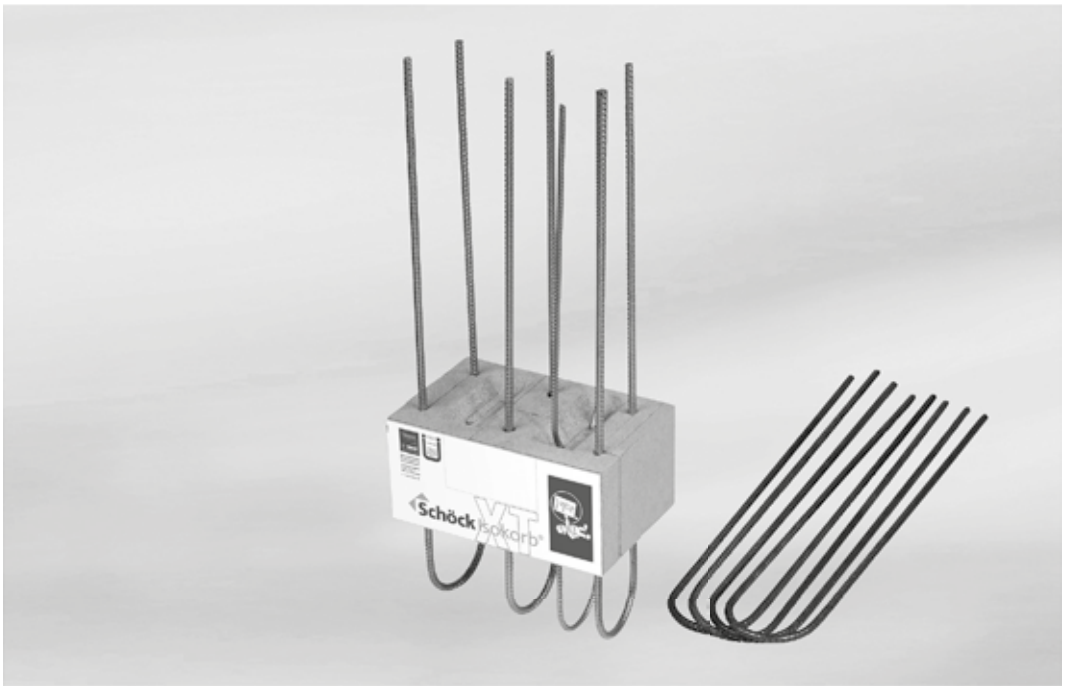
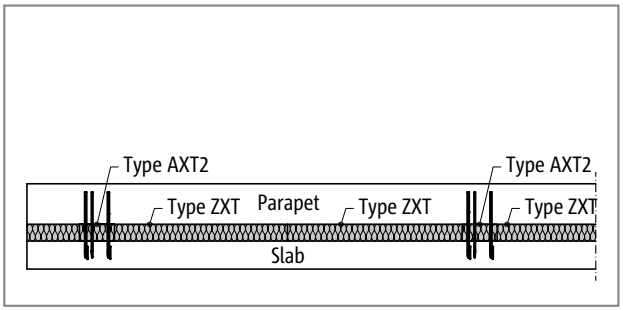
Schöck Isokorb® type AXT



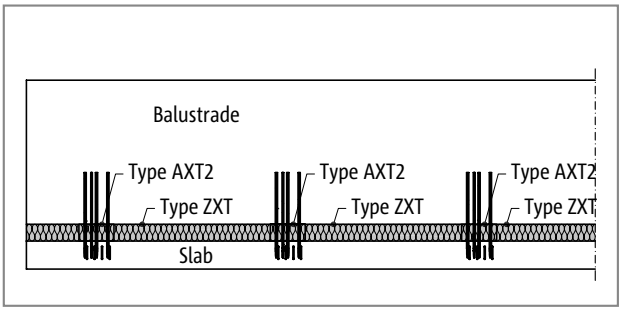
Schöck Isokorb® type AXT

Schöck Isokorb® type AXT
Suitable for parapets and balustrades. It transmits moments and shear forces, which result from an action in the same direction. In addition the Schöck Isokorb® type AXT transmits compressive forces.

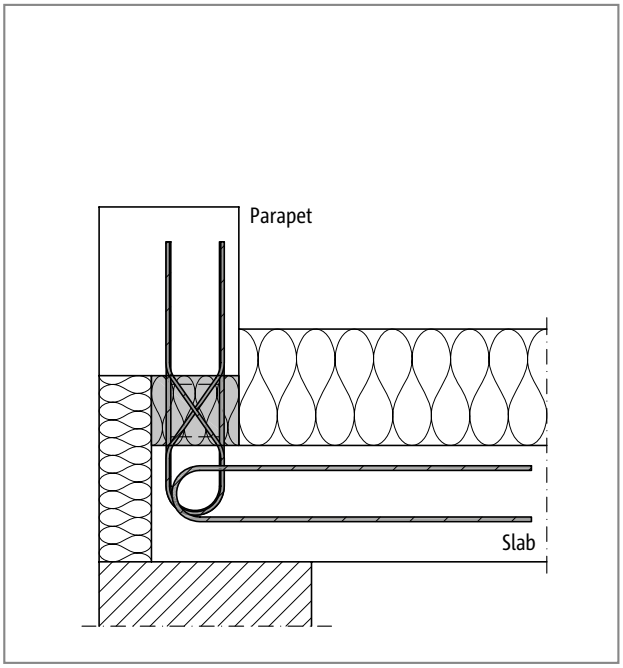
Element arrangement | Installation cross sections



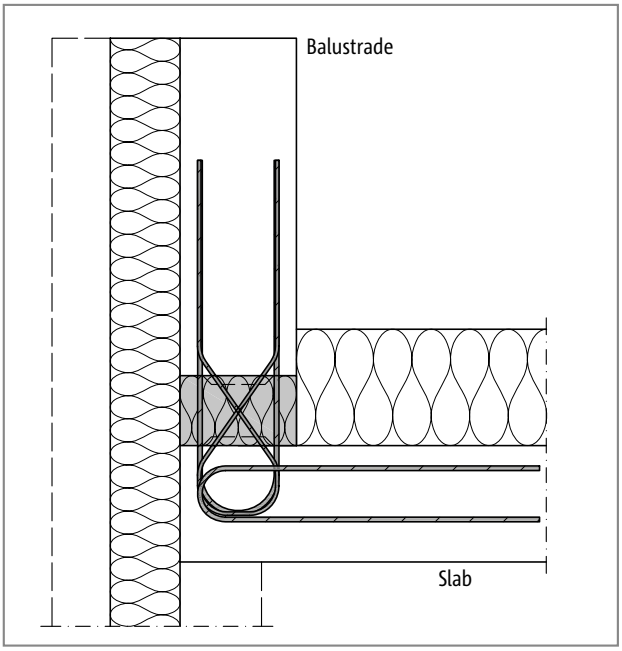
Schöck Isokorb® type AXT, ZXT: Parapet (type AXT1)



Schöck Isokorb® type AXT, ZXT: Ballustrade (type AXT2)



Schöck Isokorb® type AXT: Connection to a parapet (type AXT1)



Schöck Isokorb® type AXT: Balustrade (type AXT2) with non-load-bearing intermediate masonry

Element arangement/installation cross-section

- For insulation between the Schöck Isokorb®, Schöck Isokorb® supplementary type ZXT (see p.169) are available in R0 or as fire protection model.

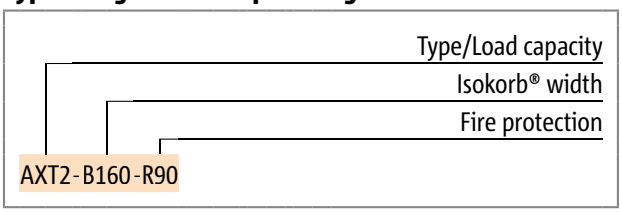
Product selection | Type designations | Special designs | Design force direction

Schöck Isokorb® type AXT variants

The configuration of the Schöck Isokorb® type AXT can be varied as follows:

- Load capacity:
  AXT1 for parapets
  AXT2 for balustrades
- Isokorb® width:
  B = 150 - 250 mm, R0
  B = 160 - 250 mm, R90
- Floor height:
  h = 160 - 250 mm
- Fire resistance class:
  R0 (Standard), R90

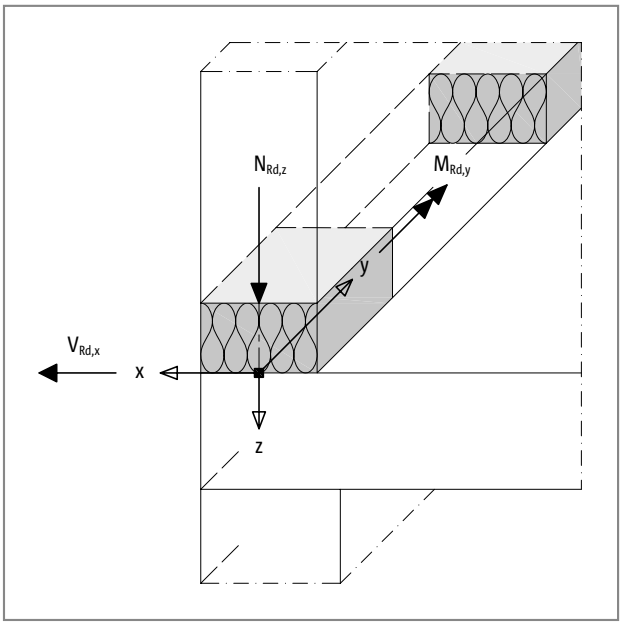
Type designations in planning documents



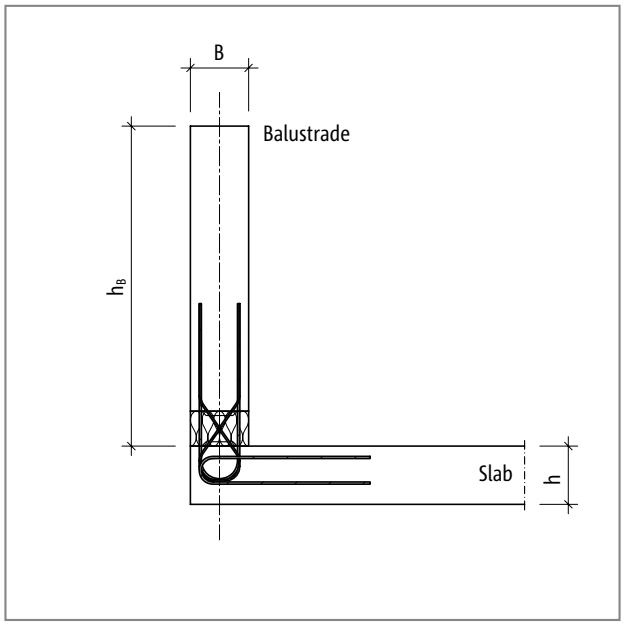
Special designs

Please contact the design support department if you have connections that are not possible with the standard product variants shown in this information (contact details on page 3).

