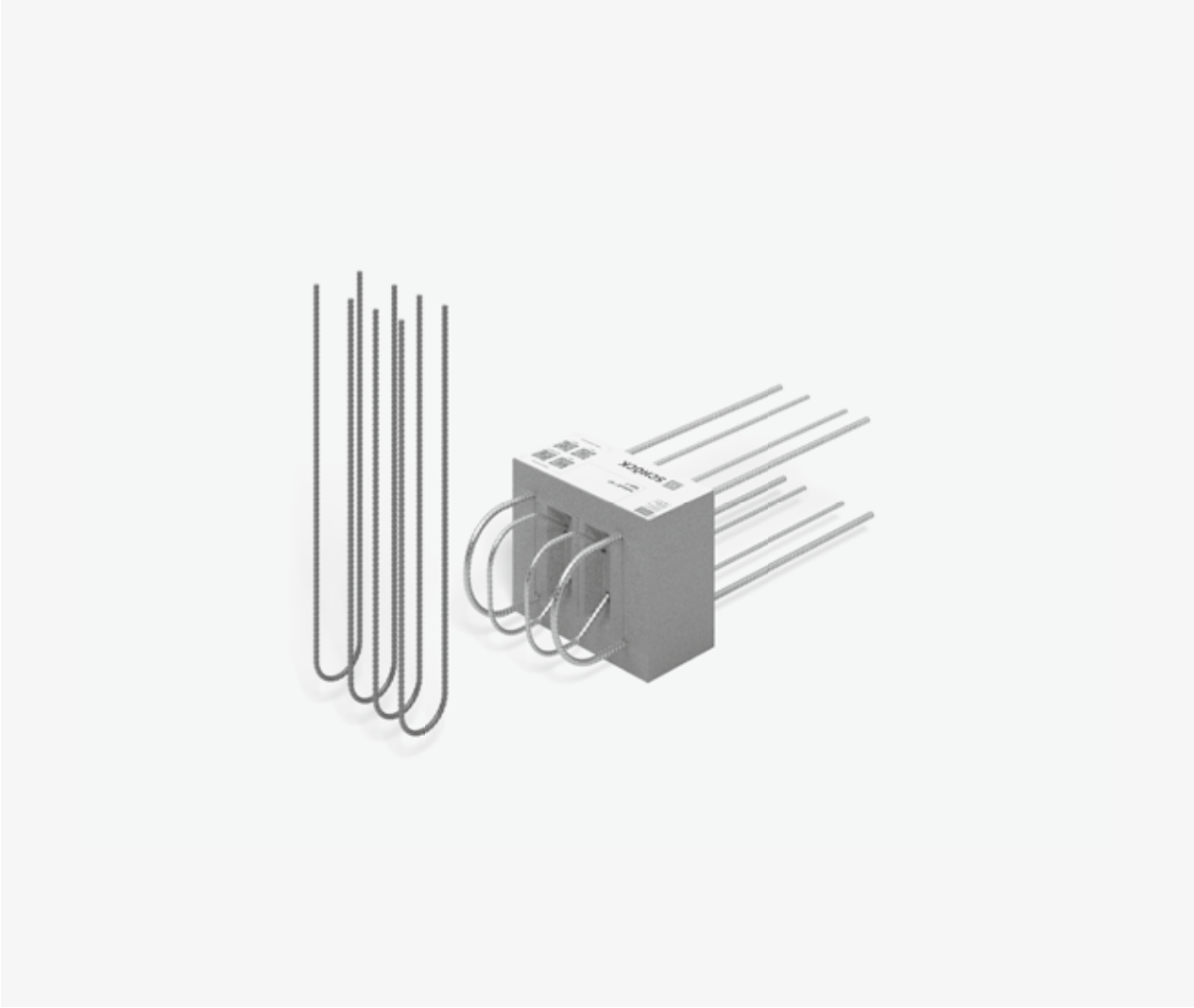
Schöck Isokorb® XT type F



Schöck Isokorb® XT type F
Load-bearing thermal insulation element for curtain parapets and balustrades. The element transfers normal forces, moments and shear forces.

