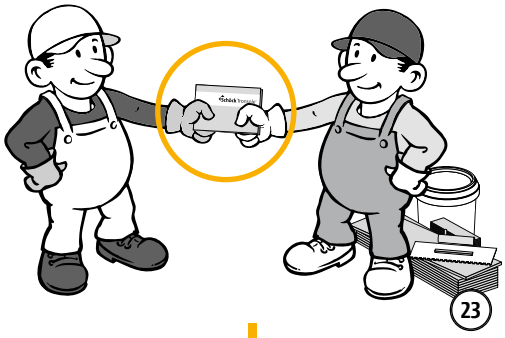
*Pay attention to sufficiently fluid consistency!

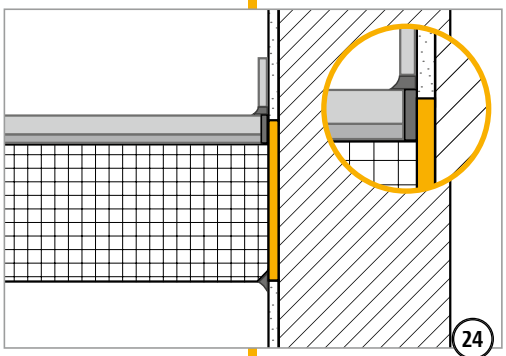


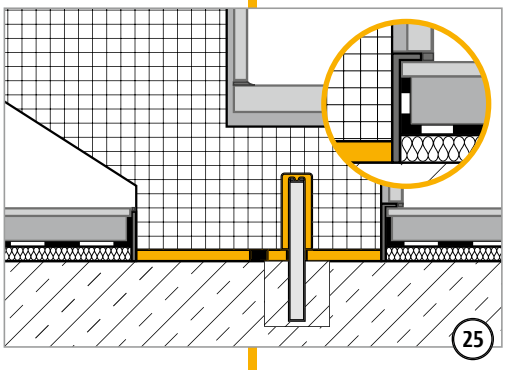




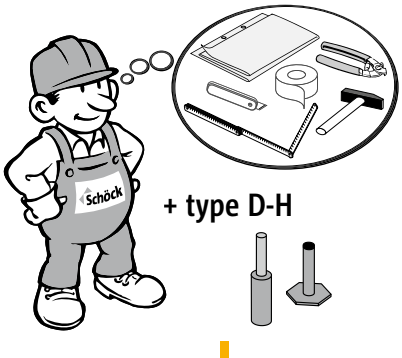


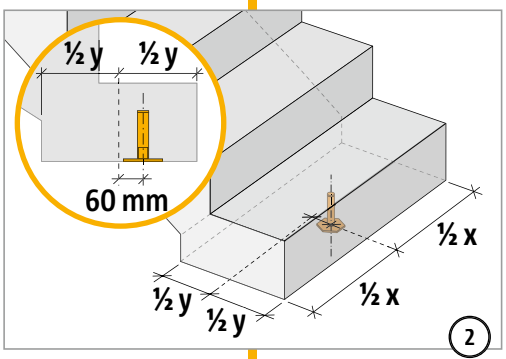


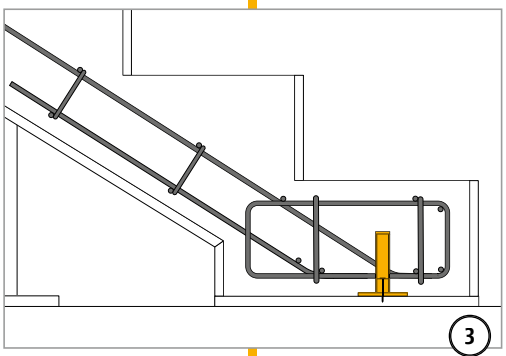


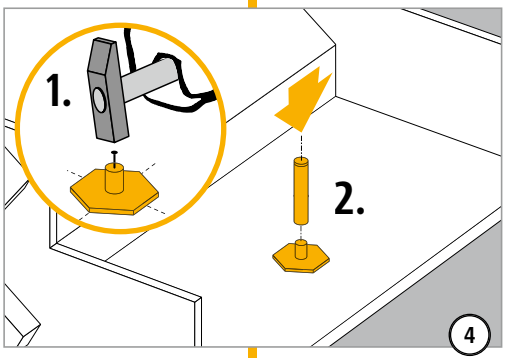


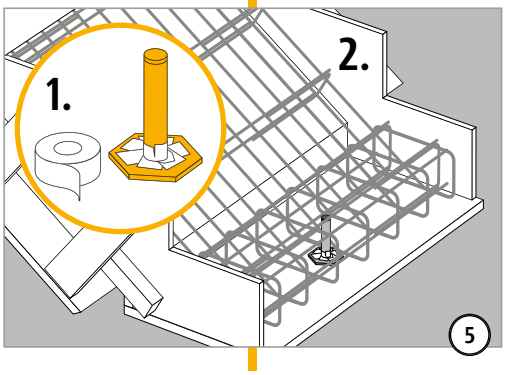
Installation instructions for prefabricating plant

