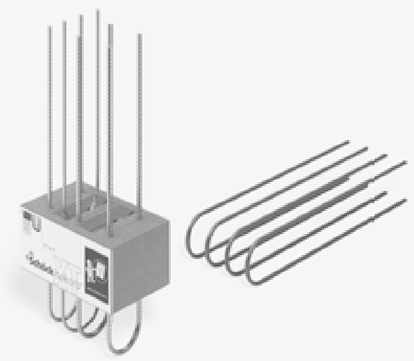
Schöck Isokorb® XT type A



Schöck Isokorb® XT type A
Suitable for parapets and balustrades. It transmits moments, shear forces and compression forces.

Element arrangement | Installation cross sections

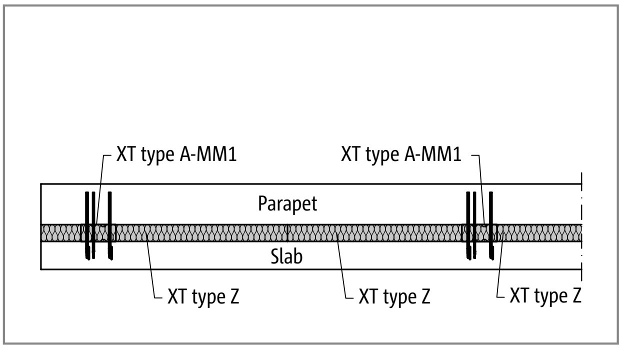


Fig. 214: Schöck Isokorb® XT type A, Z: Attic (XT type A-MM1)

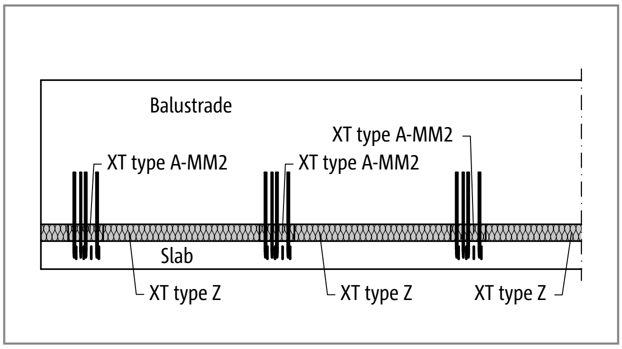


Fig. 215: Schöck Isokorb® XT type A, Z: Parapet (XT type A-MM2)

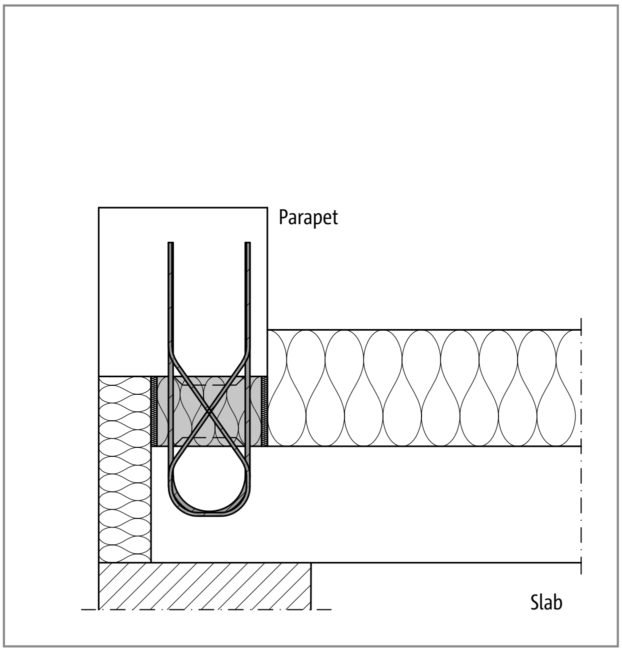


Fig. 216: Schöck Isokorb® XT type A: Connection of a parapet (XT type A-MM1)

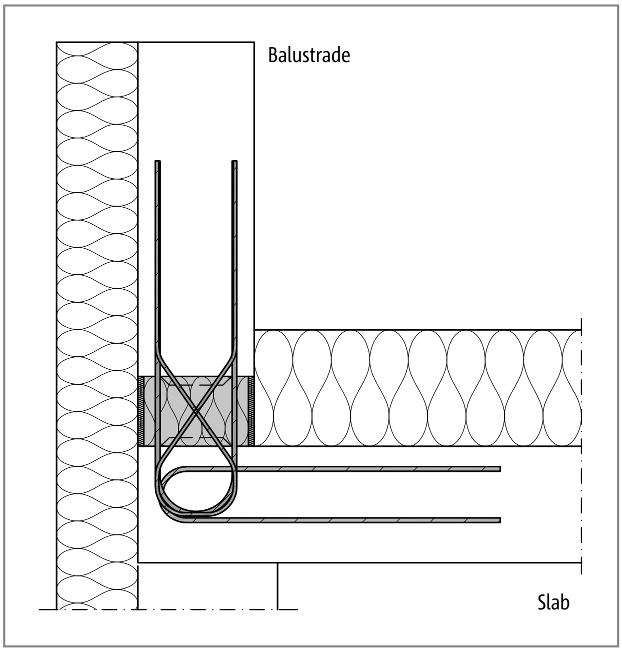


Fig. 217: Schöck Isokorb® XT type A: Connection to a balustrade (XT type A-MM2)

Element arrangement/installation cross-section

- For the insulation between the Schöck Isokorb® the Schöck Isokorb® XT type Z (see page 135) is available in fire protective configuration.

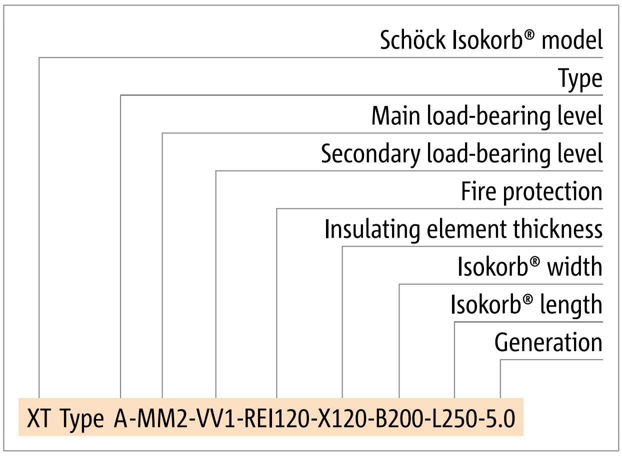
Product selection | Type designations | Special designs

Schöck Isokorb® XT type A variants

The configuration of the Schöck Isokorb® XT type A can vary as follows:

- Main load-bearing level:
  MM1 for parapets
  MM2 for balustrades
- Secondary load-bearing level:
  VV1
- Fire resistance class:
  REI120 (standard): Top and bottom fire protection projecting by 10mm on both sides
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® width:
  B = 160 - 250 mm, R0, REI120
- Isokorb® length:
  L = 250 mm
- Generation:
  5.0

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).