Element arrangement | Installation cross sections

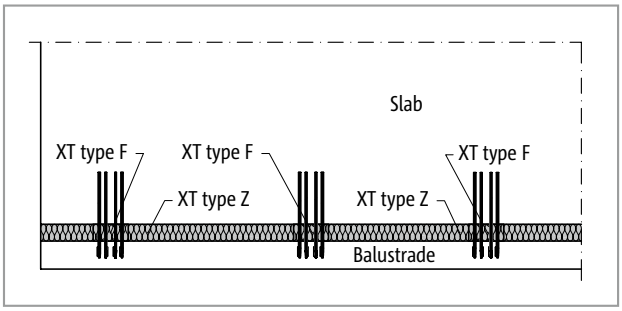


Fig. 277: Schöck Isokorb® XT type F, Z: Frontally attached balustrades

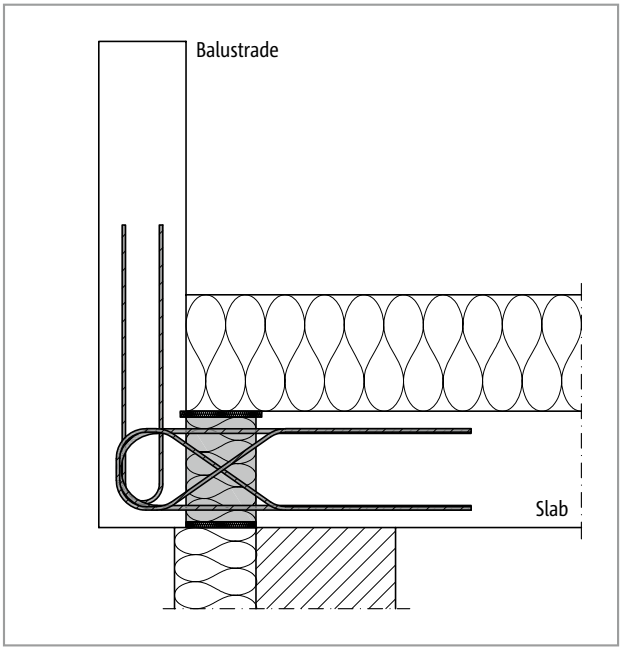


Fig. 278: Schöck Isokorb® XT type F: Connection of a frontally attached balustrade with thermal insulation composite system (TICS))

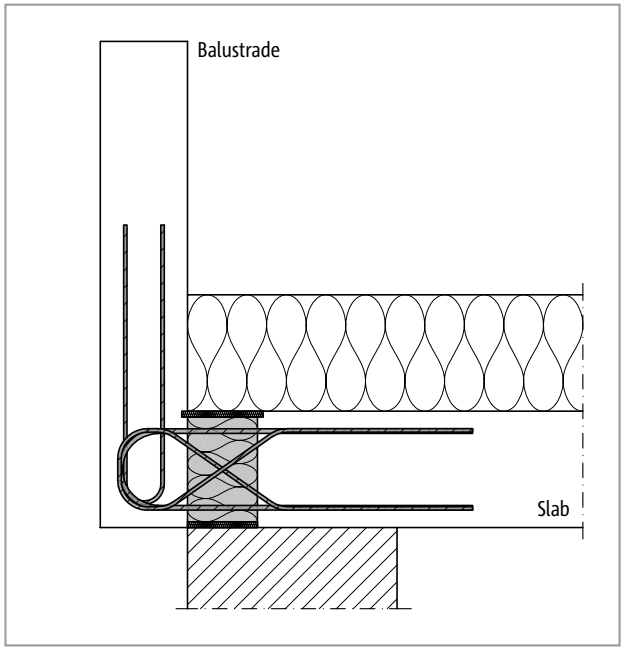


Fig. 279: Schöck Isokorb® XT type F: Connection of a frontally attached balustrade with thermal insulating masonry

Element arangement/installation cross-section

- For the insulation between the Schöck Isokorb® the Schöck Isokorb® XT type Z (see page 151) is available in fire protective configuration.

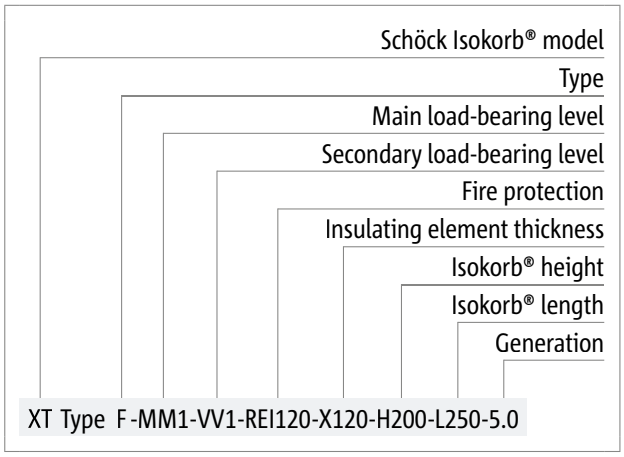
Product selection | Type designations | Special designs

Schöck Isokorb® XT type F variants

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

- Main load-bearing level:
  MM1
- 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® height:
  H = 160 to 250 mm
- 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).
In accordance with approval heights up to 500 mm are possible.