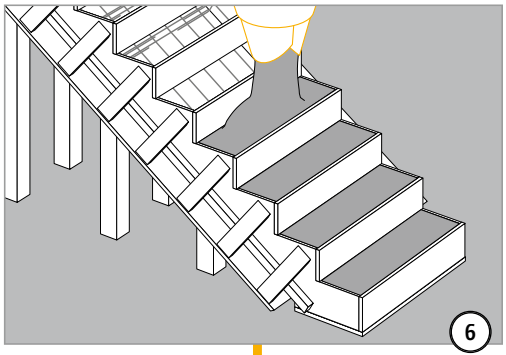


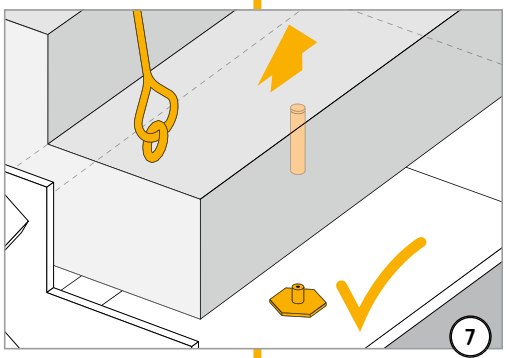


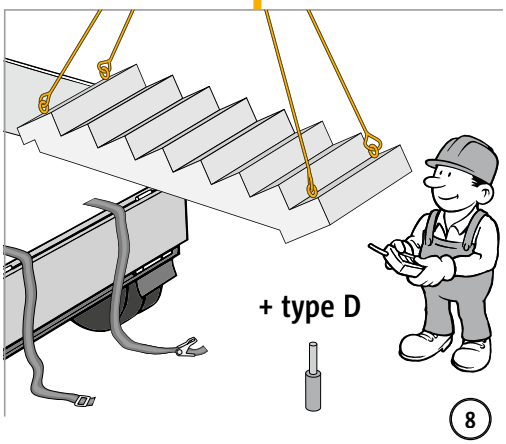






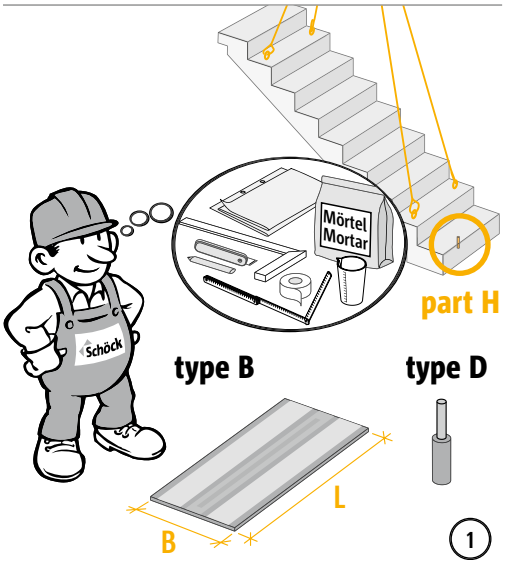


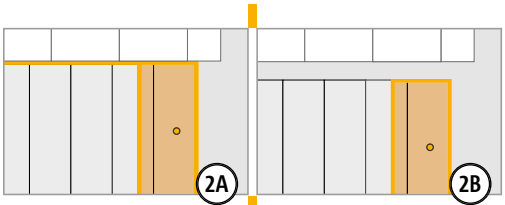


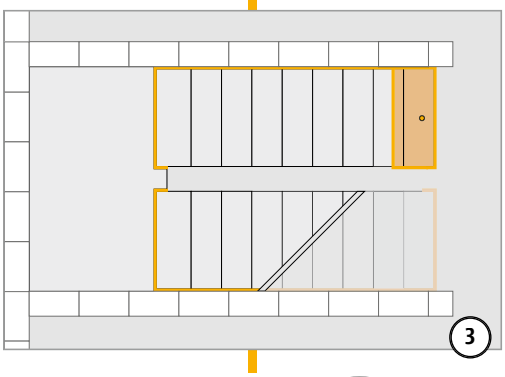


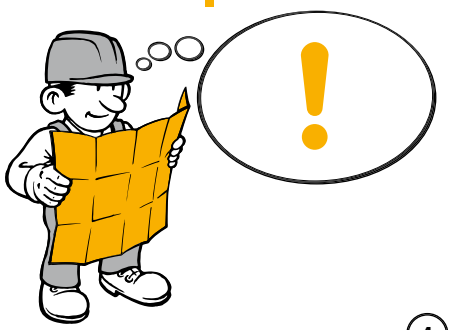
B, D

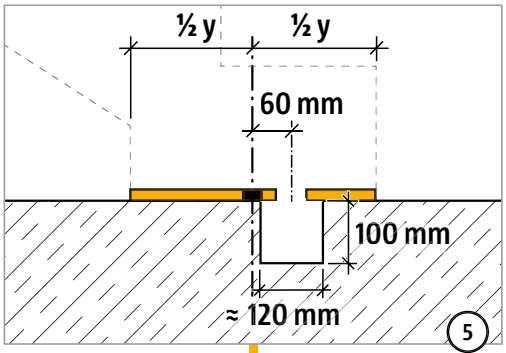
Installation instructions building site precast components

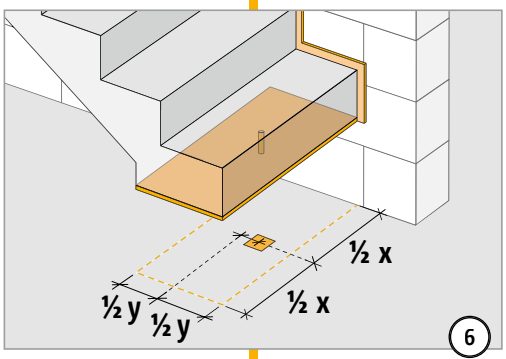










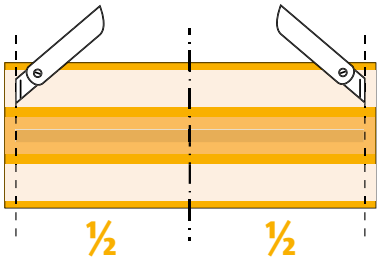


7A

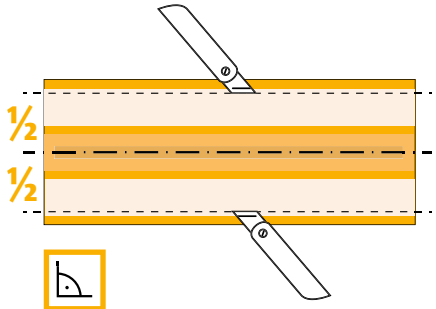
x = L
y = B

7B

x < L

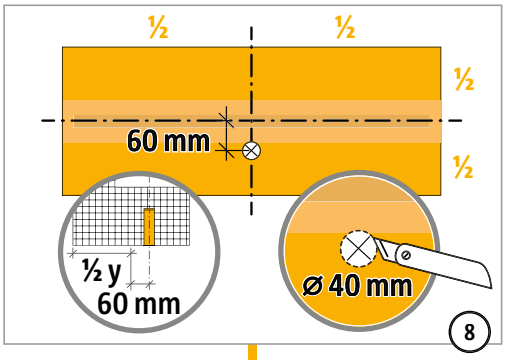


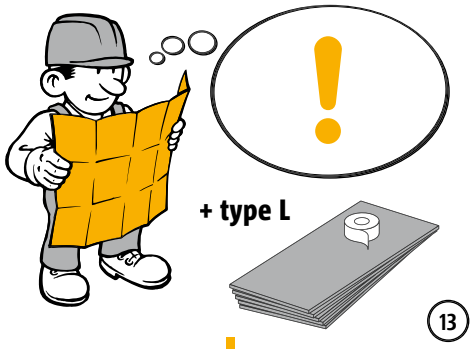
y < B

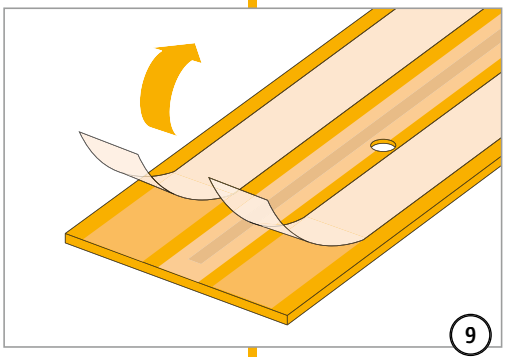


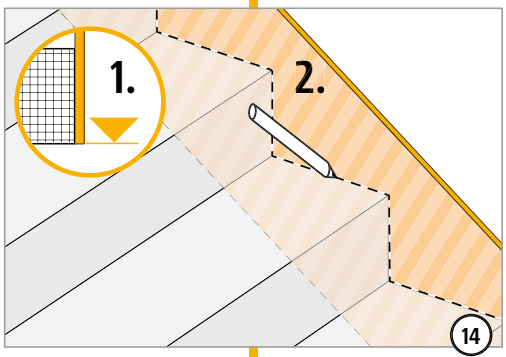
B, D

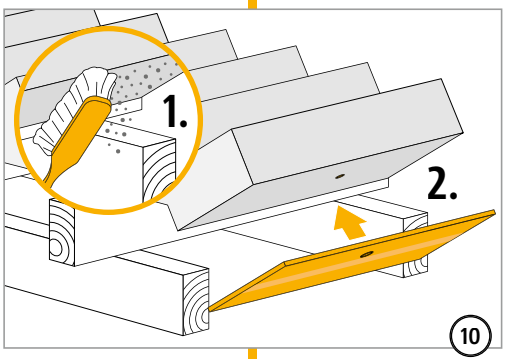
Installation instructions building site precast components