Design force direction

Direction of forces

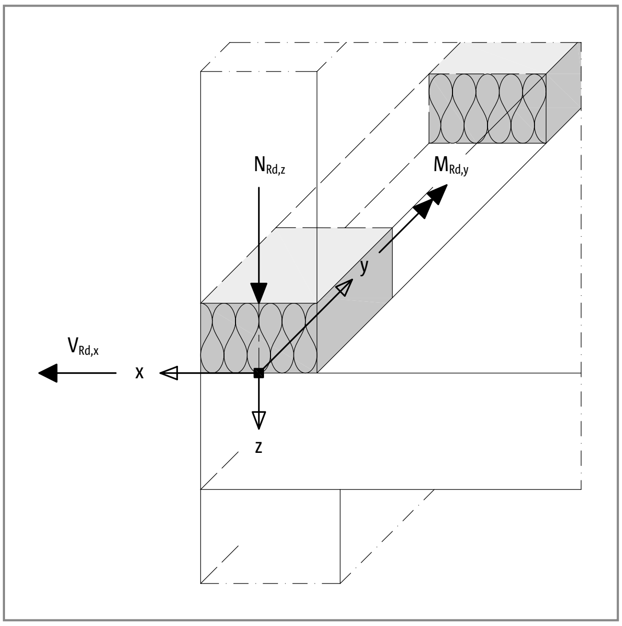


Fig. 218: Schöck Isokorb® XT type A: Sign convention for the design

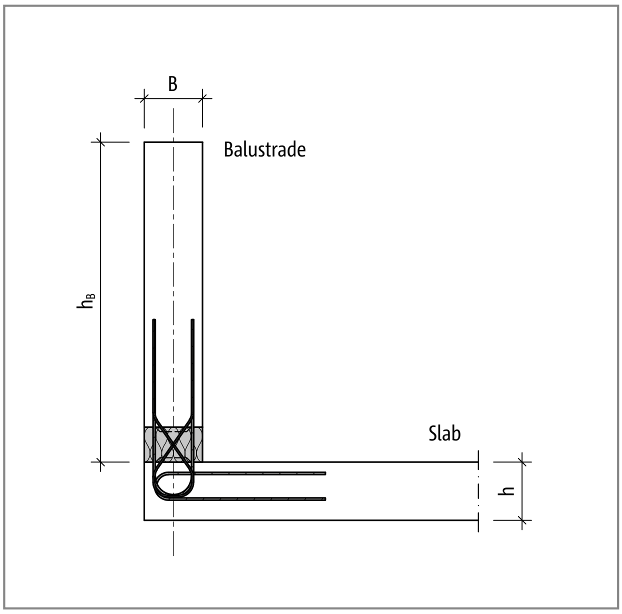


Fig. 219: Schöck Isokorb® XT type A: Static system

Determination of spacing

Determination of the maximum spacing

The maximum spacing a_{max} of several Schöck Isokorb® T type A depends on the impacting moments $m_{Ed,y}$, normal forces $m_{Ed,z}$ and shear forces $v_{Ed,x}$. It can be determined with the aid of the procedure described below.
Verification is provided if the selected distance $a_{prov} \leq a_{max}$ is = min ($a_{max,1}$; $a_{max,2}$). Then, no further verification of the design internal forces is required.

Procedure:

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

The maximum centre distance $a_{max,1}$ of several Schöck Isokorb® T type A can be determined depending on the impacting moments $m_{Ed,y}$ and normal forces $n_{Ed,z}$ with the aid of the following diagram.

- Determination of the 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 horizontal line up to the intersection point with the graphs (Take note of Schöck Isokorb® type and width)
- Draw vertical line in the intersection point and read off $N_{Rd,z}$ (intersection point of the vertical line with $N_{Rd,z}$-axis) ②
- Determination of the maximum distance: $a_{max,1} = N_{Rd,z}/n_{Ed,z}$

Determination of $a_{max,2}$

The maximum spacing $a_{max,2}$ of several Schöck Isokorb® T type A depens on the shear force

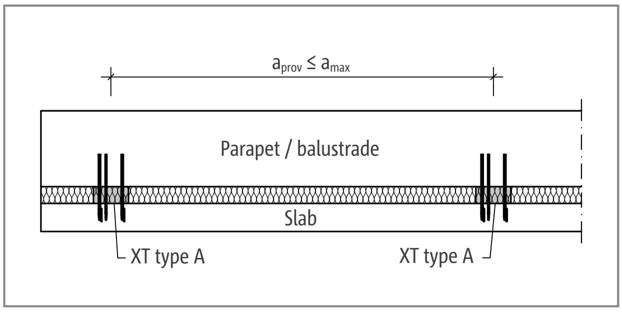


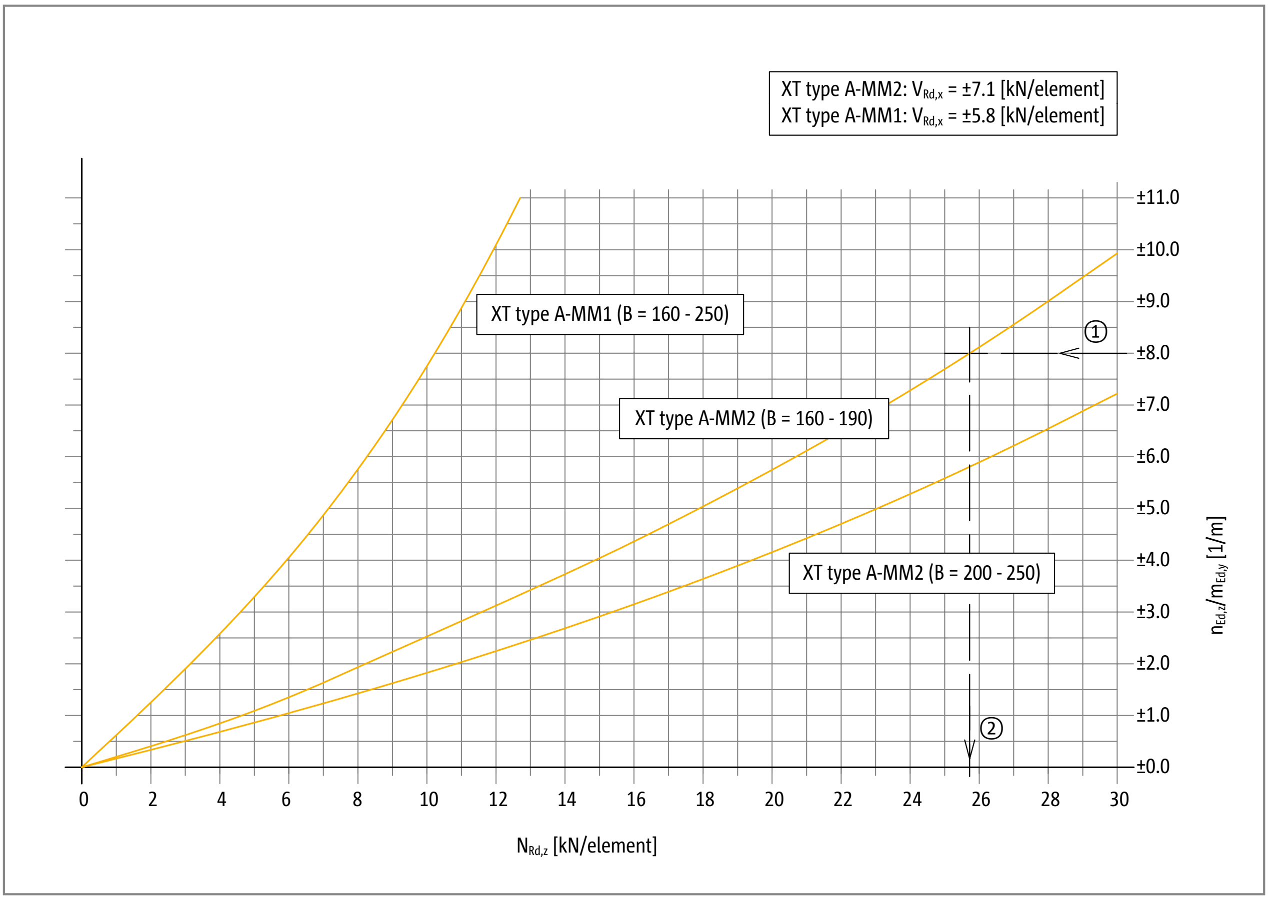
Fig. 220: Schöck Isokorb® XT type A: Verification met if selected distance $a_{prov} \leq a_{max}$