Sign convention

Sign convention for the design

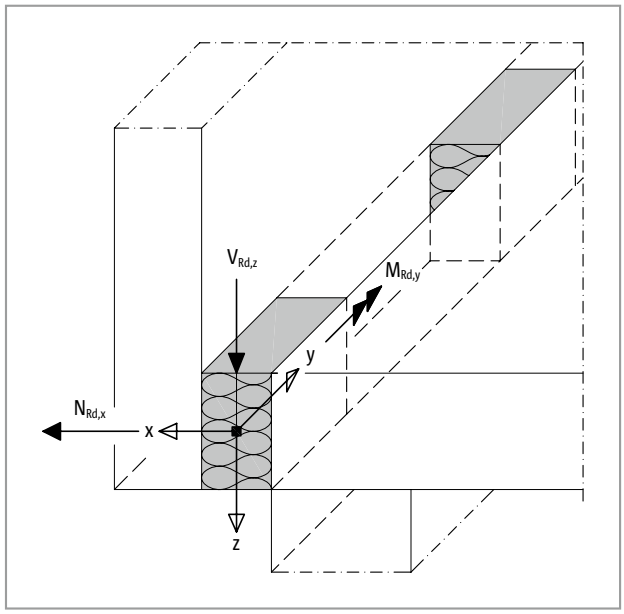


Fig. 280: Schöck Isokorb® XT type F: Sign convention for the design

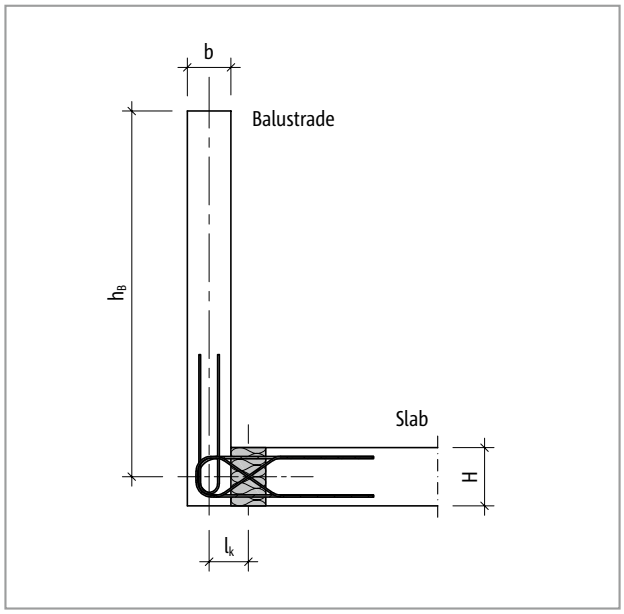


Fig. 281: Schöck Isokorb® XT type F: Static system

Determination of spacing

Determination of the maximum spacing

The maximum spacing a_{max} of several Schöck Isokorb® XT type F depends on the applied moments $m_{Ed,y}$, normal forces $n_{Ed,z}$ 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:

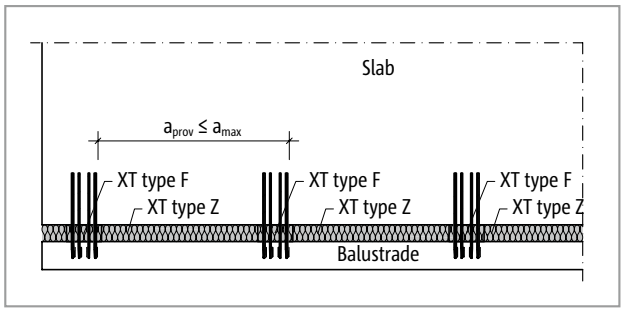
Determination $a_{max,1}$(Diagram)

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

- Determination of the applied moments $m_{Ed,y}$ and normal forces $n_{Ed,x}$
- Calculation of the ratio $n_{Ed,x}/m_{Ed,y}$
- Entry in the diagram via the outer axis using the calculated ratio ① (with negative normal force left, with positive normal force right)
- Draw horizontal line up to the intersection point with the graphs (Take note of Schöck Isokorb® type and height)
- Draw vertical line in the intersection point and read off $N_{Rd,x}$ (intersection point of the vertical line with $N_{Rd,x}$ axis) ②
- Determination of the maximum distance: $a_{max,1} = N_{Rd,x}/n_{Ed,x}$

Determination $a_{max,2}$

The maximum centre distance $a_{max,2}$ of several Schöck Isokorb® XT type F depending on the applied shear force is determined by the ratio $a_{max,2} = V_{Rd,z}/v_{Ed,z}$.