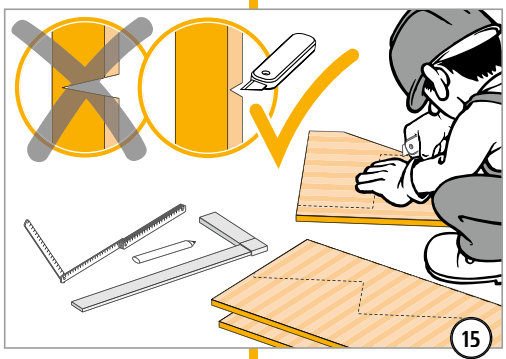


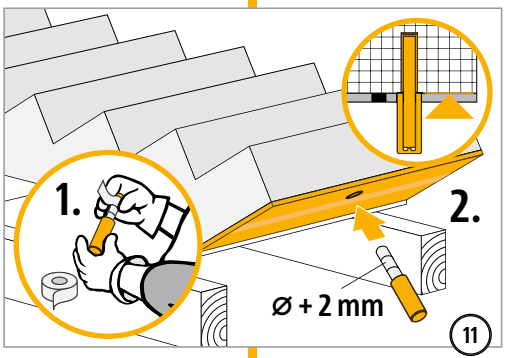


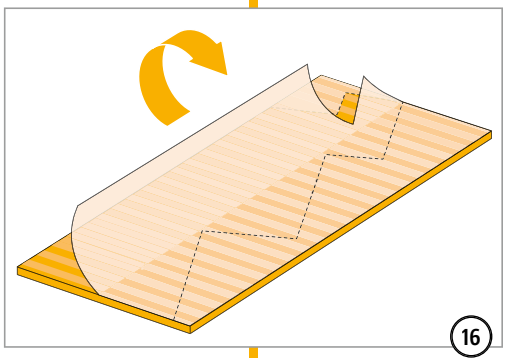


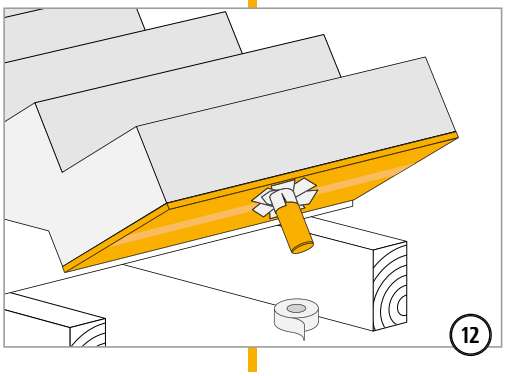


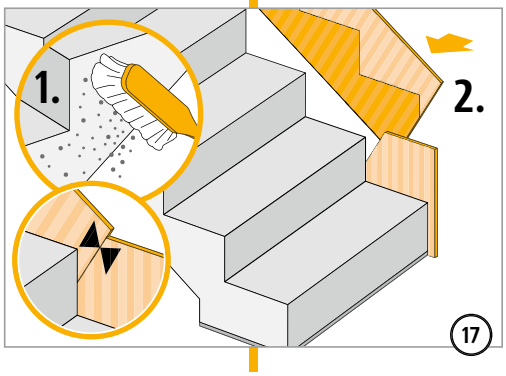






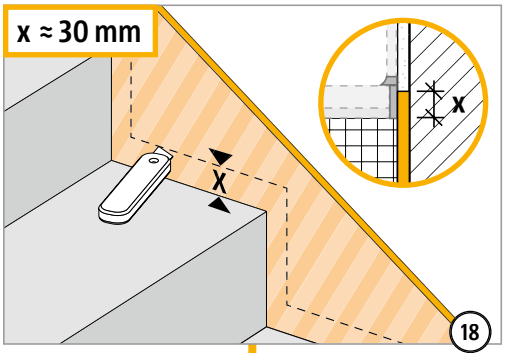


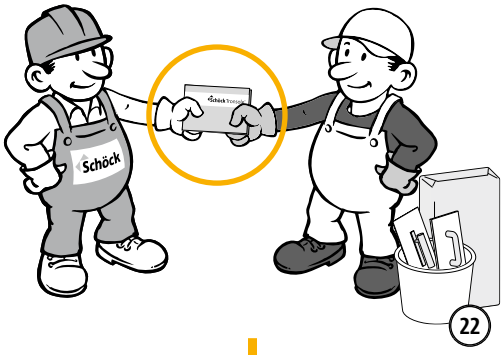


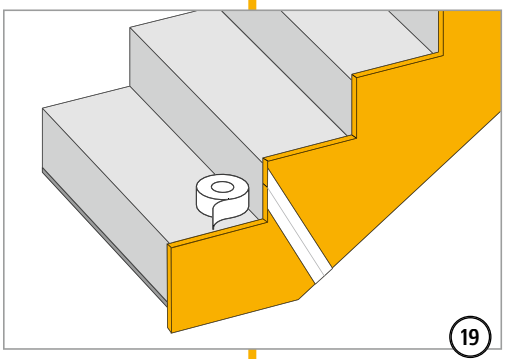


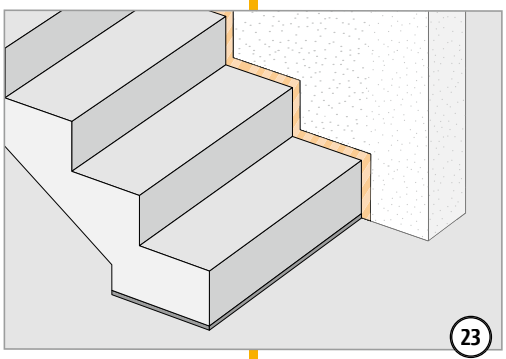
B, D

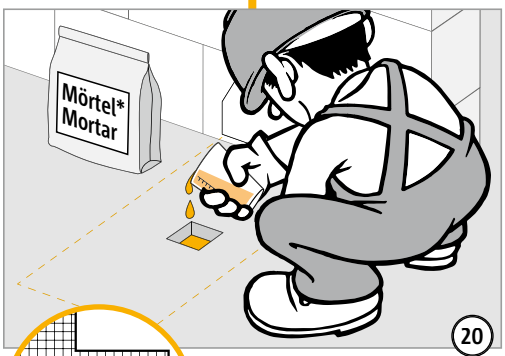
Installation instructions building site precast components