Numerical example of determination of centre distances

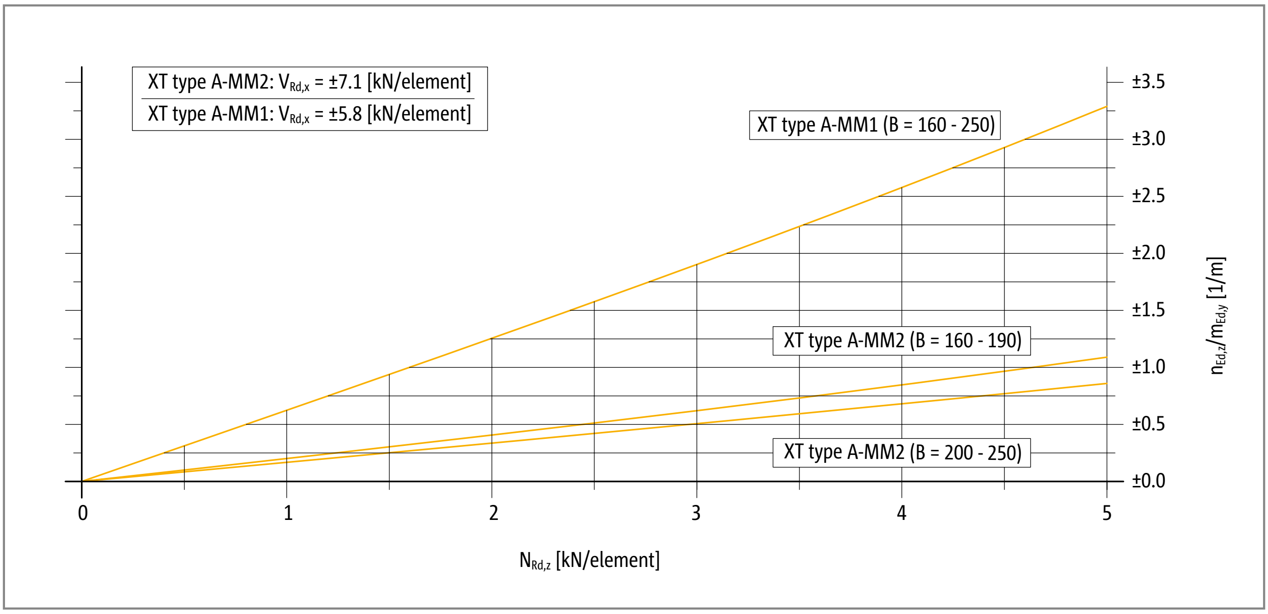
Given:	XT type A-MM2		B = 190 mm
Internal forces per metre connection length			
	$n_{Ed,z}$	= 12.0 kN/m	
	$v_{Ed,x}$	= 2.0 kN/m	
	$m_{Ed,y}$	=1.5 kNm/m	
Determination of $a_{max,1}$			
Input value ①	$n_{Ed,z}/m_{Ed,y}$	= 12.0 [kN/m] / 1.5[kNm/m] = 8.0 [1/m]	
Reading ②	$N_{Rd,z}$	= 25.7 kN	
	$a_{max,1}$	= 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.

XT type A

Reinforced concrete – reinforced concrete

Design variants

The Schöck Isokorb® XT type A, independent of the allowable normal force $N_{Rd,z}$ and the acceptable moment $M_{Rd,y}$, has a constant acceptable shear force$_{Rd,x}$. The allowable moment $M_{Rd,y}$ and the acceptable normal force $N_{Rd,z}$ condition each other in one interaction. For the design of the Schöck Isokorb® XT type A there are three **design variants A,B,C** available.

- **Design variant A**:
  In the **design table** the interaction formula is given, solved once according to the allowable moment $M_{Rd,y}$ [kNm/element] depending on an inormal force $N_{Ed,z}$ [kN/element] and solved once according to the allowable normal force $N_{Rd,z}$ [kN/element] depending on a moment $M_{Ed,y}$[kNm/element]. Verification met: $N_{Ed,z} \leq N_{Rd,z}(M_{Ed,y})$ 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 diagram** the interaction of acceptable normal force $N_{Rd,z}$ [kN/element] and moment loading $M_{Rd,y}$ [kN/element] is presented graphically. The verification is met if the intersection point from inormal force $N_{Ed,z}$ [kN/element] and moment $M_{Ed,y}$ [kN/element] lies below or at the graphs applicable for the respective Schöck Isokorb® type.
- **Design variant C**:
  In the **Interactions table** the allowable moments $M_{Rd,y}$ [kN/Element] are given depending on the acceptable normal force $N_{Rd,z}$ [kN/element].