Determination of spacing

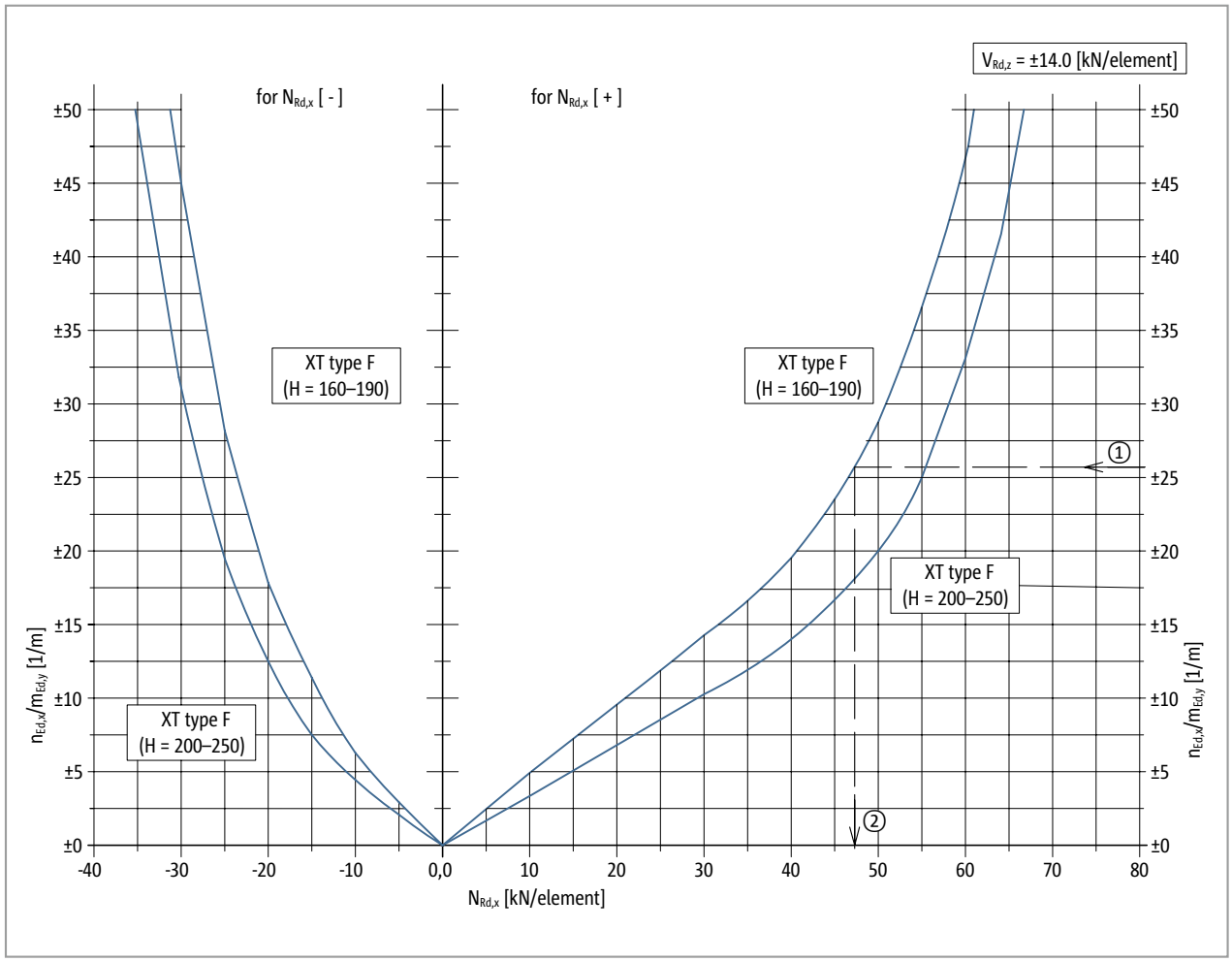
- For $n_{ed,z} = 0$ or $m_{ed,y} = 0$ use design variants A, B or C .

Design example

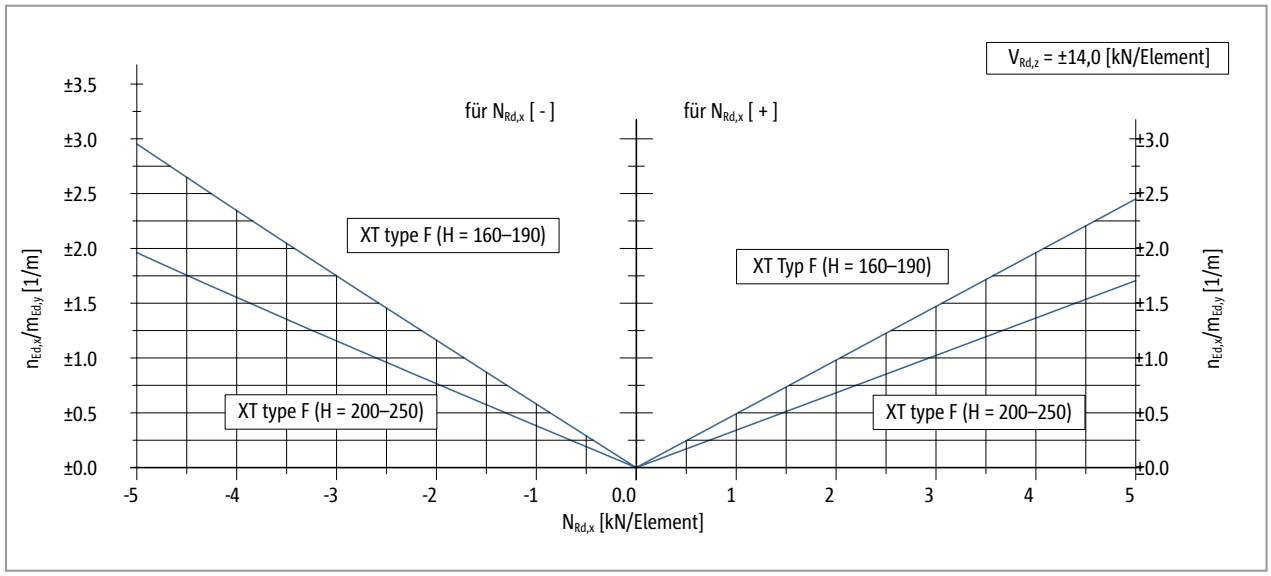
- Numerical example for the determination of the spacing see XT type A page 176.