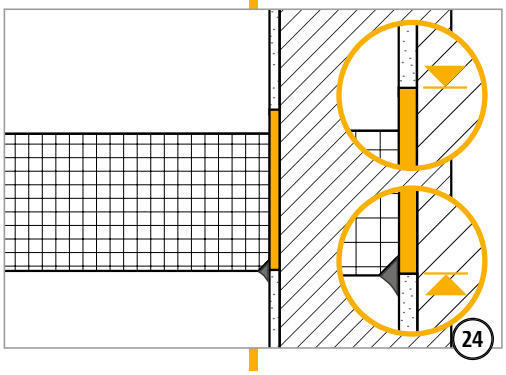




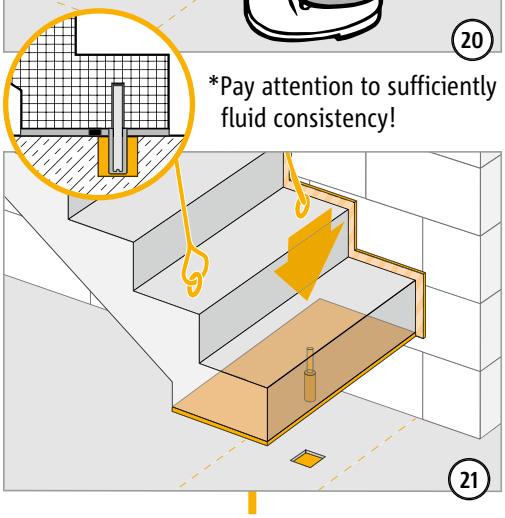


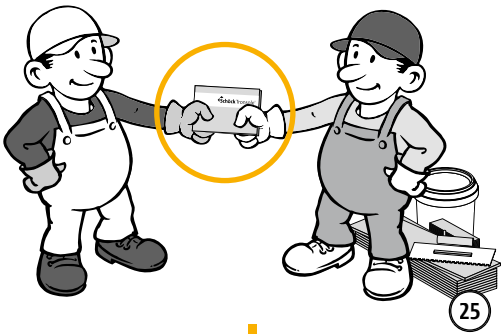


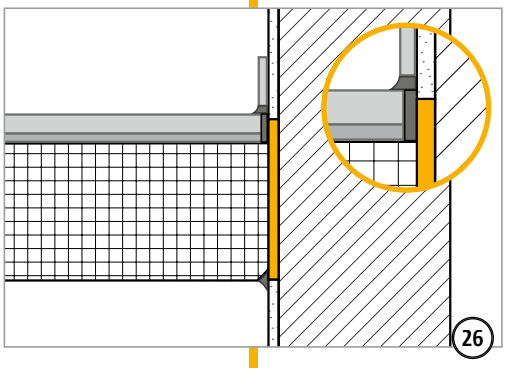




*Pay attention to sufficiently fluid consistency!

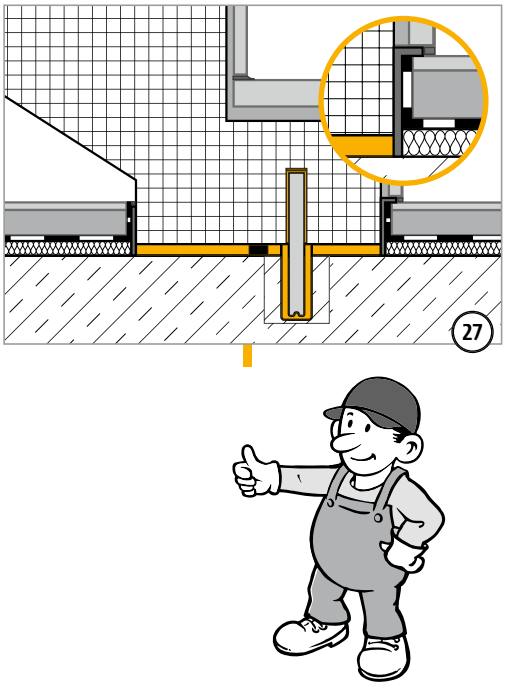






B, D

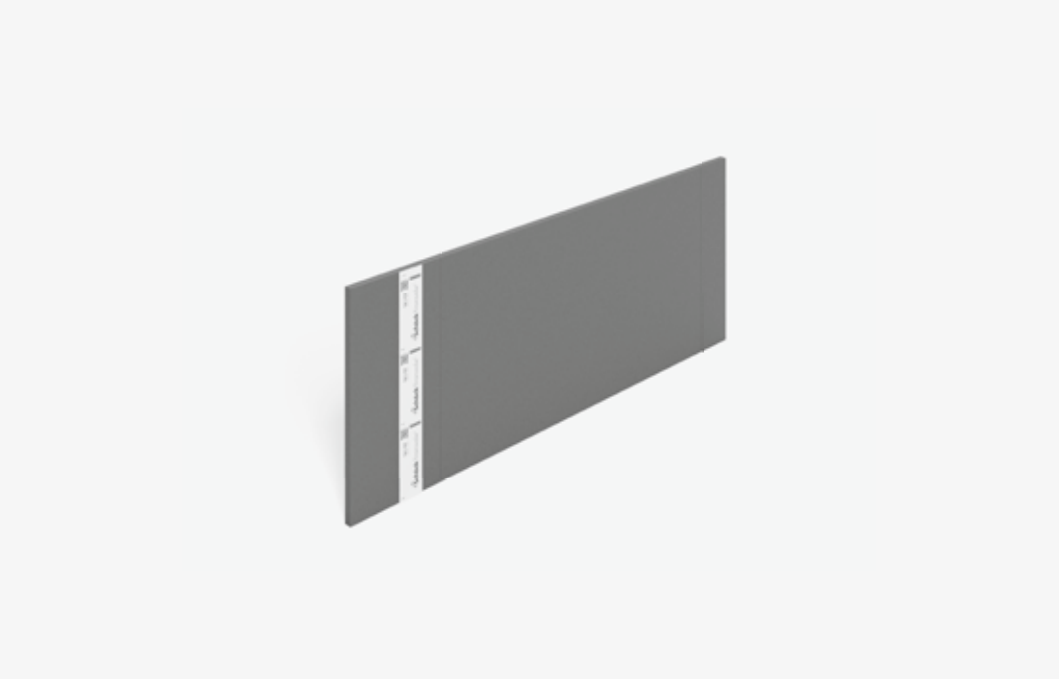
Installation instructions building site precast components



Check list

- ☐ Are the dimensions of the Schöck Tronsole® matched to the geometry of the structural components which are to be insulated?
- ☐ Have the effects on the Schöck Isokorb® connection been specified at design level?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ Are planned existing horizontal loads, which can be conducted away via type B, taken into account?