Direction of forces



Schöck Isokorb® Typ AXT: Sign convention for the design



Schöck Isokorb® type AXT: Static system

Determination of spacing

Determination of the maximum spacing

The maximum spacing a_{max} of the Schöck Isokorb® type AXT is dependent on the moments $m_{Ed,y}$, normal forces $n_{Ed,z}$ and shear forces $v_{Ed,x}$ acting on them. It can be determined with the aid of the procedure described below.
DThe verification is produced if the selected distance a_{prov} is ≤ a_{max} = min ($a_{max,1}$; $a_{max,2}$). In this case no further verification of the design internal forces is required.

Procedure:

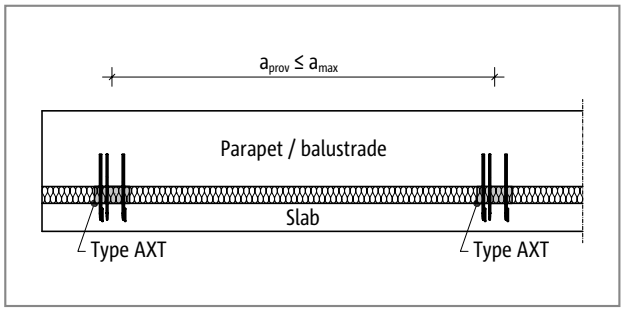
Determination of $a_{max,1\ (diagram)}$

The maximum spacing $a_{max,1}$ of the Schöck Isokorb® type AXT can be determined depending on the moments $m_{Ed,y}$ and normal forces $n_{Ed,z}$ acting on them with the aid of the following diagram.

- Determination of the acting moments $m_{Ed,y}$ and normal forces $n_{Ed,z}$
- Calculation of the ratio $n_{Ed,z}/m_{Ed,y}$
- Read up the righthand axis for $n_{Ed,z}/m_{Ed,y}$ using the calculated ratio ①
- Draw a horizontal line up to the intersection with the appropriate curve (note Schöck Isokorb® type and width)
- Draw a vertical line through the intersection and read off $N_{Rd,z}$ (intersection of the vertical line with the $N_{Rd,z}$ axis) ②
- Determine the maximum distance: $a_{max,1}$ = $N_{Rd,z}/n_{Ed,z}$

Determination of $a_{max,2}$

The maximum spacing $a_{max,2}$ of the Schöck Isokorb® type AXT depends on the shear force and is determined through the relationship $a_{max,2} = V_{Rd,x}/v_{Ed,x}$.



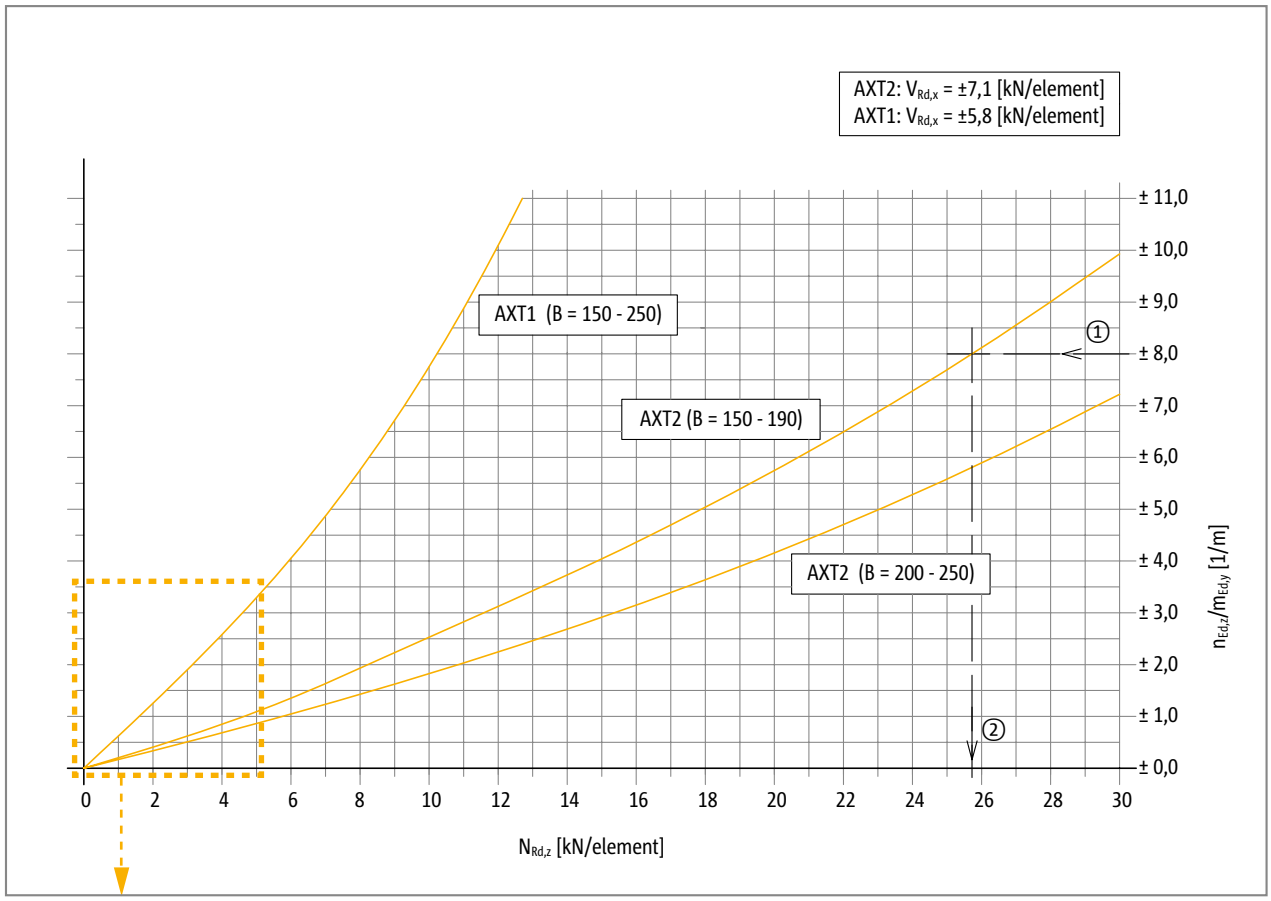
Schöck Isokorb® type AXT: Verification achieved, if selected distance a_{prov} ≤ a_{max}

Numerical example determination of centre distances

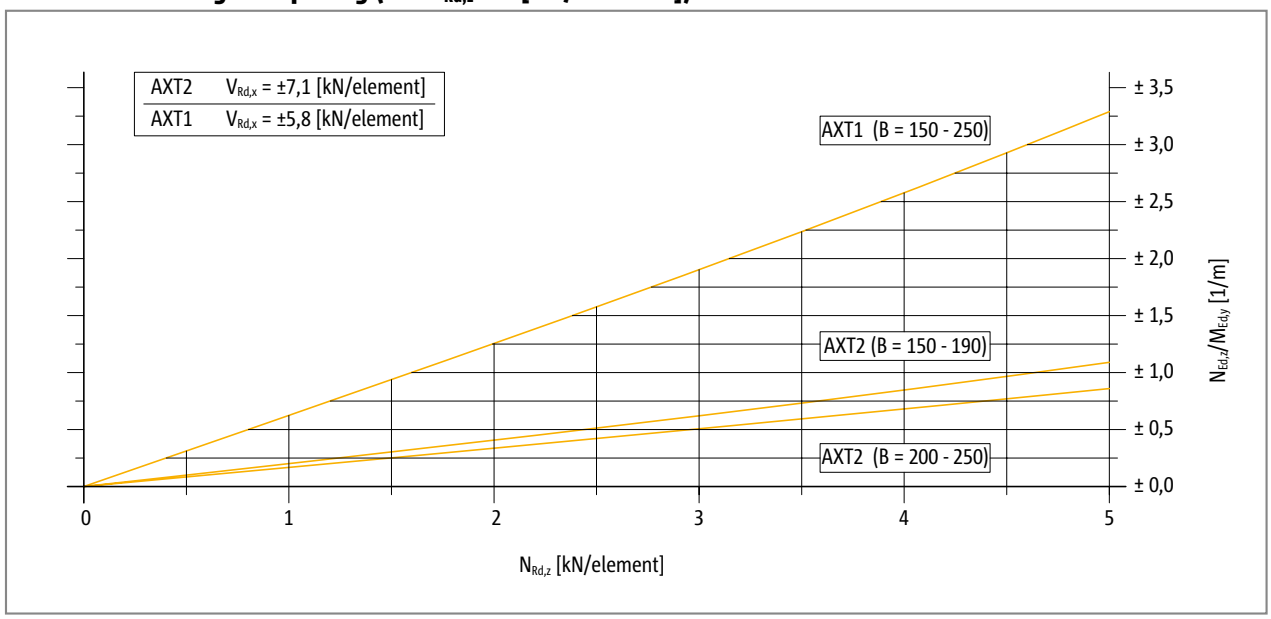
given:	AXT2	B = 190 mm
internal forces per meter connection length		
	$n_{Ed,z}$	= 12.0 kN/m
	$v_{Ed,x}$	= 2.0 kN/m
	$m_{Ed,y}$	=1.5 kNm/m
Determination of $a_{max,1}$		
input value ①	$n_{Ed,z}/m_{Ed,y}$	= 12.0 [kN/m] / 1.5[kNm/m] = 8.0 [1/m]
read off ②	$N_{Rd,z}$	= 25.7 kN
	$a_{max,1}$	= 25.7 kN / 12.0 [kN/m] = 2.14 m
Determination of a_{max2}	$a_{max,2}$	= 7.1 kN / 2.0 [kN/m] = 3.55 m
⇒	a_{max}	**= 2.14 m**