Determination of spacing

Diagram determination of the spacing C25/30



Detailed extract diagram spacing C25/30 (-5 < $N_{Rd,z}$ < 5 [kN/element])



Design variants C25/30

The Schöck Isokorb® XT type F, independent of the allowable normal force $N_{Rd,x}$ and of the allowable moments $M_{Rd,y}$, has a constant allowable shear force $V_{Rd,z}$. The allowable moment $M_{Rd,y}$ and the allowable normal force $N_{Rd,x}$ condition each other in an interaction.
For the design of the Schöck Isokorb® XT type F 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 alowable moment $M_{Rd,y}$ [kNm/element] depending on normal 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: $N_{Ed,x} \leq N_{Rd,x}(M_{Ed,y})$ or $M_{Ed,y} \leq M_{Rd,y}(N_{Ed,x})$ and $V_{Ed,z} \leq V_{Rd,z}$
- **Design variant B**:
  In the **design diagram** the interaction of allowable normal force $N_{Rd,x}$ [kN/element] and moment loading $M_{Rd,y}$ [kN/element] is presented graphically. The verification is met if the intersection point from normal force $N_{Ed,x}$ [kN/element] and momemt $M_{Ed,y}$ [kN/element] lies below or on the respective Schöck Isokorb® type applicable graphs.
- **Design variant C**:
  In the **interaction table** the allowable moments $M_{Rd,y}$ [kN/element] are given depending on the normal force $N_{Rd,x}$ [kN/element].