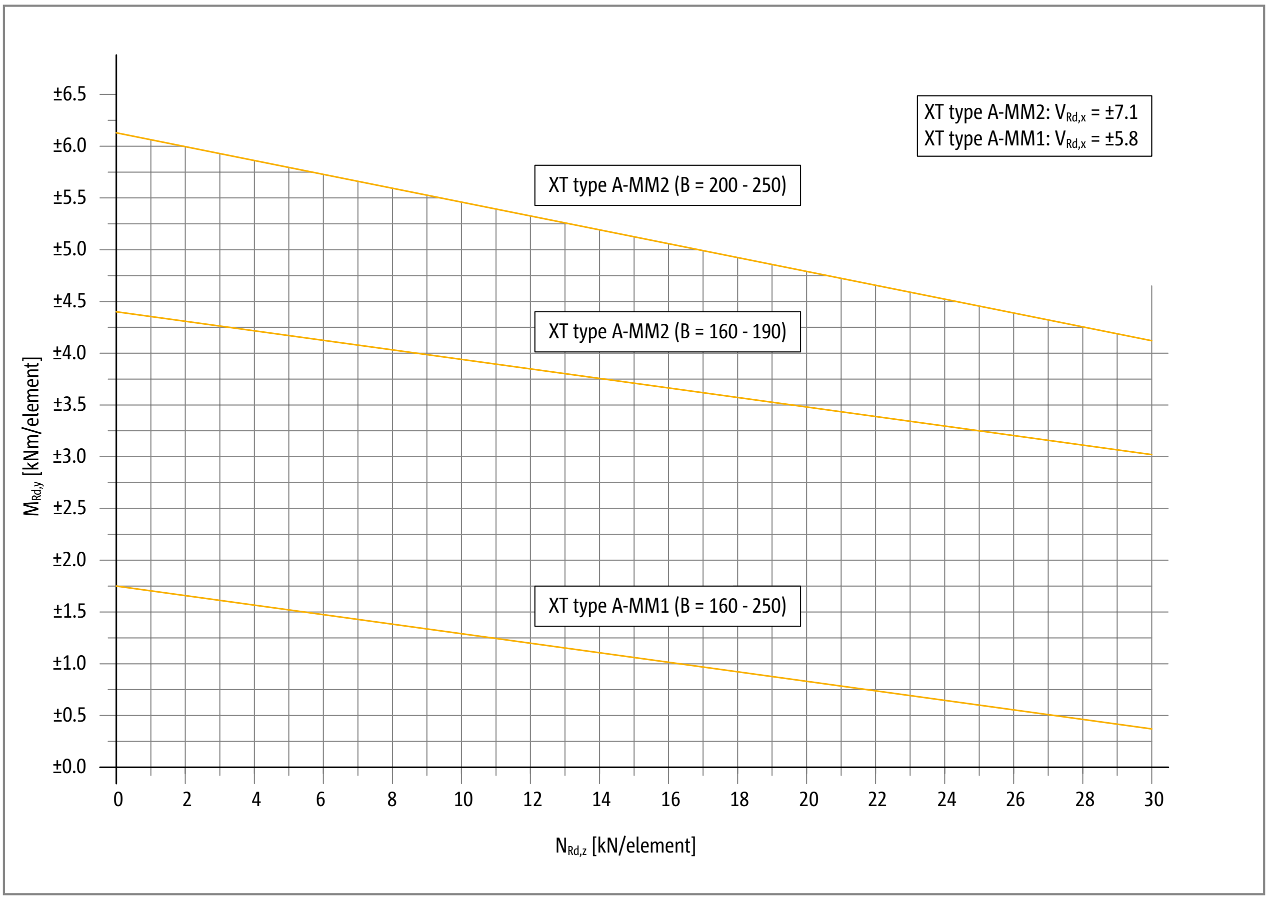
Design variant A: Design table

Schöck Isokorb® XT type A		MM1	MM2
Design values with		Concrete strength class ≥ C25/30	
		$M_{Rd,y}$ [kNm/element]	
Isokorb® width [mm]	160 - 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]	
	160 - 190	$\leq 38{,}04 - \frac{\lvert M_{Ed,y} \rvert}{0{,}046}$	$\leq 95{,}65 - \frac{\lvert M_{Ed,y} \rvert}{0{,}046}$
	200 - 250	$\leq 38{,}04 - \frac{\lvert M_{Ed,y} \rvert}{0{,}046}$	$\leq 92{,}89 - \frac{\lvert M_{Ed,y} \rvert}{0{,}066}$
		$V_{Rd,x}$ [kN/Element]	
	160 - 250	±5.8	±7.1

Schöck Isokorb® XT type A	MM1	MM2
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
Parapet/balustrade B_{min}	160	160
Floor h_{min} [mm]	160	160

Design variants

Design variant B: Design diagram



Design variant C: Interaction table

Schöck Isokorb® XT type A		MM1 (B = 160 - 250)	MM2 (B = 160 - 190)	MM2 (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® XT type A apply for an identically directed action, i.e. negative shear force with positive moment or positive shear force with negative moment. The Schöck Isokorb® XT type F is recommended for further combinations.
- The design values are given for a concrete strength class ≥ C25/30 on the parapet/balustrade side and ≥ C20/25 on the floor side.
- 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 Dorn.

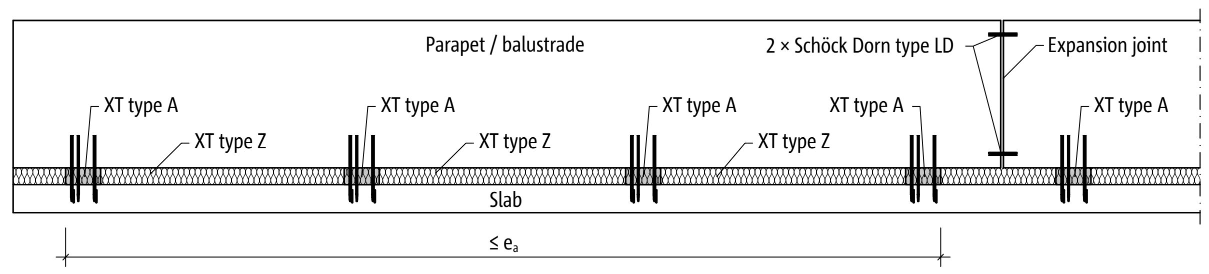


Fig. 221: Schöck Isokorb® XT type A: Expansion joint arrangement

Schöck Isokorb® XT type A		MM1, MM2
Spacing		e_a [m]
Insulating element thickness [mm]	120	23.0

XT type A

Reinforced concrete – reinforced concrete

Edge spacing

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.
- For the distance of the connection stirrup from the edge of the floor the following applies: $e_R \geq 100$ mm.