Schöck Tronsole® type L



Schöck Tronsole® type L (joint formation)
Serves the acoustic bridge-free formation of the joints between stair flight resp. landing and staircase wall. It can be applied with in-situ concrete as well as prefabricated construction.
The Tronsole® type L is also available in the soundproofing packet (See page 161).

Product characteristics | Product design | Product selection | Type designations

Product characteristics

- Optimum impact sound protection through avoidance of acoustic bridges in the area of joints
- High quality and easily cut PE foam panels
- Stable material, no damage during construction progress
- Secure attachment using adhesive assembly tape

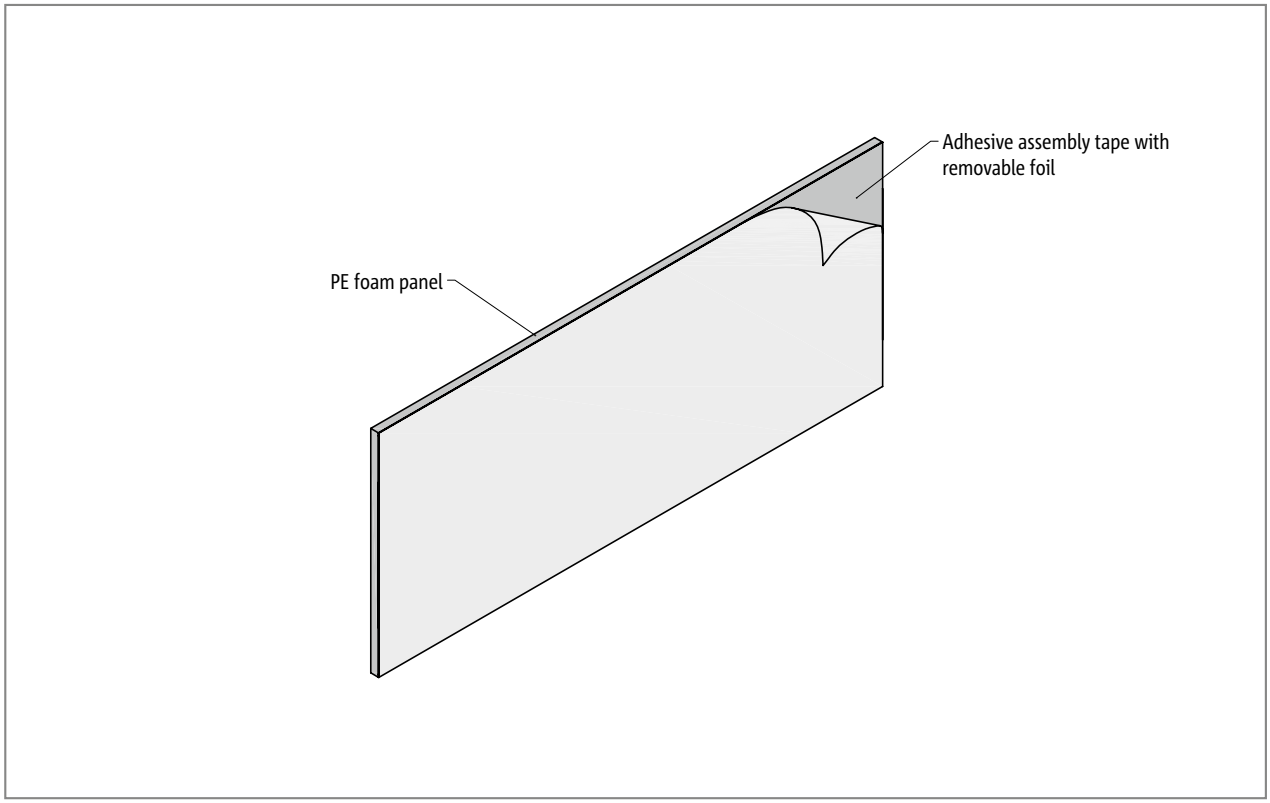


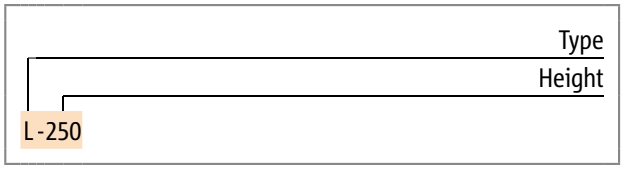
Fig. 147: Schöck Tronsole® type L