Determination of spacing

Diagram spacing (0 < $N_{Rd,z}$ < 30 [kN/element])



Detailed view diagram spacing (0 < $N_{Rd,z}$ < 5 [kN/element])



Determination of spacing

- For $n_{ed,z}$ = 0 or $m_{ed,y}$ = 0, use design variants A,B, or C.

Design variants

The Schöck Isokorb® type AXT, independent of the allowable normal force $N_{Rd,z}$ and the allowable moment $M_{Rd,y}$, has a constant allowable shear force $V_{Rd,x}$. The allowable moment $M_{Rd,y}$ and the allowable normal forces $N_{Rd,z}$ determine each other mutually in an interaction. For the design of the Schöck Isokorb® type AXT there are three **design variants A,B,C** available.

- **Design variant A**:
  In the **design table** the interaction formula solved once according to the allowable moment $M_{Rd,y}$ [kNm/element] depending on an acting normal force $N_{Ed,z}$ [kN/element] is given and solved once according to the allowable normal force $N_{Rd,z}$ kN/element] depending on an acting moment $M_{Ed,y}$ [kNm/element]. Verification achieved: $N_{Ed,z} \leq N_{Rd,z}(M_{Ed,y})$ or $M_{Ed,y} \leq M_{Rd,y}(N_{Ed,z})$ and $V_{Ed,x} \leq V_{Rd,x}$
- **Design variant B**:
  In the **design diagramm** the interaction of allowable normal force $N_{Rd,z}$ [kN/element] and moment load $M_{Rd,y}$ [kN/element] is presented graphically. The verification is achieved, if the intersection of acting normal force $N_{Ed,z}$ [kN/element] and acting moment $M_{Ed,y}$ [kN/element] lies below or on the graph applicable for the respective Schöck Isokorb® type.
- **Design variant C**:
  In the **interaction table** the allowable moments $M_{Rd,y}$ [kN/element] are given depending on the allowable normal force $N_{Rd,z}$ [kN/element].

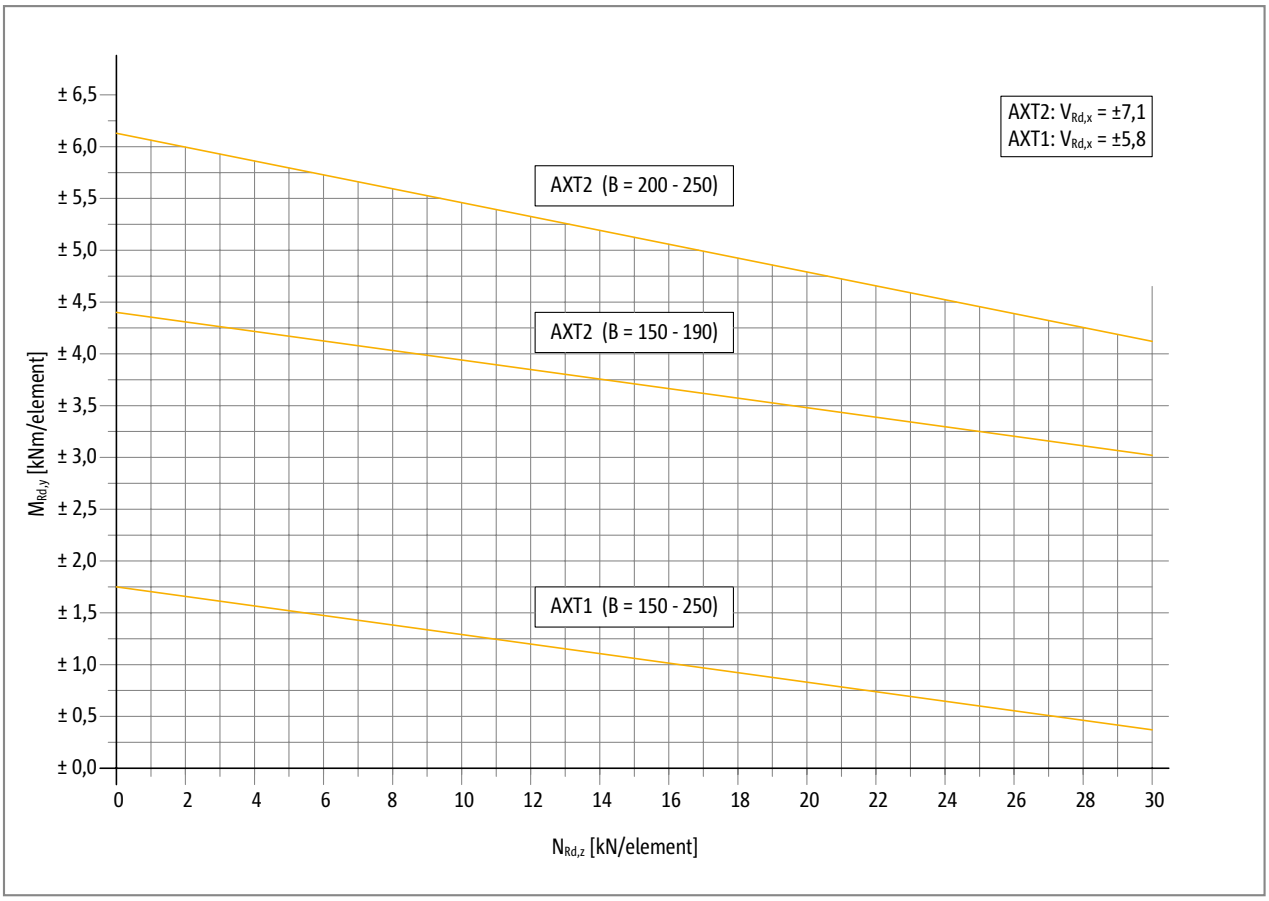
Design variant A: Design table

Schöck Isokorb® type		AXT1	AXT2
Design values with		Concrete strength class ≥ C25/30	
		$M_{Rd,y}$ [kNm/element]	
Isokorb® width [mm]	150 - 190	$\leq 1{,}75 - 0{,}046 \cdot N_{Ed,z}$	$\leq 4{,}40 - 0{,}046 \cdot N_{Ed,z}$
	200 - 250	$\leq 1{,}75 - 0{,}046 \cdot N_{Ed,z}$	$\leq 6{,}13 - 0{,}066 \cdot N_{Ed,z}$
		$N_{Rd,z}$ [kN/Element]	
	150 - 190	$\leq 38{,}04 - \frlvert M_{Ed,y} \frrvert / 0{,}046$	$\leq 95{,}65 - \frlvert M_{Ed,y} \frrvert / 0{,}046$
	200 - 250	$\leq 38{,}04 - \frlvert M_{Ed,y} \frrvert / 0{,}046$	$\leq 92{,}89 - \frlvert M_{Ed,y} \frrvert / 0{,}066$
		$V_{Rd,x}$ [kN/Element]	
	150 - 250	±5.8	±7.1

Schöck Isokorb® type	AXT1	AXT2
Isokorb® length [mm]	250	250
Tension bars/compression bars	2 × 2 ⌀ 8	2 × 3 ⌀ 8
Shear force bars	1 ⌀ 6 + 1 ⌀ 6	1 ⌀ 6 + 1 ⌀ 6
Connection stirrup	2 ⌀ 8	4 ⌀ 8
Balustrade/parapet B_{min} R0	150	150
Balustrade/parapet B_{min} R90	160	160
Floor h_{min} [mm]	160	160

Design variants

Design variant B: Design diagram



Design variant C: Interaction table

Schöck Isokorb® type		AXT1 (B = 150 - 250)	AXT2 (B = 150 - 190)	AXT2 (B = 200 - 250)
Design values with		Concrete strength class ≥ C25/30		
		$M_{Rd,y}$ [kNm/element]		
$N_{Rd,z}$ [kN/Element]	0.0	±1.7	±4.4	±6.1
	5.0	±1.5	±4.2	±5.8
	10.0	±1.3	±3.9	±5.5
	15.0	±1.1	±3.7	±5.1
	20.0	±0.8	±3.5	±4.8
	25.0	±0.6	±3.3	±4.5
	30.0	±0.4	±3.0	±4.2