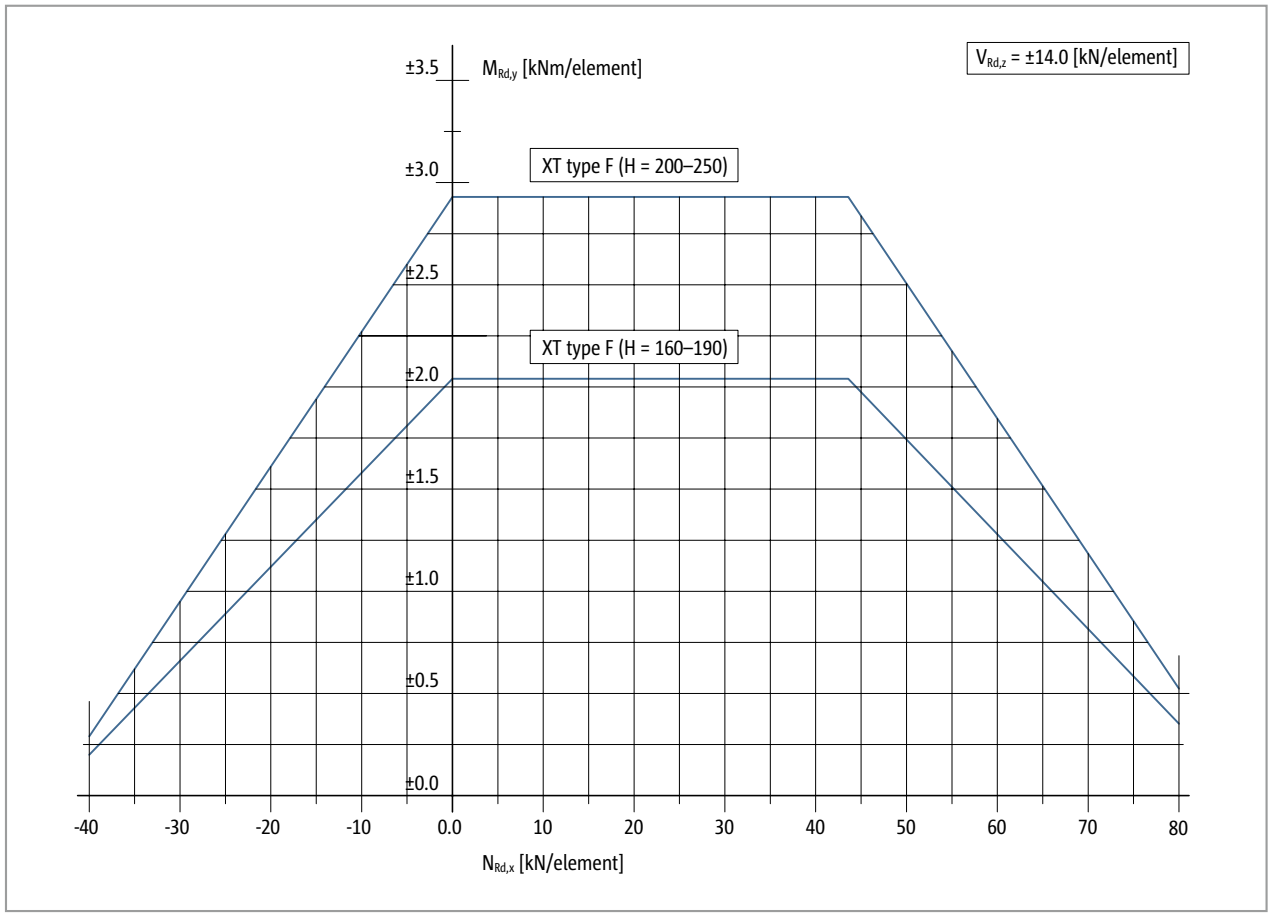
Design variant A: Design table

Schöck Isokorb® XT type F		MM1	
Design values with		Concrete strength class ≥ C25/30	
		for	$M_{Rd,y}$ [kNm/element]
Isokorb® height H [mm]	160–190	$-40 \leq N_{Ed,x} < 0$	$\pm \lvert 2.04 + 0.046 \cdot N_{Ed,x} \rvert$
		$0 \leq N_{Ed,x} \leq 43.2$	±2.04
		$43.2 < N_{Ed,x} \leq 80$	$\pm \lvert 4.03 - 0.046 \cdot N_{Ed,x} \rvert$
	200–250	$-40 \leq N_{Ed,x} < 0$	$\pm \lvert 2.93 + 0.066 \cdot N_{Ed,x} \rvert$
		$0 \leq N_{Ed,x} \leq 43.2$	±2.93
		$43.2 < N_{Ed,x} \leq 80$	$\pm \lvert 5.78 - 0.066 \cdot N_{Ed,x} \rvert$
$V_{Rd,z}$ [kN/element]			
Isokorb® height H [mm]	160–250	±14.0	

Schöck Isokorb® XT type F	MM1
Placement with	Isokorb® length [mm]
	250
Tension bars/compression bars	2 × 2 ⌀ 8
Shear force bars	2 ⌀ 6 + 2 ⌀ 6
Connection stirrup	4 ⌀ 6
Balustrade b_{min} [mm]	160
Floor h_{min} [mm]	160

Design variants C25/30

Design variant B: Design diagram



Design variant C: Interaction table

Schöck Isokorb® XT type F		MM1 (H = 160–190)	MM1 (H = 200–250)
Design values with		Concrete strength class ≥ C25/30	
		$M_{Rd,y}$ [kNm/element]	
$N_{Rd,x}$ [kN/element]	-40.0	±0.20	±0.29
	-30.0	±0.66	±0.95
	-20.0	±1.12	±1.61
	-10.0	±1.58	±2.27
	0–40.0	±2.04	±2.93
	50.0	±1.73	±2.48
	60.0	±1.27	±1.82
	70.0	±0.81	±1.16
	80.0	±0.35	±0.50

Notes on design

- 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.

Design example

- Numerical example for the determination of the spacing see XT type A page 176.

Expansion joint spacing | Edge 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 Stacon®.