Schöck Tronsole® type L variants

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

- Height:
  for landing: H = 250 mm and for stair flights H = 420 mm

Type designation in planning documents



Installation cross sections

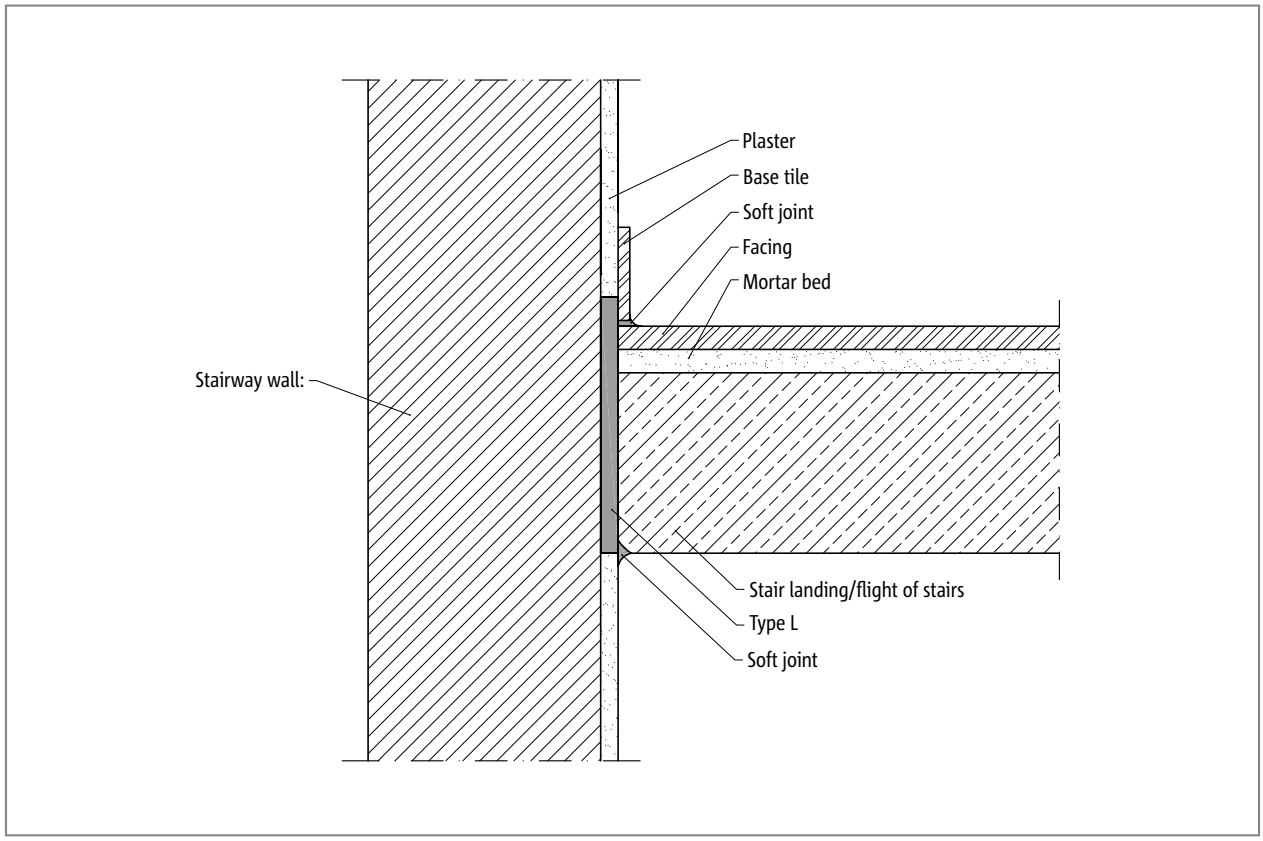


Fig. 148: Schöck Tronsole® type L: Installation cross-section in-situ concrete stairs

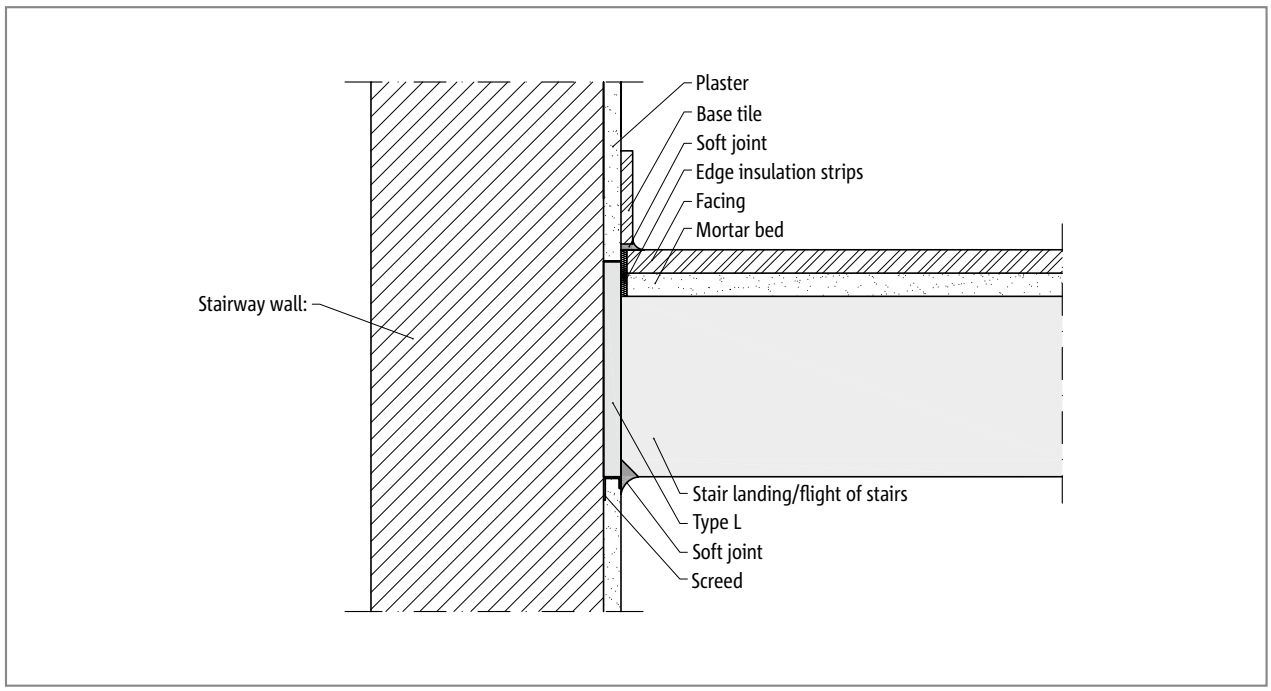


Fig. 149: Schöck Tronsole® type L: Installation cross-section precast landing

Element arrangement

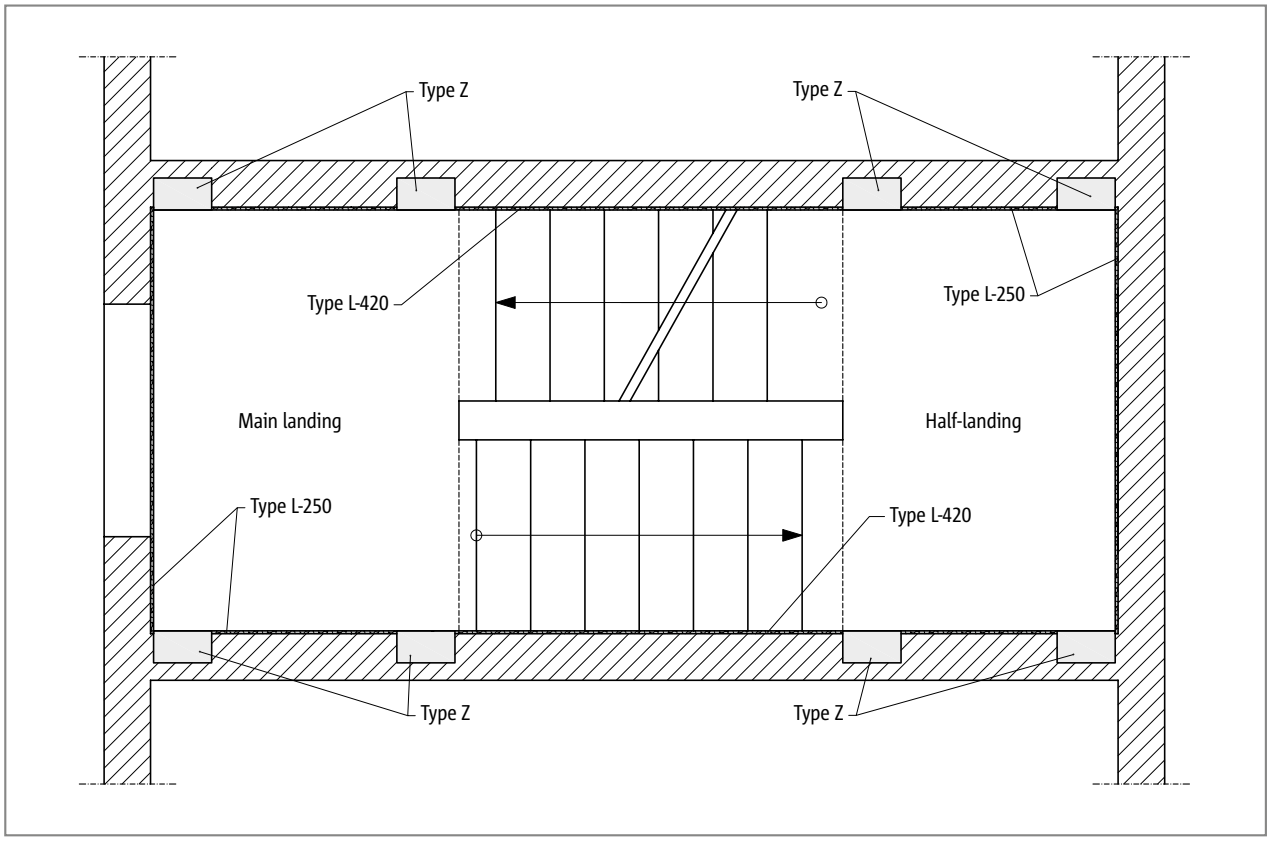


Fig. 150: Schöck Tronsole® type L-250 and type L-420: Soundproofing solution for stair flights and landings with the inclusion of the Tronsole® type Z

Element arrangement

- The Schöck Tronsole® type L can be combined with every other Schöck Tronsole® type.