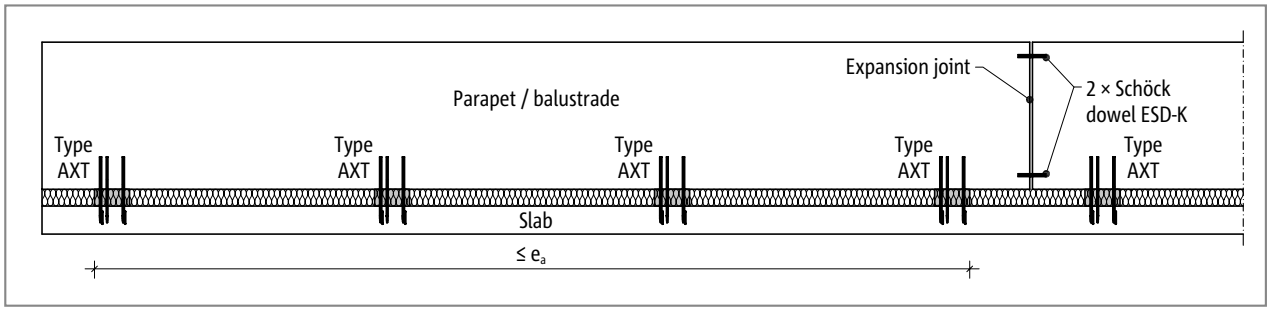
Notes on design

- The design values of the Schöck Isokorb® type AXT apply only for an identically directed action, i.e. negative shear force with positive moment or positive shear force with negative moment. The Schöck Isokorb® type FXT is recommended for further action combinations.
- The design values for a concrete strength class ≥ C25/30 are given for balustrade side and floor side.
- The shear force loading of the slabs in the area of the insulation joint is to be limited to $V_{Rd,\,max}$, whereby $V_{Rd,\,max}$, acc. to BS EN 1992-1-1 (EC2), Exp. (6.9) is determined for $\Theta = 45°$ and $\alpha = 90°$ (slab load-bearing capacity).
- The indicative minimum concrete strength class of the external structural component is C32/40.

Expansion joint spacing

Maximum expansion joint spacing

Expansion joints are to be arranged in the external structural components. The longitudinal change due to temeperature is related to the maximum distance e_a of the outer edges of the outermost Schöck Isokorb® types. With this the outer structural component can project laterally over the Schöck Isokorb®.
With fixed points such as, for example corners, half the maximum length e_a applies.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Dowel.



Schöck Isokorb® type AXT: Expansion joint configuration

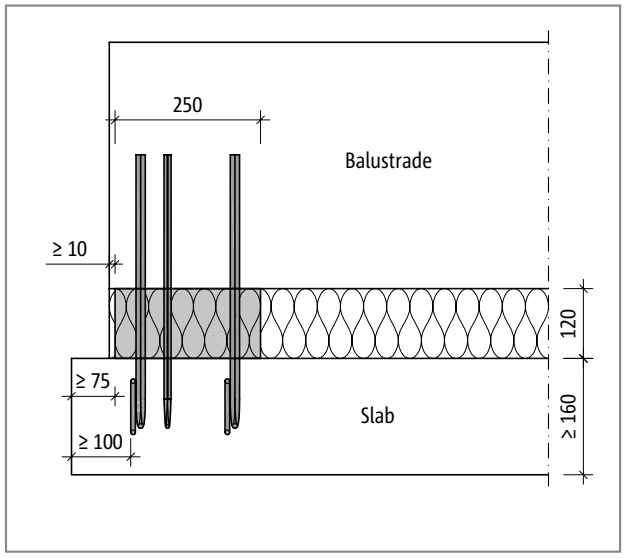
Schöck Isokorb® type		AXT
Spacing		e_a [m]
Insulating element thickness [mm]	120	23.0

Edge distances

The Schöck Isokorb® must be so arranged at the expansion joint that the following conditions are met:

- For the distance of the insulation member from the edge of the balustrade or of the insulation joint in the balustrade the following applies: $e_R \geq 10$ mm.
- For the distance of the insulation member from the edge of the floor the following applies $e_R \geq 75$ mm.
- FFor the distance of the connection stirrup from the edge of the floor the following applies: $e_R \geq 100$ mm.

Edge spacing

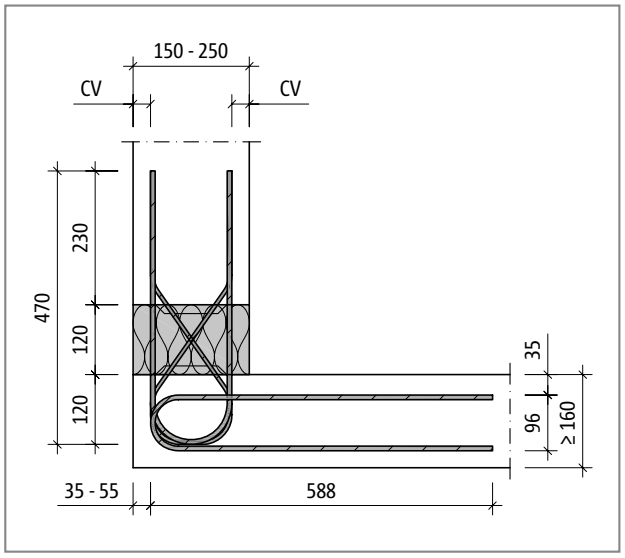


Schöck Isokorb® type AXT: View edge distances

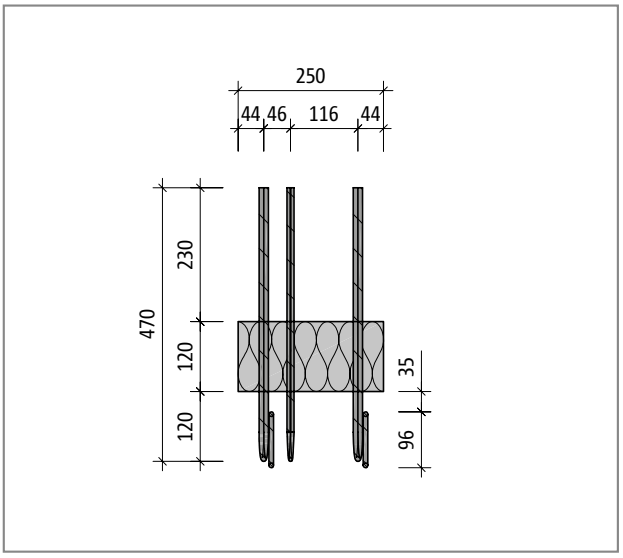
Edge distances

- The edge distances in floor and balustrade are not required to be the same.

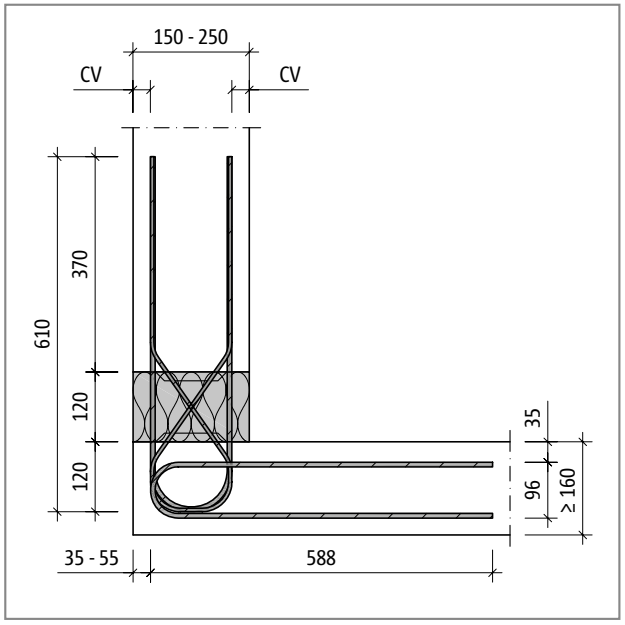
Product description



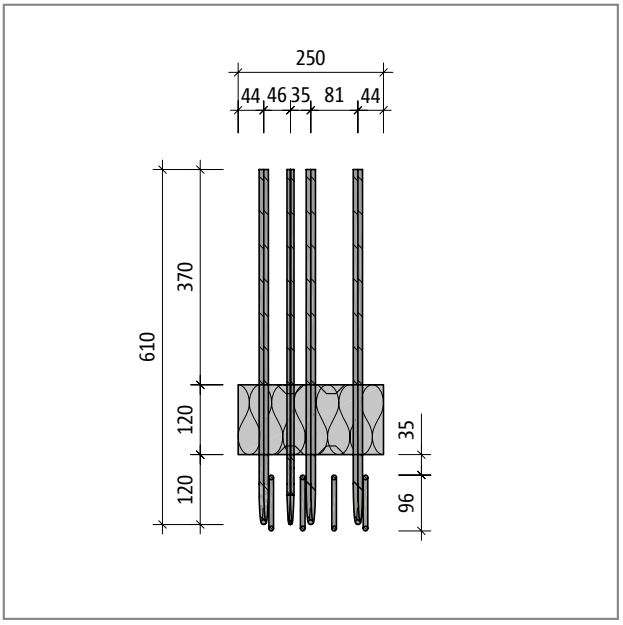
Schöck Isokorb® type AXT1: Product section



Schöck Isokorb® type AXT1: Product view



Schöck Isokorb® type AXT2: Product section



Schöck Isokorb® type AXT2: Product view

Product information

- Minimum width of the balustrade or parapet B_{min} = 150 mm, note minimum floor height$_{min}$ = 160 mm.
- Download further product plan views and cross-sections at www.schoeck.co.uk/download
- The concrete cover of the connection stirrup should be at least 35 mm.