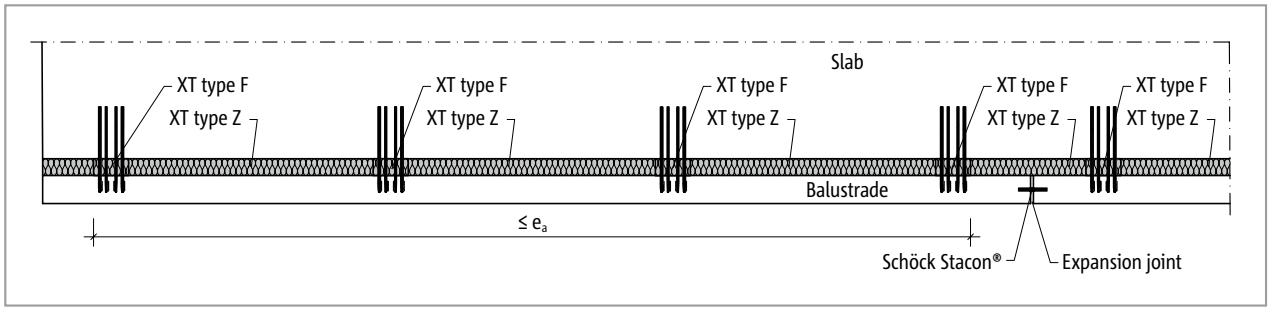


Fig. 282: Schöck Isokorb® XT type F: Expansion joint arrangement

Schöck Isokorb® XT type F		MM1
Distance for		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 floor the following applies: $e_R \geq 10$ mm.
- For the distance of the insulation member from the edge of the balustrade or of the insulation joint the following applies: $e_R \geq 70$ mm.
- For the distance of the connection stirrup from the edge of the balustrade or of the insulation joint in the balustrade the following applies: $e_R \geq 100$ mm.

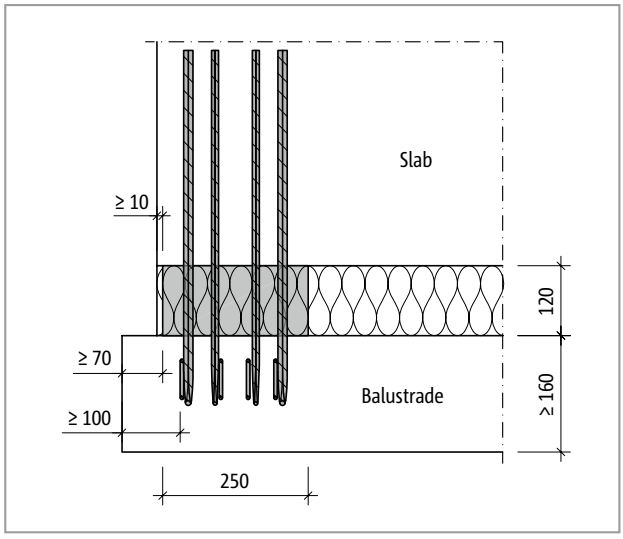


Fig. 283: Schöck Isokorb® XT type F: Top view edge separations

Product description | Concrete cover

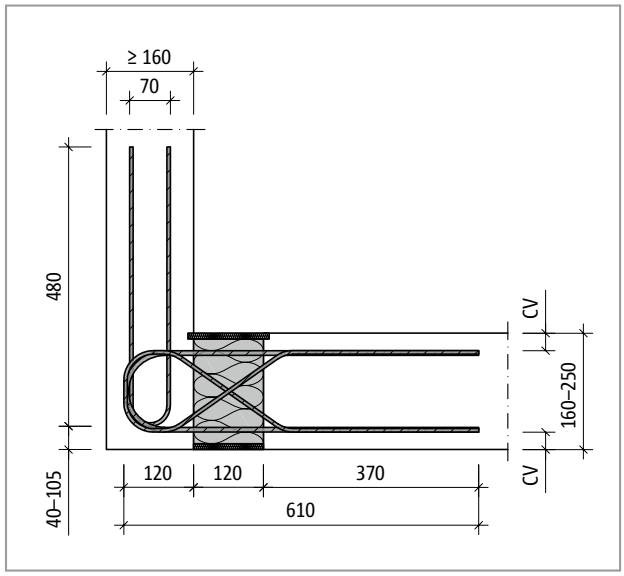


Fig. 284: Schöck Isokorb® XT type F: Product section

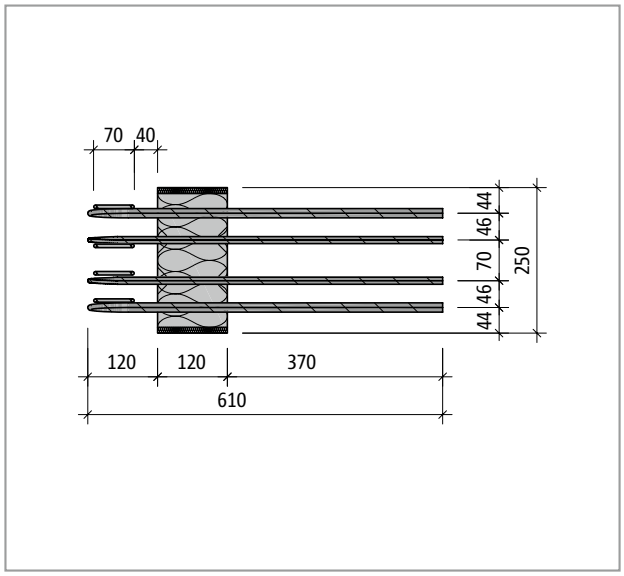


Fig. 285: Schöck Isokorb® XT type F: Product plan view

Product information

- Note minimum width of the parapet b_{min} = 160 mm, minimum floor height H_{min} = 160 mm.
- Download further product plan views and cross-sections at cad.schoeck.co.uk

Concrete cover

The concrete cover CV of the Schöck Isokorb® XT type F varies depending on the height of the floor. 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 F of CV = 30 mm is sufficient.
For reinforcing steel connection stirrups delivered ex works the concrete cover c_v in the parapet is to be selected depending on the exposure class.