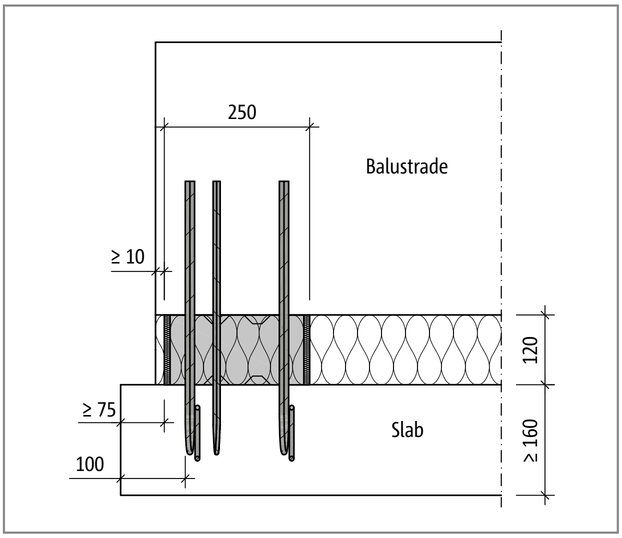


Fig. 222: Schöck Isokorb® XT type A: View edge distances

Edge distances

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

Product description

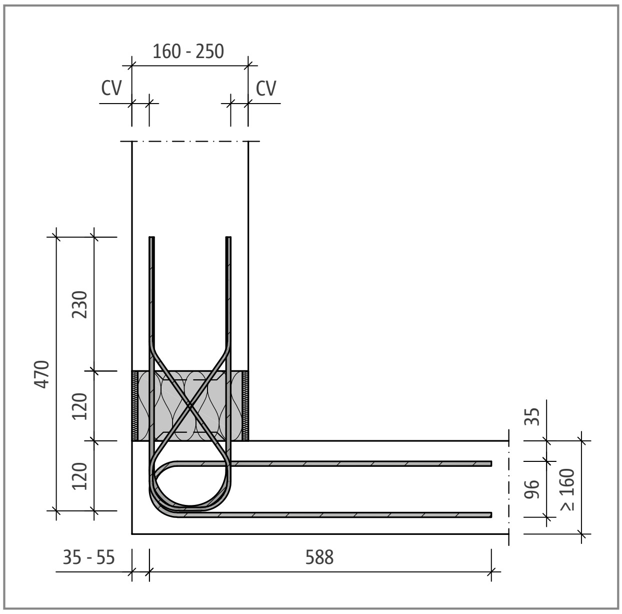


Fig. 223: Schöck Isokorb® XT type A-MM1: Product section

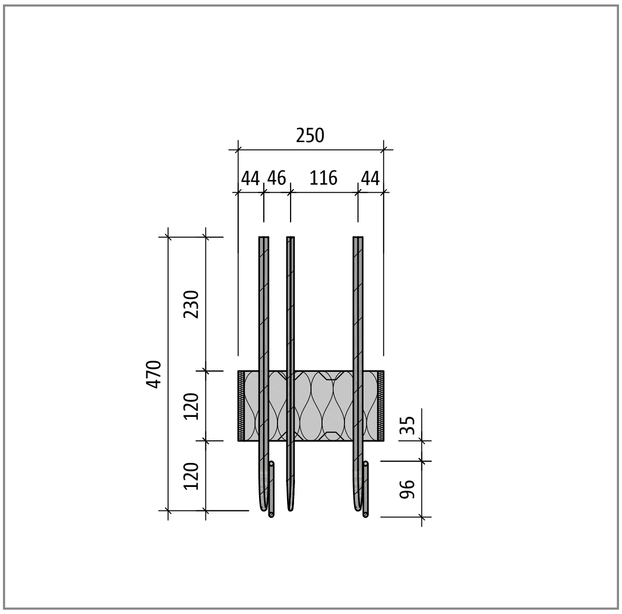


Fig. 224: Schöck Isokorb® XT type A-MM1: Product view

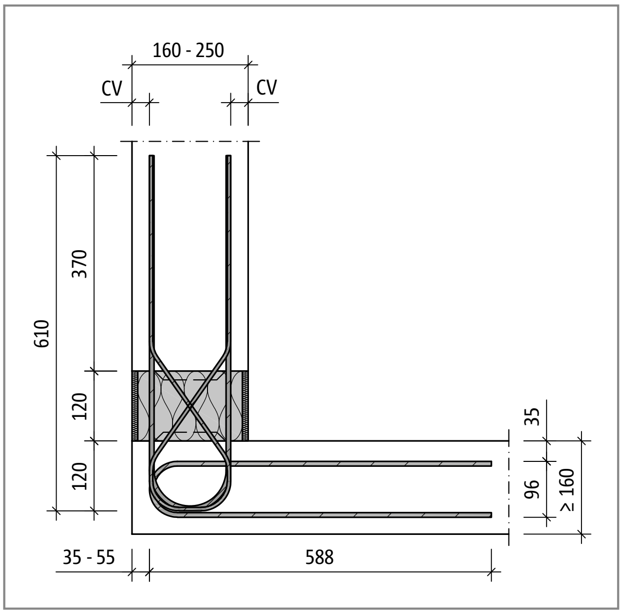


Fig. 225: Schöck Isokorb® XT type A-MM2: Product section

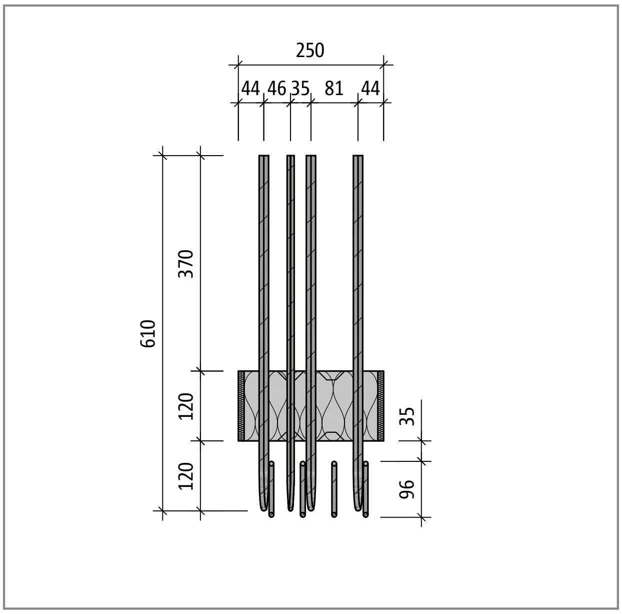


Fig. 226: Schöck Isokorb® XT type A-MM2: Product view

Product information

- Note minimum width of parapet or balustrade B_{min} = 160 mm, minimum floor height h_{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

Concrete cover

The concrete cover CV of the Schöck Isokorb® XT type A varies depending on the width of the parapet. As only ribbed reinforcement steels are used for reinforcement of the parapet in the area of the Schöck Isokorb®, there is no risk of corrosion. Therefore also with an exposure class XC4 a concrete cover in the area of the Schöck Isokorb® XT type A of CV = 25 mm is sufficient.