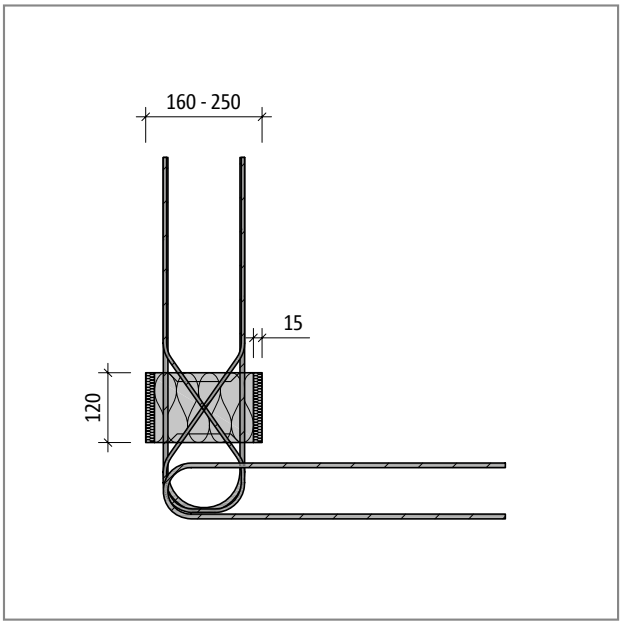
Concrete cover | Fire protection configuration

Concrete cover

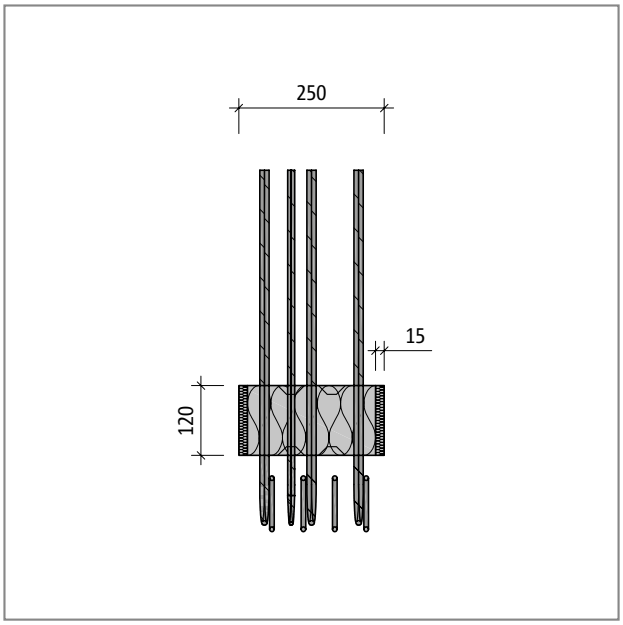
The concrete cover CV of the Schöck Isokorb® type AXT varies depending on the width of the balustrade. As stainless, ribbed reinforcing steel is used exclusively for the reinforcement of the balustrade in the area of the Shöck Isokorb® there is no risk of corrosion. Therefore, also with an exposure class XC3/4, a concrete cover in the area of the Schöck Isokorb® type AXT of CV = 25 mm is sufficient.

Schöck Isokorb® type		AXT1, AXT2
Concrete cover with		CV [mm]
Isokorb® width [mm]	150	25
	160	30
	170	35
	180	40
	190	45
	200	30
	210	35
	220	40
	230	45
	240	50
	250	55

Product configuration with fire protection requirement

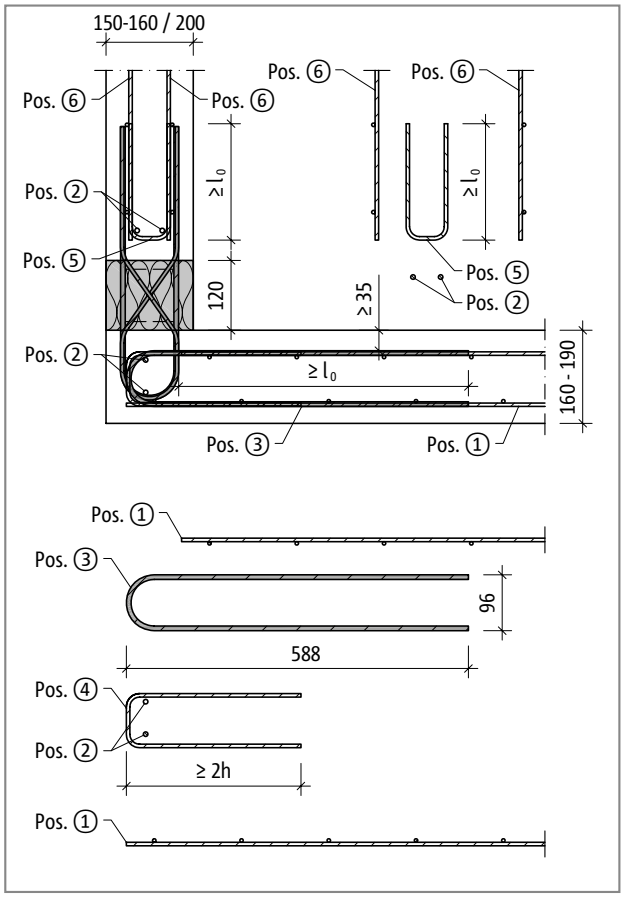


Schöck Isokorb® type AXT2 with R90: product section; fire protection slabs at the sides

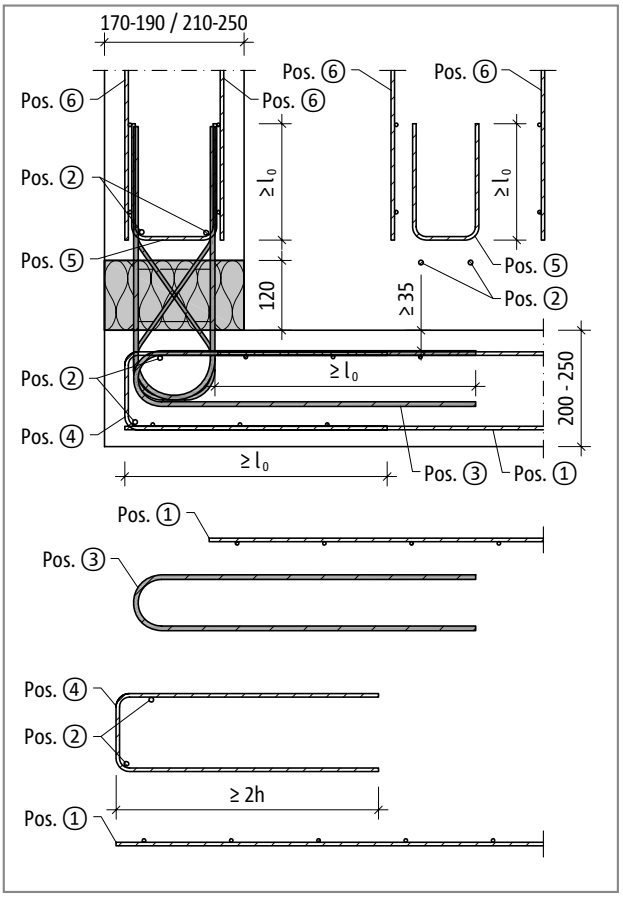


Schöck Isokorb® type AXT2 with R90: product section; fire protection slabs at the sides

On-site reinforcement



Schöck Isokorb® type AXT: On-site reinforcement on the inside (B =150 - 160 and B = 200)



Schöck Isokorb® type AXT: On-site reinforcement on the outside (B =170 - 190 and B = 210 - 250)

The reinforcement of the reinforced concrete slab is determined from the structural engineer's design. With this the effective moment, the effective normal force and the effective shear force should be taken into account.
In addition, it is to be ensured that the tension bars of the Schöck Isokorb® are 100% lapped. The existing floor reinforcement can be taken into account so far as the maximum separation to the tension bars of 4⌀ is maintained. Additional reinforcement may be required.

On-site reinforcement

Recommendation for the on-site connection reinforcement

Details of the lapping reinforcement for Schöck Isokorb® with a loading of 100 % of the maximum design moment with C25/30; positively selected: a_s lapping reinforcement ≥ a_s Isokorb® tension bars/compression members.

Schöck Isokorb® type		AXT1	AXT2
	Location	Concrete strength class ≥ C25/30	
Pos. 1 Lapping reinforcement			
Pos. 1 [mm²/Element]	Floor side	100	201
Lap length l_0 [mm]	Floor side	451	451
Pos. 2 Steel bars along the insulation joint			
Pos. 2	floor side/balustrade side	4 • H8	4 • H8
Pos. 3 Factory supplied connection stirrup			
Pos. 3	Floor side	2 • H8	4 • H8
Pos. 4 Structural edging for the floor height h = 200 - 250 mm			
Pos. 4	Floor side	H8@150	H8@150
Pos. 5 Stirrup as suspension reinforcement			
Pos. 5	balustrade side	H8@250	H8@250
Lap length l_0 [mm]	balustrade side	200	332
Pos. 6 Lapping reinforcement			
Pos. 6 [mm²/Element]	balustrade side	100	151
Lap length l_0 [mm]	balustrade side	200	332

Information about on-site reinforcement

- Alternative connection reinforcement is possible. For the determination of the lap length the rules acc. to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA apply. A reduction of the required lap length using m_{Ed}/m_{Rd} is permitted.
- For the reinforcing steel connection stirrups supplied ex works, the upper concrete cover c_v in the floor slab is to be selected dependent on the exposure class.
- With the Schöck Isokorb® widths B=150, 160, 200 the concrete cover CV is ≤ 35 mm. The reinforcement is therefore to be arranged within the tension/compression bars.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Design example