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

On-site reinforcement

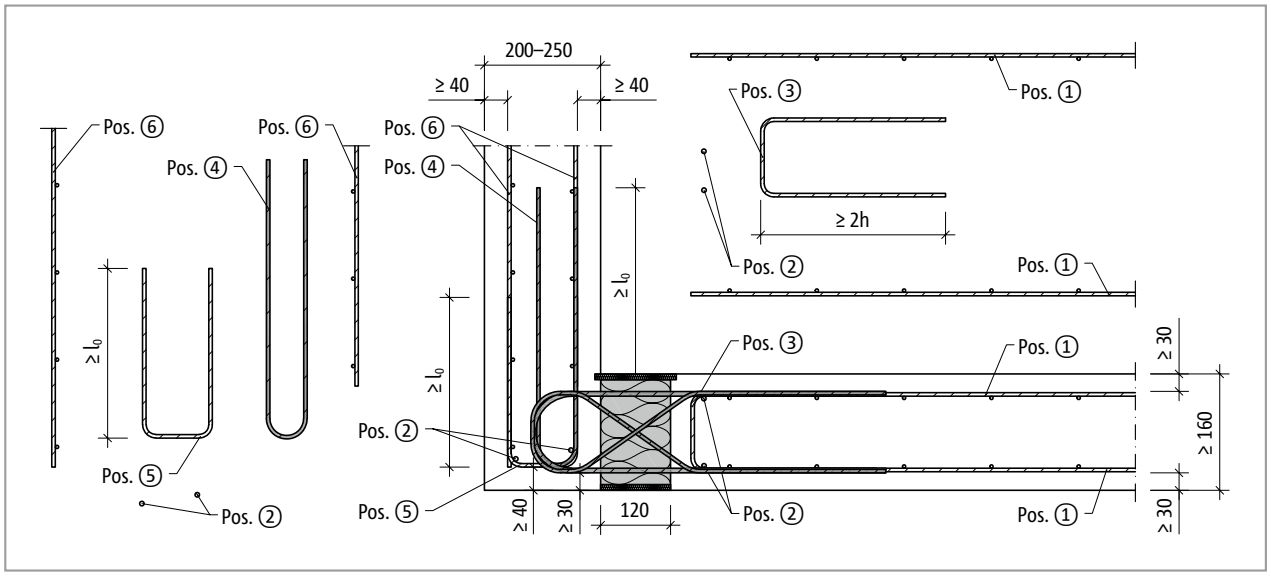


Fig. 286: Schöck Isokorb® XT type F: On-site reinforcement with parapet/balustrade width b = 200 - 250; on-site reinforcement b = 160 - 190 such as b = 200 - 250 without Pos. 5

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 | Installation instructions

Recommendation for the on-site connection reinforcement
Details on the lapping reinforcement for Schöck Isokorb® with a loading of 100% of the maximum design moment with C25/30; structurally selected: a_s lapping reinforcement ≥ a_sIsokorb® compression/tension bars.

Schöck Isokorb® XT type F		MM1
On-site reinforcement	Location	Concrete strength class ≥ C25/30
Overlapping reinforcement		
Pos. 1 [mm²/Element]	Floor side	100
Lap length l_0 [mm]		332
Steel bars along the insulation joint		
Pos. 2	floor side/parapet side	4 • H8
Stirrup as suspension reinforcement		
Pos. 3	Floor side	H8@250
Factory supplied connection stirrup		
Pos. 4	balustrade side	4 • H8
Overlapping reinforcement		
Pos. 6 [mm²/Element]	balustrade side	113
Lap length l_0 [mm]		340
Constructive edging (not applicable for b = 160–190 mm)		
Pos. 5	balustrade side	H8@200
Lap length l_0 [mm]		340

Information about on-site reinforcement
- Alternative connection reinforcements are possible. The rules as per BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA apply for the determination of the lap length. A reduction of the required lap length with m_{Ed}/m_{Rd} is permitted.
- Pos. 5 may be dispensed with for the on-site reinforcement for balustrade widths b = 160 - 190 mm (without diagram).
- The indicative minimum concrete strength class of the external structural component is C32/40.

Installation instructions
The current installation instruction can be found online under:
www.schoeck.com/view/5156

☑ 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?