Element arrangement

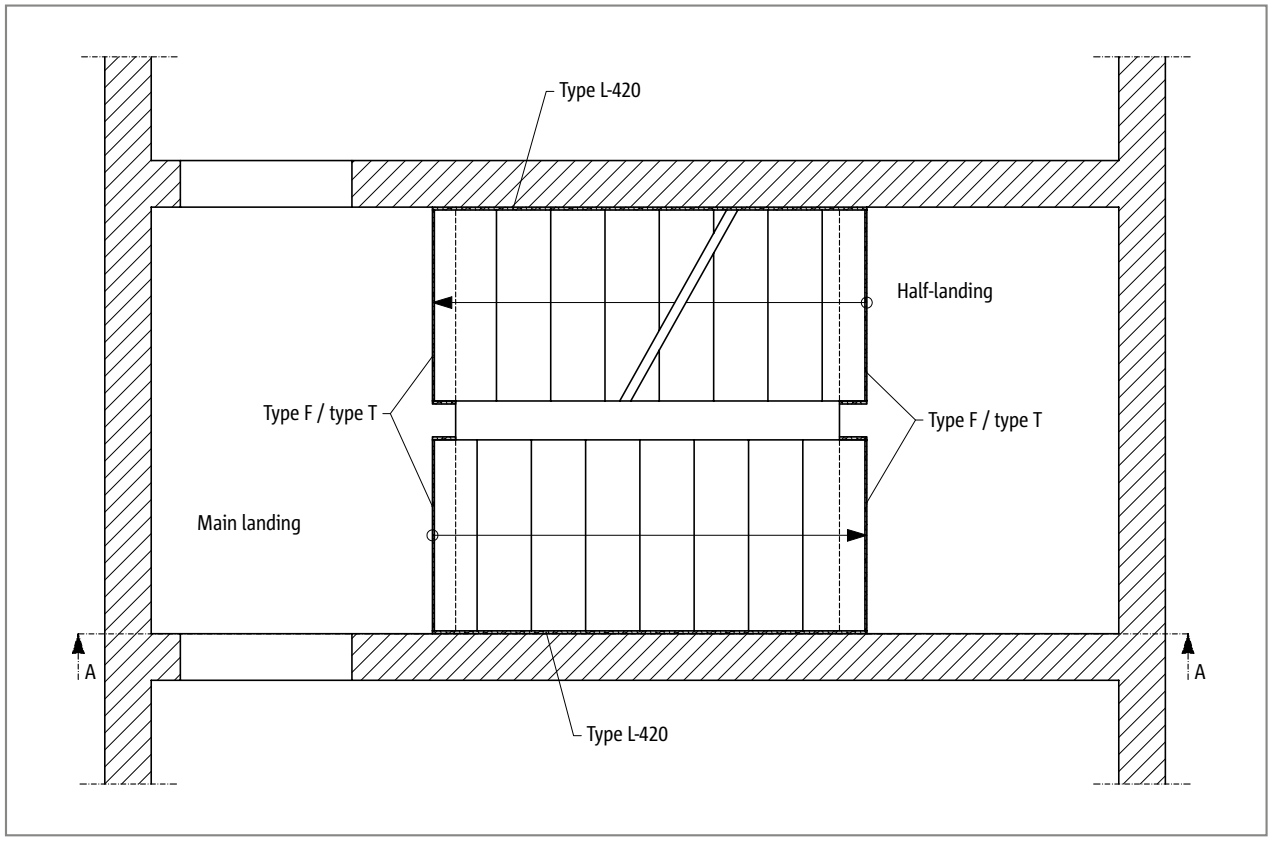


Fig. 151: Schöck Tronsole® type L-420: Soundproofing solution for stair flights with the inclusion of the Tronsole® type F or type T