Design example

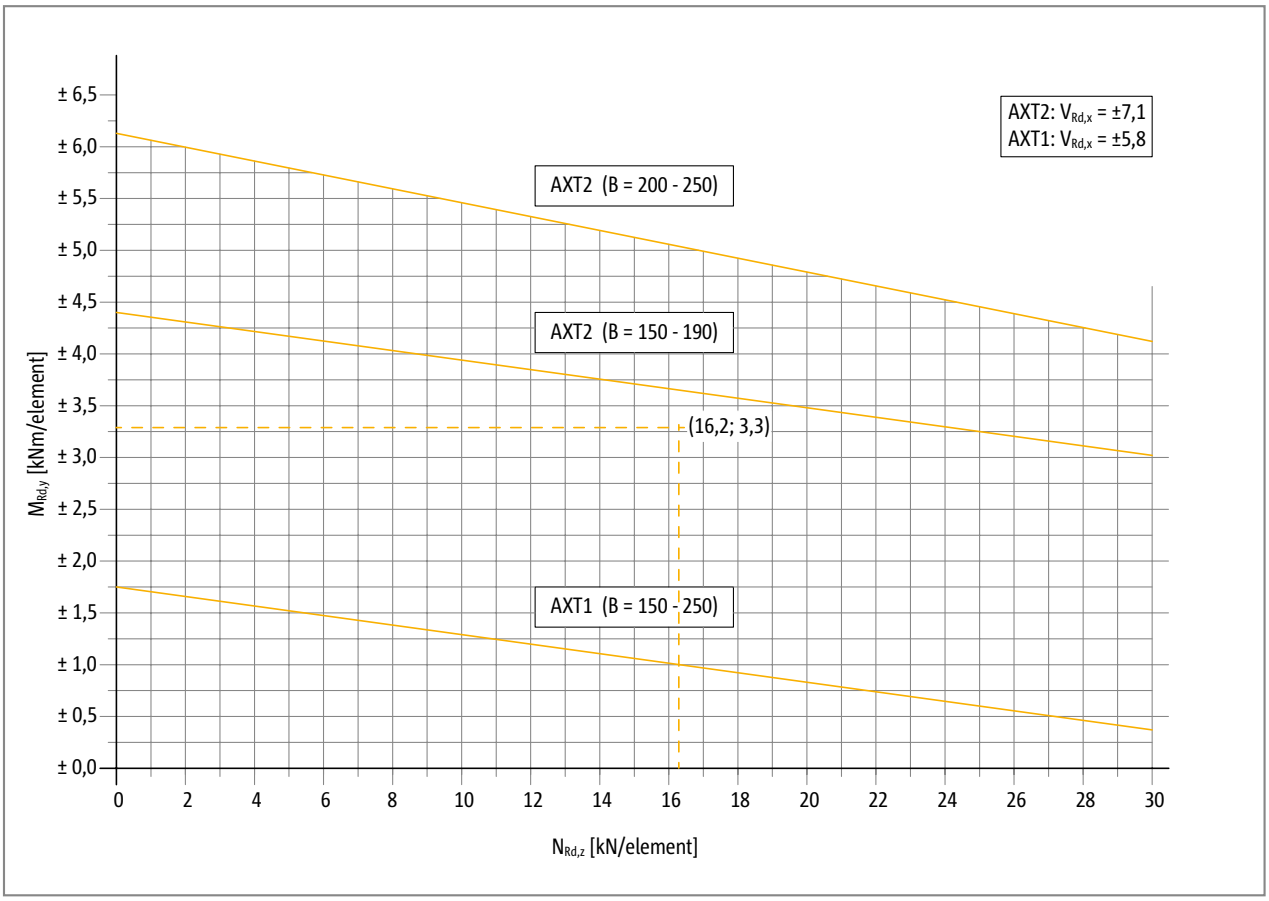
Given:	concrete floor		C25/30,
	concrete balustrade		C25/30
Balustrade	B	= 200 mm	
	h_B	= 1.00 m	
Loading:			
Own weight and expansion	g_k	= 6 kN/m	
Wind	w_k	= 0.8 kN/m²	
Cross beam load	q_k	= 1.0 kN/m	
Selected:	Schöck Isokorb® type AXT2 B = 200 mm		
	spacing a_{prov} = 2.00 m		
Effect per Schöck Isokorb®			
	$N_{Ed,z}$	= $\gamma_G \cdot g_k \cdot a_{prov}$	
	$N_{Ed,z}$	= 1.35 · 6 kN/m · 2.00 m = 16.2 kN	
	$V_{Ed,x}$	= - ($\gamma_Q \cdot w_k \cdot h_B + \gamma_Q \cdot \Psi_0 \cdot q_k$) · a_{prov}	
	$V_{Ed,x}$	= - (1.5 · 0.8 kN/m² ·1.00 m + 1.5 · 0.7 · 1.0 kN/m) · 2.0 m = - 4.5 kN	
	$M_{Ed,y}$	= ($\gamma_Q \cdot w_k \cdot h^2_B/2 + \gamma_Q \cdot \Psi_0 \cdot q_k \cdot h_B$) · a_{prov}	
	$M_{Ed,y}$	= (1.5 · 0.8 kN/m² · 1.0 m²/2 + 1.5 · 0.7 · 1.0 kN/m · 1.0 m) · 2.0 m = 3.3 kNm	
Note:	For the verification with selected or predetermined spacing 1 design variant is sufficient. Alternatively the verification of the maximum centre distances page 190 is enough.		

Design variant A

Design table	Schöck Isokorb® type AXT2 B = 200 mm		
Moment load-bearing capacity	$M_{Rd,y}$	≤ 6.13 - 0.066 · $N_{Ed,z}$	
	$M_{Rd,y}$	≤ 6.13 - 0.066 · 16.2 kN = 5.1 kNm	
	⇒	$M_{Ed,y}$ = 3.3 kNm ≤ $M_{Rd,y}$ = 5.1 kNm → NW o.k. ✓	
Shear force load-bearing capacity		$V_{Rd,x}$ = - 7.1 kN	
	⇒	$V_{Ed,x}$ = -4.5 kN ≤ $V_{Rd,x}$ = - 7.1 kN → NW o.k. ✓	
Note:	The check is concerned with an interaction, either the moment verification or the verification of the normal force is enough.		

Design example

Design model B
Design diagram



The point ($N_{Ed,z}$; $M_{Ed,y}$) = (16.2 kN; 3.3 kNm) lies below the line of the Schöck Isokorb® type AXT2 (B = 200 - 250).
With this the verification is achieved.

Shear force load-bearing capacity $V_{Rd,x}$ = - 7.1 kN

⇒ $V_{Ed,x}$ = -4.5 kN ≤ $V_{Rd,x}$ = - 7.1 kN → NW o.k. ✓

Design variant C

Interaction table $M_{Rd,y}$ = ± 4.8 kNm with $N_{Rd,z}$ = 20 kN

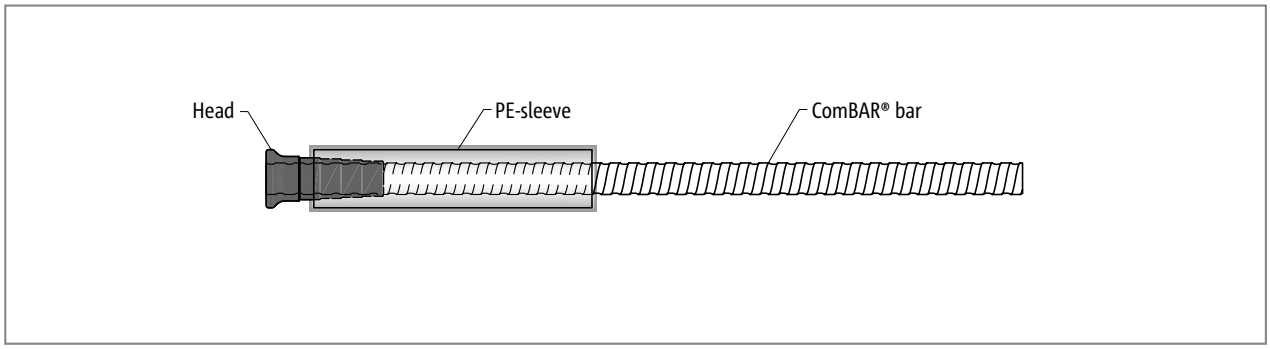
⇒ $M_{Ed,y}$ = 3.3 kNm ≤ $M_{Rd,y}$ = ± 4.8 kNm → NW o.k.✓