Schöck Isokorb® XT type A		MM1, MM2
Concrete cover with		CV [mm]
Isokorb® width [mm]	160	30
	170	35
	180	40
	190	45
	200	30
	210	35
	220	40
	230	45
	240	50
	250	55

On-site reinforcement

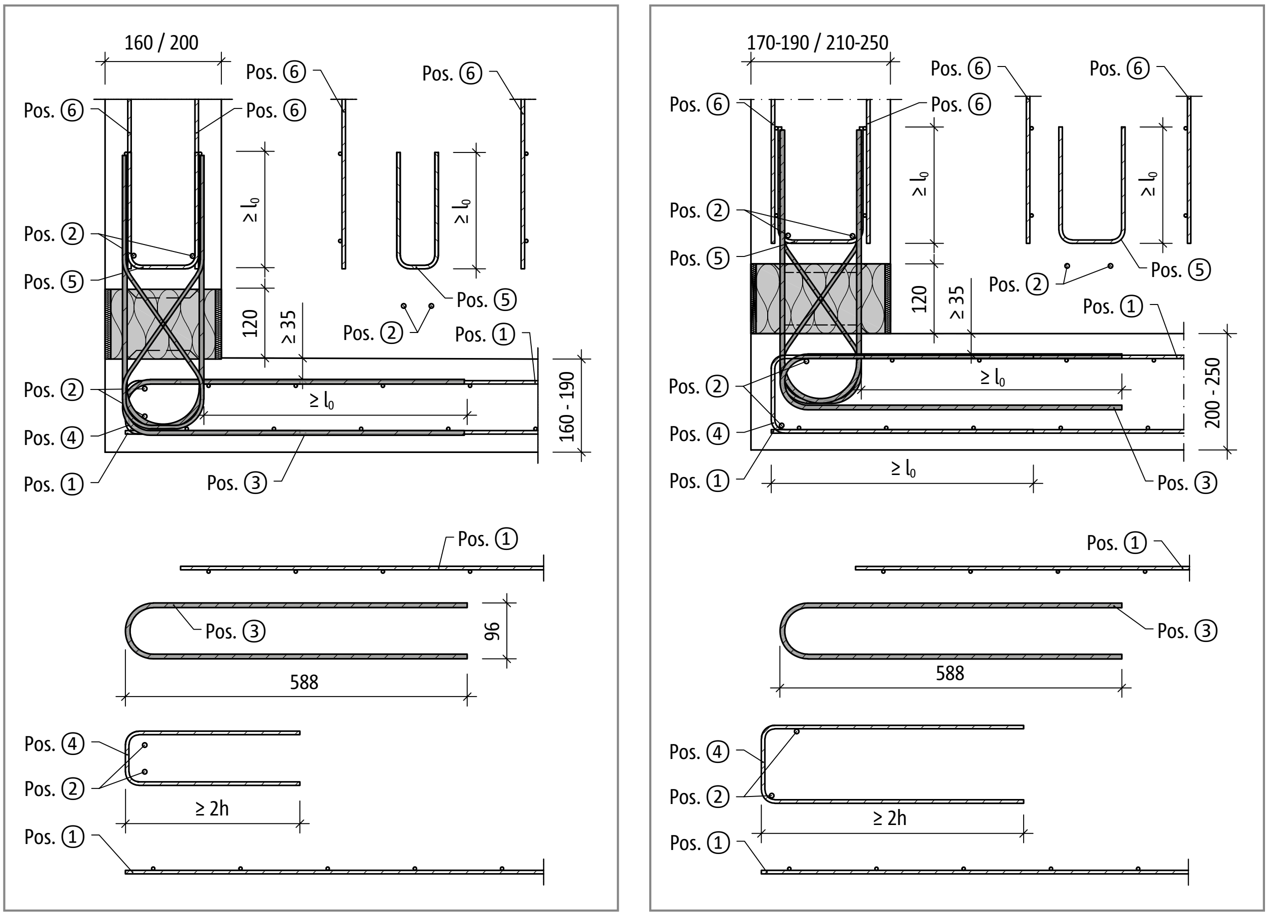


Fig. 227: Schöck Isokorb® XT type A: On-site reinforcement on the inside (B = 160 and B = 200)

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® XT type A		MM1	MM2
	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 supplementary edge reinforcement			
Pos. 4	**Floor side**	⌀ 6/200	⌀ 6/200
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 according to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA apply FA reduction of the required lap length with 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 parapet	C25/30
Parapet	B = 200 mm	
	h_B = 1.00 m	
Loading:		
Self-weight and extension	g_k = 6 kN/m	
Wind	w_k = 0.8 kN/m²	
Beam load	q_k = 1.0 kN/m	
Selected:	Schöck Isokorb® XT type A-MM2 B = 200 mm	
	Spacing a_{prov} = 2.00 m	

Impact per Schöck Isokorb®

$N_{Ed,z} = \gamma_G \cdot g_k \cdot a_{prov}$

$N_{Ed,z} = 1.35 \cdot 6\ \text{kN/m} \cdot 2.00\ \text{m} = 16.2\ \text{kN}$

$V_{Ed,x} = -(\gamma_Q \cdot w_k \cdot h_B + \gamma_Q \cdot \psi_0 \cdot q_k) \cdot a_{prov}$

$V_{Ed,x} = -(1.5 \cdot 0.8\ \text{kN/m}^2 \cdot 1.00\ \text{m} + 1.5 \cdot 0.7 \cdot 1.0\ \text{kN/m}) \cdot 2.0\ \text{m} = -4.5\ \text{kN}$

$M_{Ed,y} = (\gamma_Q \cdot w_k \cdot h^2_B/2 + \gamma_Q \cdot \psi_0 \cdot q_k \cdot h_B) \cdot a_{prov}$

$M_{Ed,y} = (1.5 \cdot 0.8\ \text{kN/m}^2 \cdot 1.0\ \text{m}^2/2 + 1.5 \cdot 0.7 \cdot 1.0\ \text{kN/m} \cdot 1.0\ \text{m}) \cdot 2.0\ \text{m} = 3.3\ \text{kNm}$

Note: For the verification with selected or given spacing a, a design variant is sufficient. Alternatively the verification of the maximum centre distances suffices page 156.

Design variant A

Design table: Schöck Isokorb® XT type A-MM2 B = 200 mm

Moment load-bearing capacity: $M_{Rd,y} \leq 6.13 - 0.066 \cdot N_{Ed,z}$

$M_{Rd,y} \leq 6.13 - 0.066 \cdot 16.2\ \text{kN} = 5.1\ \text{kNm}$

$\Rightarrow M_{Ed,y} = 3.3\ \text{kNm} \leq M_{Rd,y} = 5.1\ \text{kNm} \rightarrow$ NW o.k. ✓