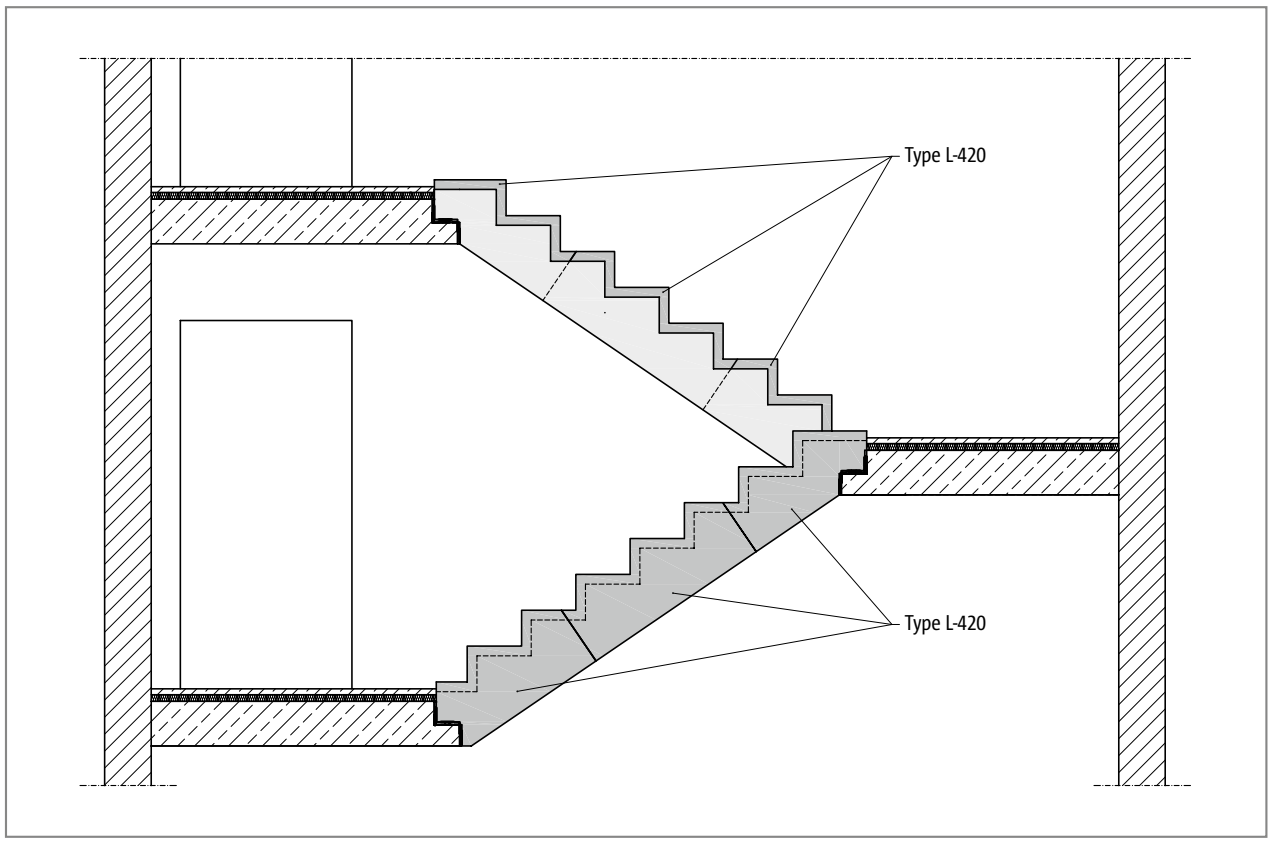


Fig. 152: Schöck Tronsole® type L-420: Element arrangement, Section A-A

Product description | Precast construction | Fire protection

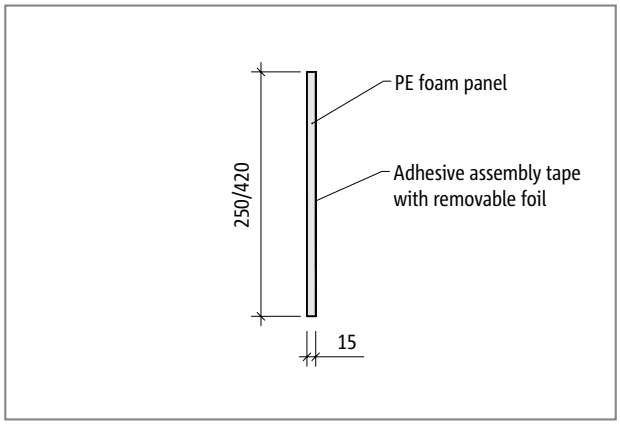


Fig. 153: Schöck Tronsole® type L-250 resp. L-420: Product section

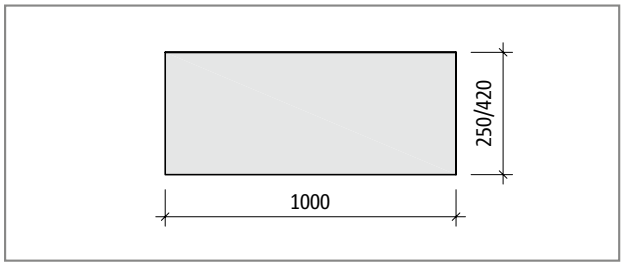


Fig. 154: Schöck Tronsole® type L-250 resp. L-420: Product layout

Product information

- The Tronsole® type L is also available as soundproofing packet
- The Tronsole® type L transmits no statically relevant forces.
- The Schöck Tronsole® type L is offered with the length L = 1000 mm.

Precast part construction

If prefabricated stair flights are to be installed between two opposite walls, a dimensional tolerance must be specified by the planner. If, for example, a wall at the site of the stair flight is required , a space of at least 20 mm is to be planned between the stair strings and the enclosing walls, although the Schöck Tronsole® type L is only 15 mm thick. This allows the smooth installation of prefabricated stair flights using affixed Tronsole® type L.

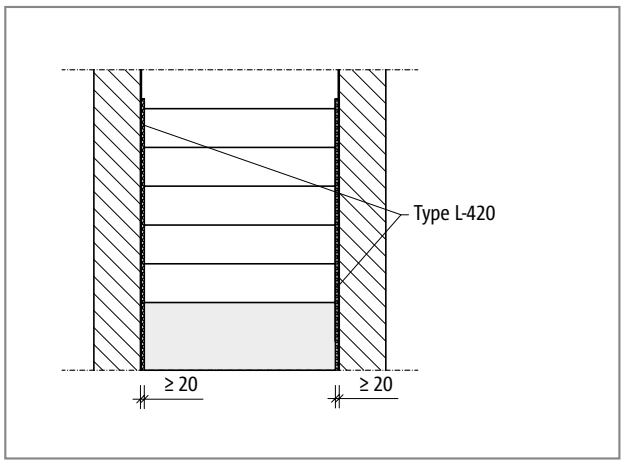


Fig. 155: Schöck Tronsole® type L-420: Taking into account installation tolerances

Fire protection

With the Tronsole® type L it is a matter of a static, non-relevant, impact soundproofing element.

Fire protection

- The Tronsole® type L conforms with building materials class B2 according to DIN 4102.

Materials | Soundproofing packet | Installation instructions | Installation

Materials and construction materials

Schöck Tronsole® type L	Material
PE foam panel	PE foam according to DIN EN 14313

Schöck Tronsole® type L	Physical properties
Dynamic stiffness in accordance with DIN EN 29052-1	90 MN/m³
Unit weight in accordance with DIN EN ISO 845	28 kg/m³
Water take-up after 7 days	< 1 Vol.-%

Soundproofing packet

The soundproofing packet is a coordinated system packet with all necessary installation aids. The supplied adhesive tape for the sealing adhesion of the joint slab butt points simplifies the acoustic bridge-free installation of the Schöck Tronsole® type L.
The soundproofing packet completes the impact sound insulation solution in the stair well and is component part of the soundproofing system.
The soundproofing packet consists of:

- 15 Schöck Tronsole® type L-250 resp. L-420
- 20 m adhesive tape (1 roll)
- 1 suitable cutting tool (cutter)
- 1 pencil
- 1 installaton instruction

Installation manual

As the Schöck Tronsole® type L is combined with a force transmitting Tronsole®, the installation instructions for the Tronsole® type L are presented in exemplary combinations in all further product sections.

Installation

- The Schöck Tronsole® type L is bonded to the dry and dust-free structural component with the aid of an own-product double-sided assembly adhesive tape. With this, it is matter of a prefabricated stair flight resp. with the staircase wall when it is in-situ concrete stairs.
- The PE foam panels can be cut by hand using a simple cutting tool.
- The Tronsole® type L closes the joint between stair string resp. landing and wall maintaining a joint width of 15 mm.

☑ Check list

- ☐ With the planning of prefabricated components is the Tronsole® type L given, is there a sufficiently wide joint between stair flight or landing and staircase wall?
- ☐ Are the dimensions of the Schöck Tronsole® matched to the geometry of the structural components which are to be insulated?
- ☐ Have the requirements with regard to fire protection been cleared and announced?
- ☐ Due to a fire protection requirement are larger concrete covers and larger structural component heights taken into account?

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