$N_{Ed,z}$ = 16.2 kN ≤ $N_{Rd,z}$ = 20 kN → NW o.k. ✓

Shear force load-bearing capacity $V_{Rd,x}$ = - 7,1 kN

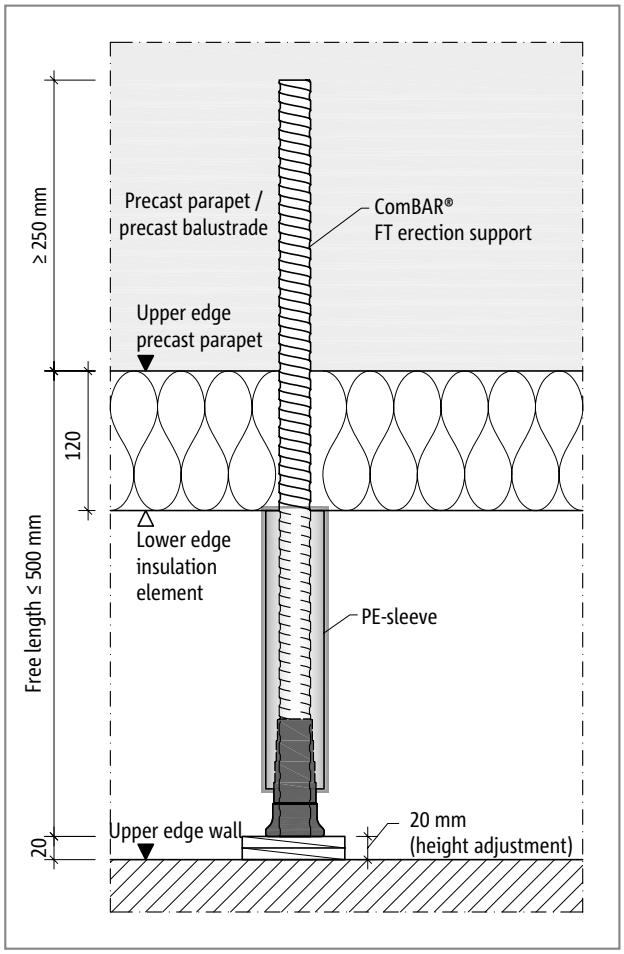
⇒ $V_{Ed,x}$ = - 4.5 kN ≤ $V_{Rd,x}$ = - 7.1 kN → NW o.k. ✓

Schöck ComBAR® FT erection support



Schöck ComBAR® FT erection support: ComBAR® single-headed bar with sleeve

Schöck ComBAR® type	FT erection support L=650 mm	FT erection support L=850 mm
Diameter [mm]	25	25
Bar length [mm]	650	850
Max. load per support [kN]	30	30
Max. free length [mm]	500	500
Min. anchoring length FT [mm]	250	250

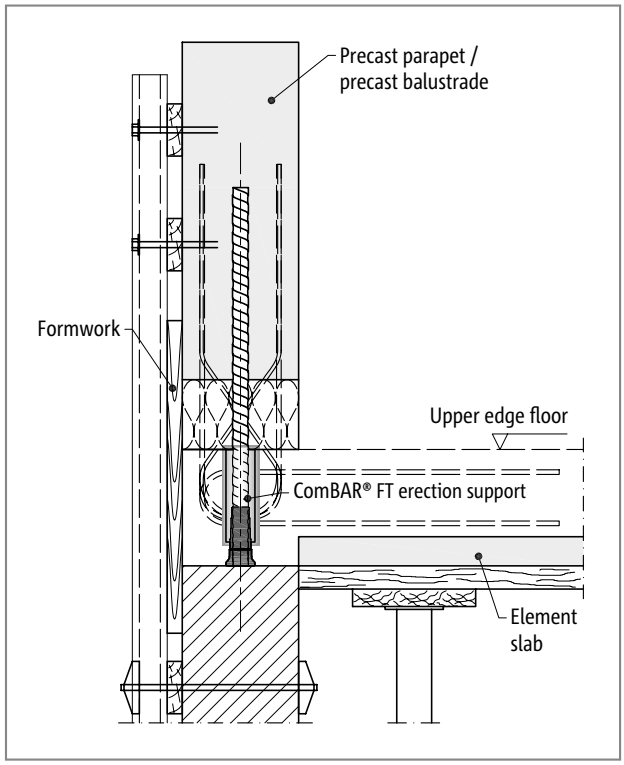


Schöck ComBAR® FT erection support: planning dimensions

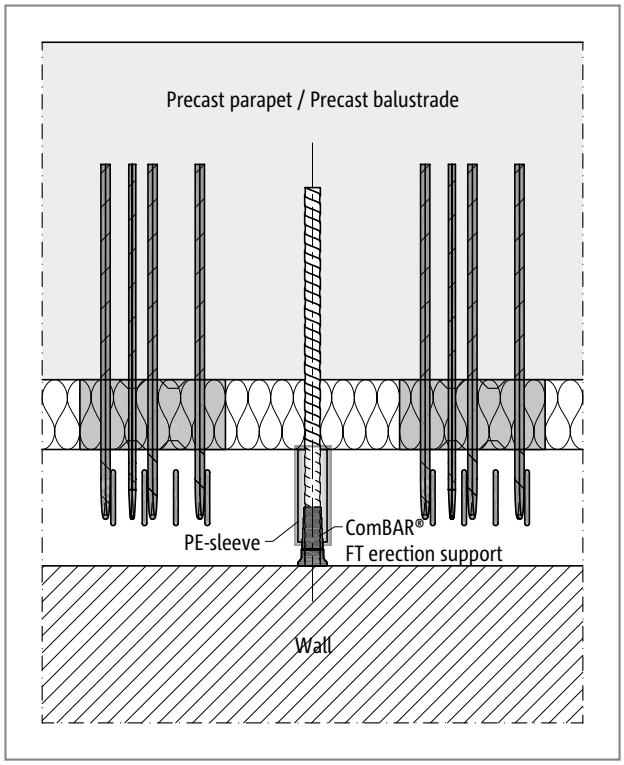
Product

- In the structural state the Schöck ComBAR FT erection support can accept the given load for a short time only.
- The Schöck ComBAR FT erection support is to be used only in combination with the Schöck Isokorb® type AXT.
- The sleeve is structurally necessary and is to be imbedded in concrete in the floor.

Schöck ComBAR® FT erection support

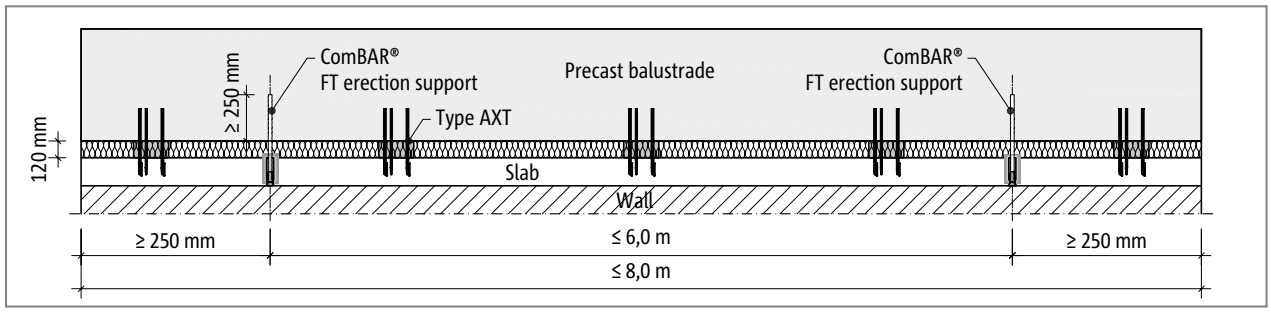


Schöck ComBAR® FT erection support: Installation in a precast concrete parapet; section



Schöck ComBAR® FT erection support: Installation in a precast concrete parapet; view

Area of application



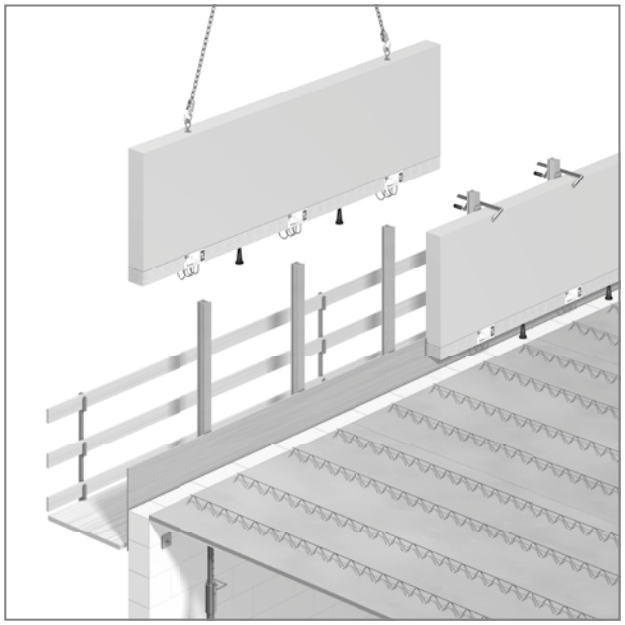
Schöck Isokorb® type AXT with ComBAR® FT erection support: Edge separations and minimum embedment length in the precast concrete balustrade

Precast concrete balustrade/precast concrete parapeta

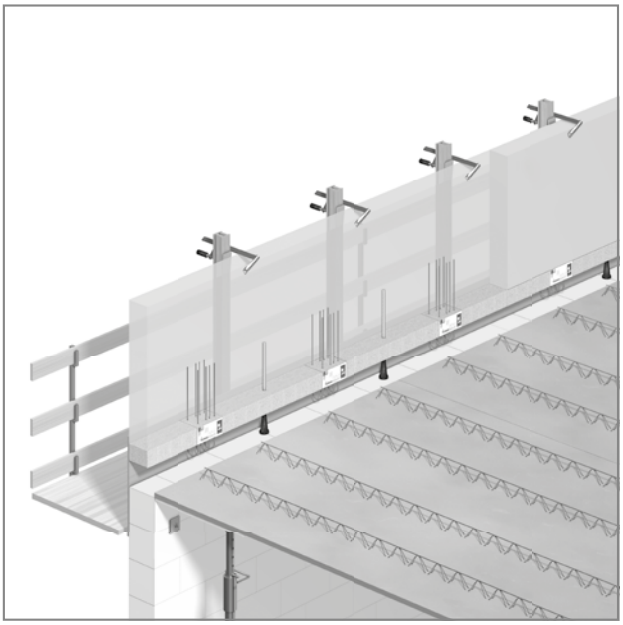
- Total weight ≤ 60 kN (30 kN/ComBAR® FT erection support)
- Overall length ≤ 8.0 m
- Thickness ≥ 150 mm
- Concrete strength class ≥ C25/30
- Reinforcement inside and outside
- Number of Schöck ComBAR® FT erection supports per precast concrete part ≤ 2