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

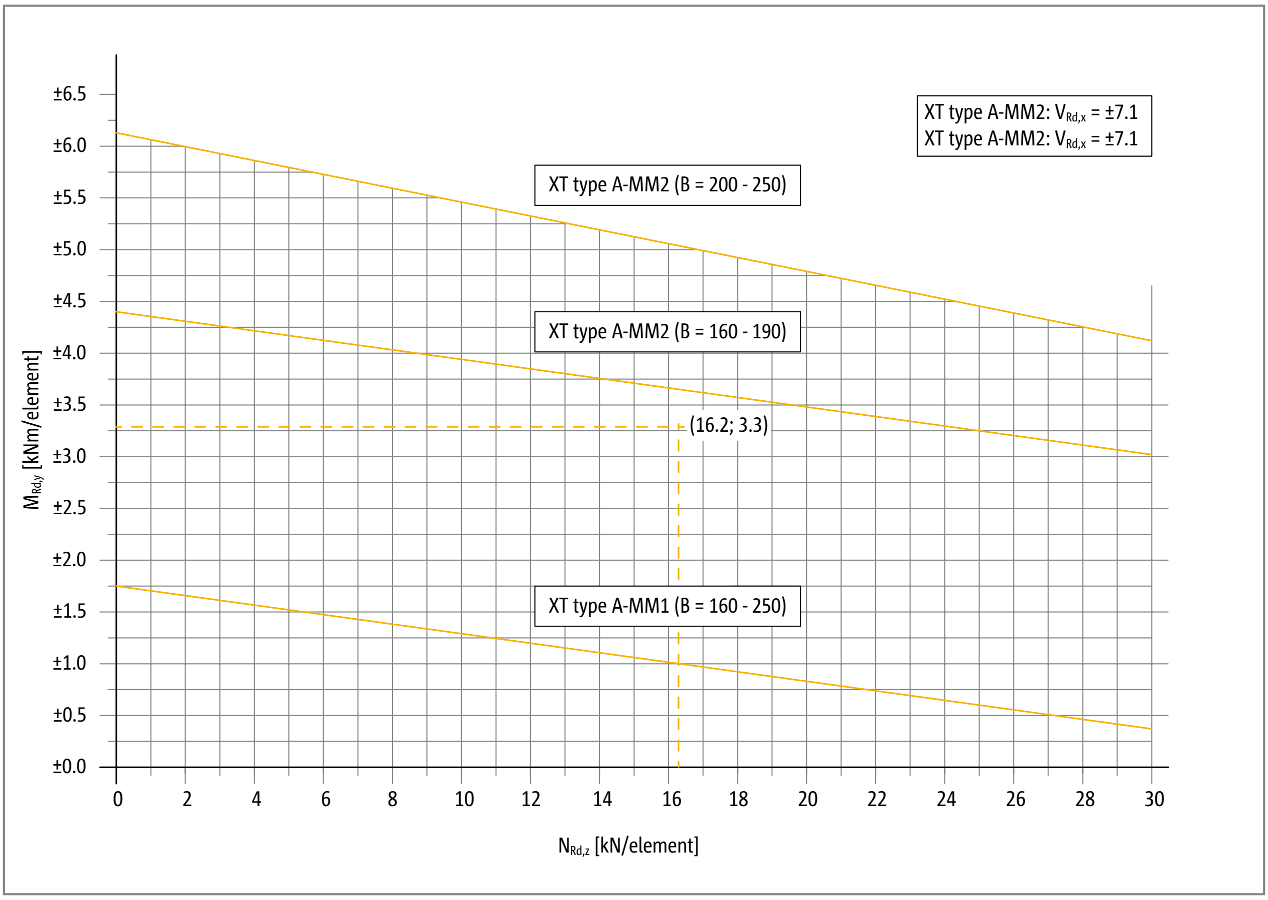
$\Rightarrow V_{Ed,x} = -4.5\ \text{kN} \leq V_{Rd,x} = -7.1\ \text{kN} \rightarrow$ NW o.k. ✓

Note: As this concerns an interaction, either the moment verification or the verification of the normal force suffices.

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® XT type A-MM2 (B = 200 - 250).
Thus the verification is rendered.

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

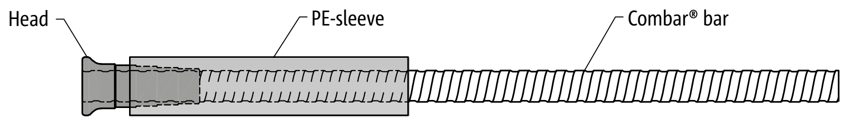


Fig. 228: Schöck Combar® FT erection support: Combar® single-headed bar with sleeve

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

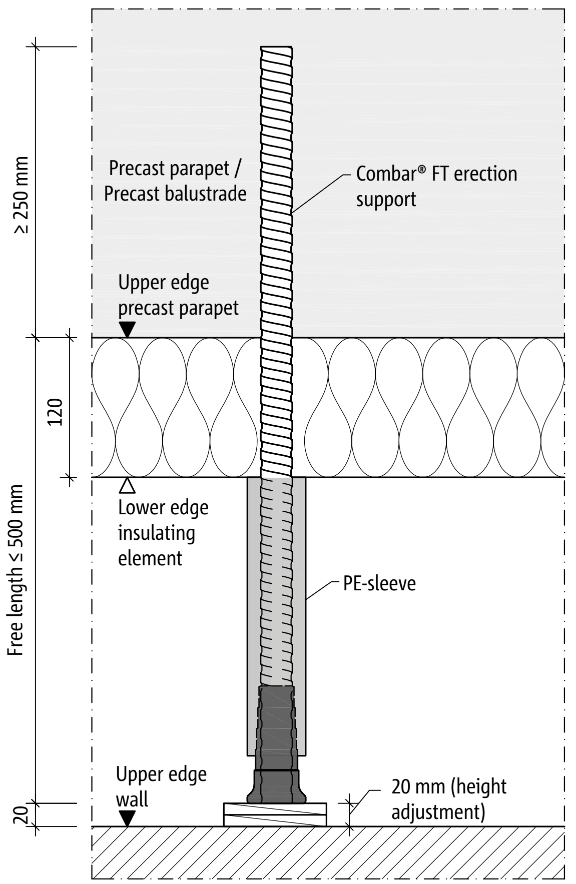


Fig. 229: Schöck Combar® FT erection support: planning dimensions

Schöck Combar® FT erection support

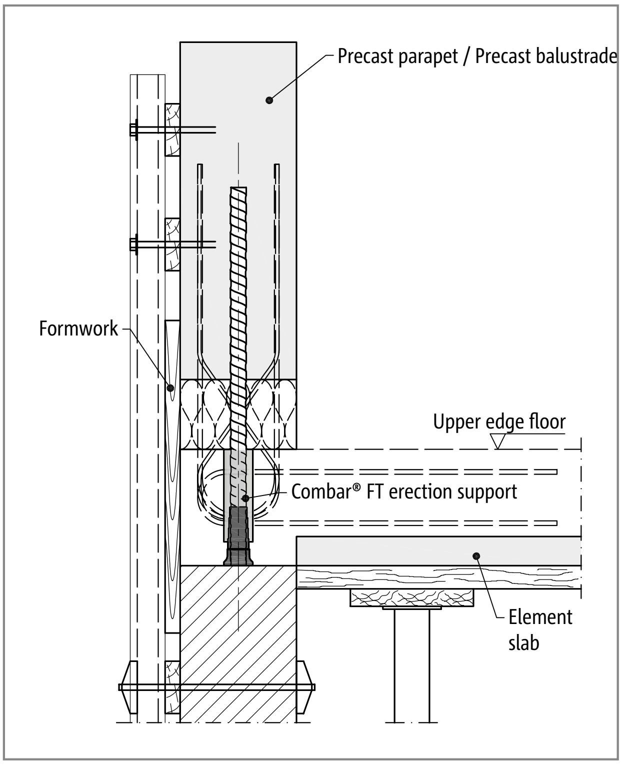


Fig. 230: Schöck Combar® FT erection support: Installation in a precast concrete parapet; section