Schöck ComBAR® FT erection support

Installation precast concrete balustrade/precast concrete parapet



Schöck Isokorb® type AXT with ComBAR® FT erection support: Raising of the precast concrete parapeta

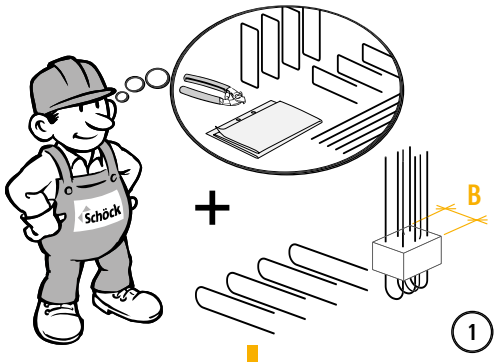


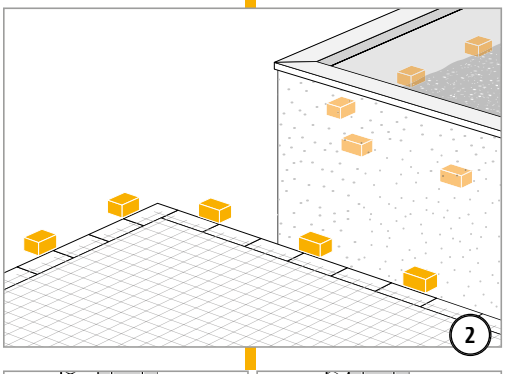
Schöck Isokorb® type AXT with ComBAR® FT erection support: Securing of the aligned precast concrete parapet

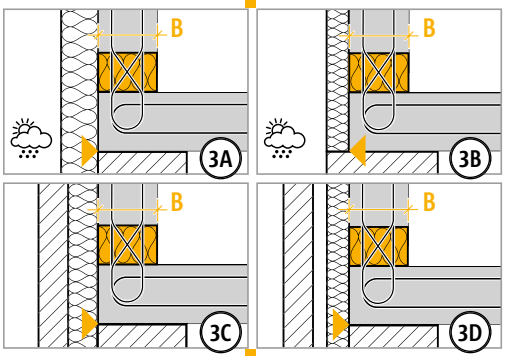
Installation

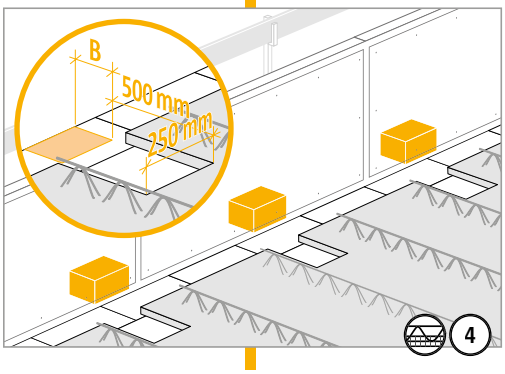
- The sleeve is part of the product.
- Mount parapet.
- Place parapet at the installation point and adjust height using adjustment shims.
- Secure using c-clamps.
- Install connection stirrups.

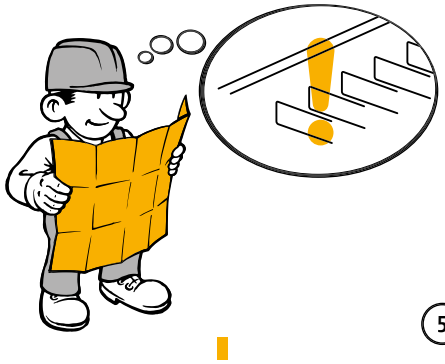
Installation instructions

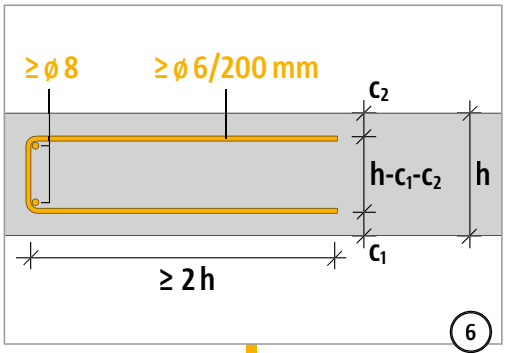


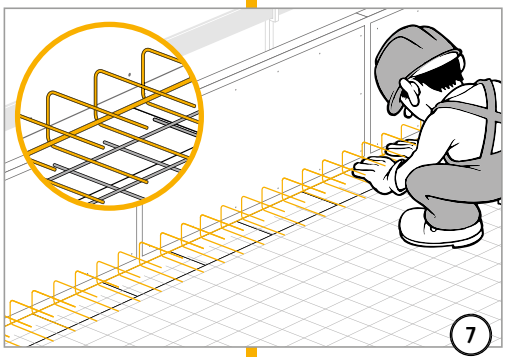


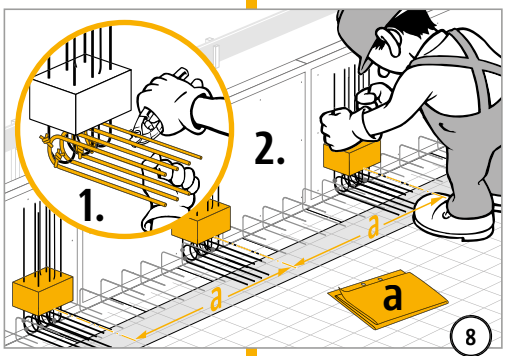


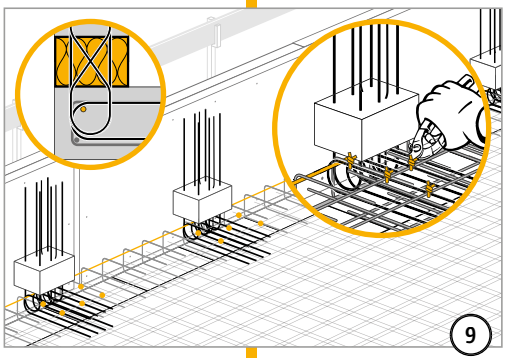


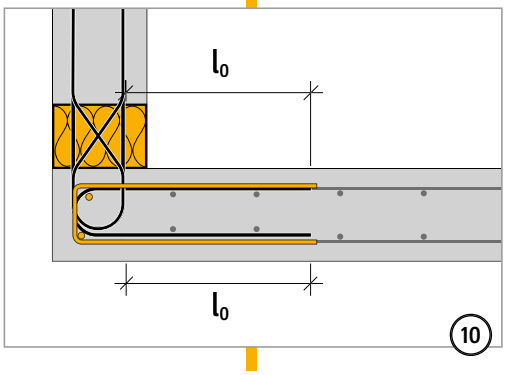




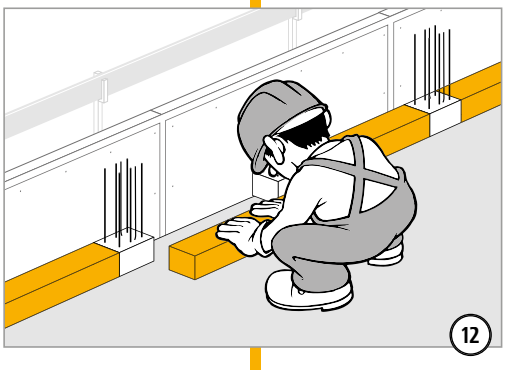


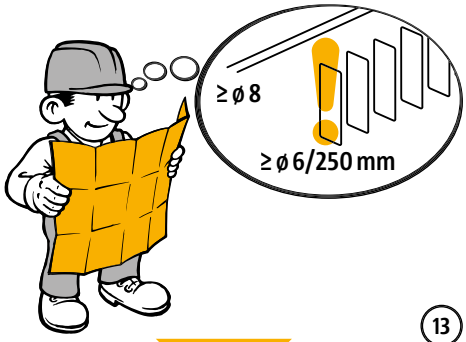


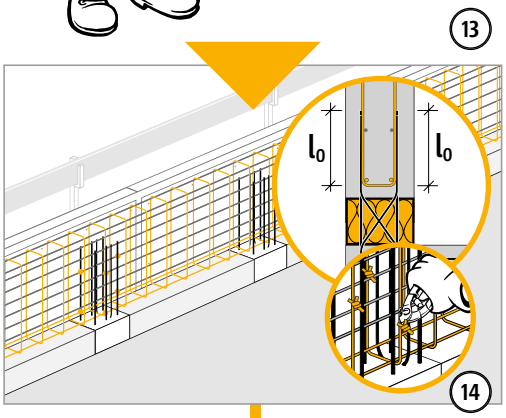


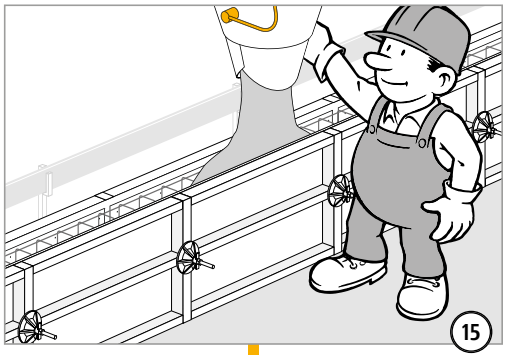


Installation instructions









Check list

- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ Has the maximum separation of the outermost Schöck Isokorb® types as a result of expansion in the outer structural components been maintained?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Are the requirements with regard to fire protection explained and is the appropriate addendum entered in the Isokorb® type description in the implementation plans?