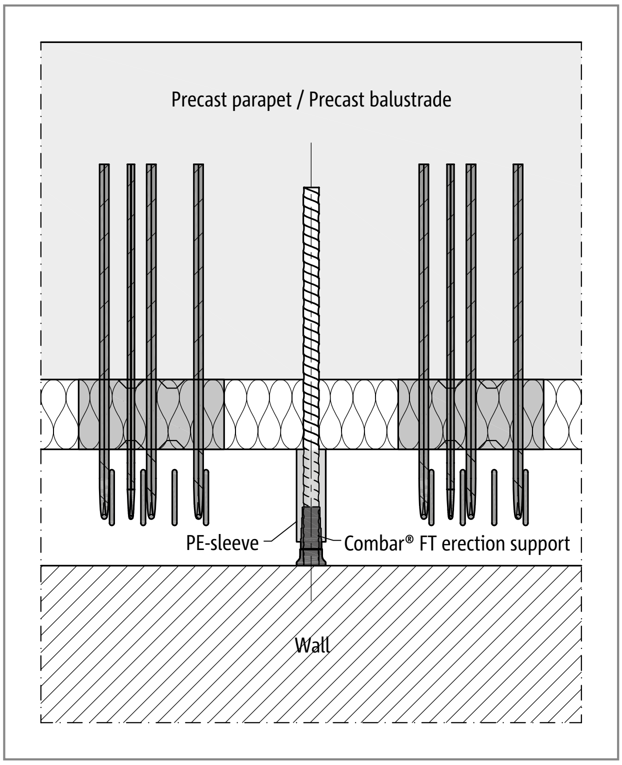


Fig. 231: Schöck Combar® FT erection support: Installation in a precast concrete parapet; view

Product

- The Schöck Combar® FT erection support, in the structural condition can only accept the given load in the short-term.
- The Schöck Combar® FT erection support is to be used only in conjunction with the Schöck Isokorb® XT type A.
- The sleeve is structurally necessary and is concreted into the floor (avoidance of constraint between prefabricated part and floor).

Area of application

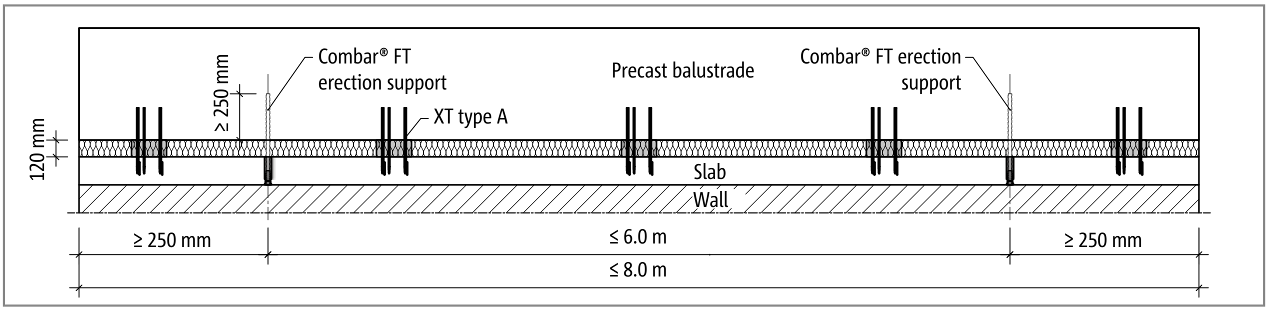


Fig. 232: Schöck Isokorb® XT type A with Combar® FT erection support: Edge distance and minimum bond length in the prefabricated parapet

Precast concrete balustrades/precast concrete parapets

- 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

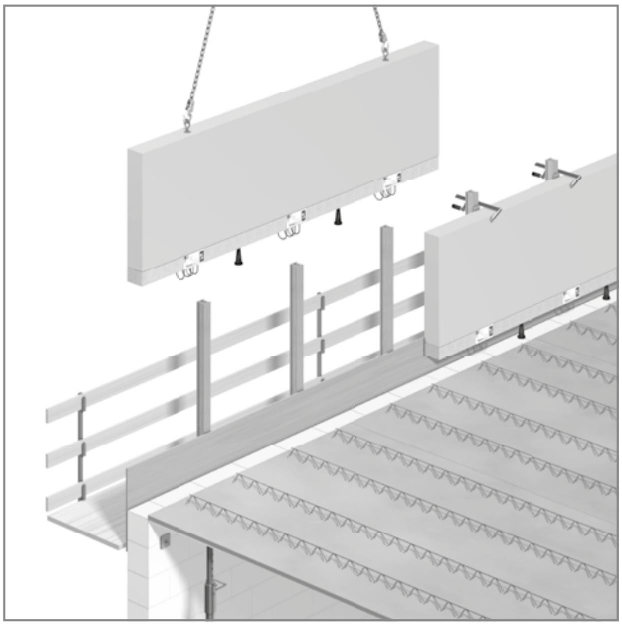


Fig. 233: Schöck Isokorb® XT type A with Combar® FT erection support: Hoisting of the prefabricated attic

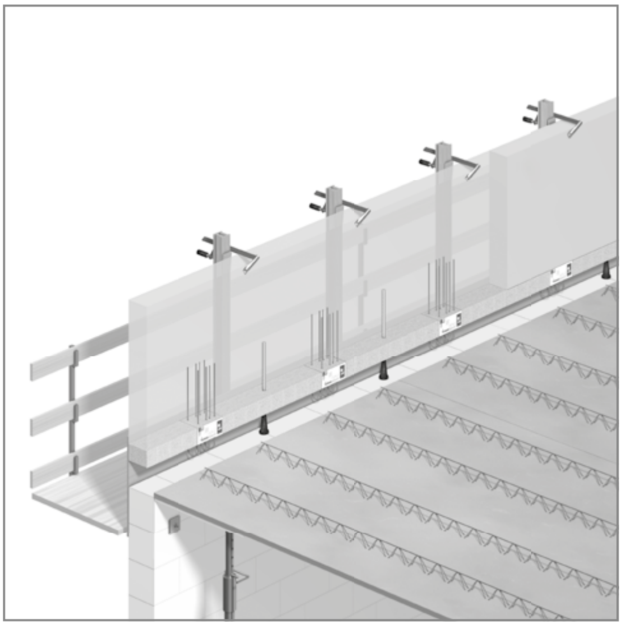


Fig. 234: Schöck Isokorb® XT type A with Combar® FT erection support: Securing of the aligned precast concrete parapet

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.

☑ 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?