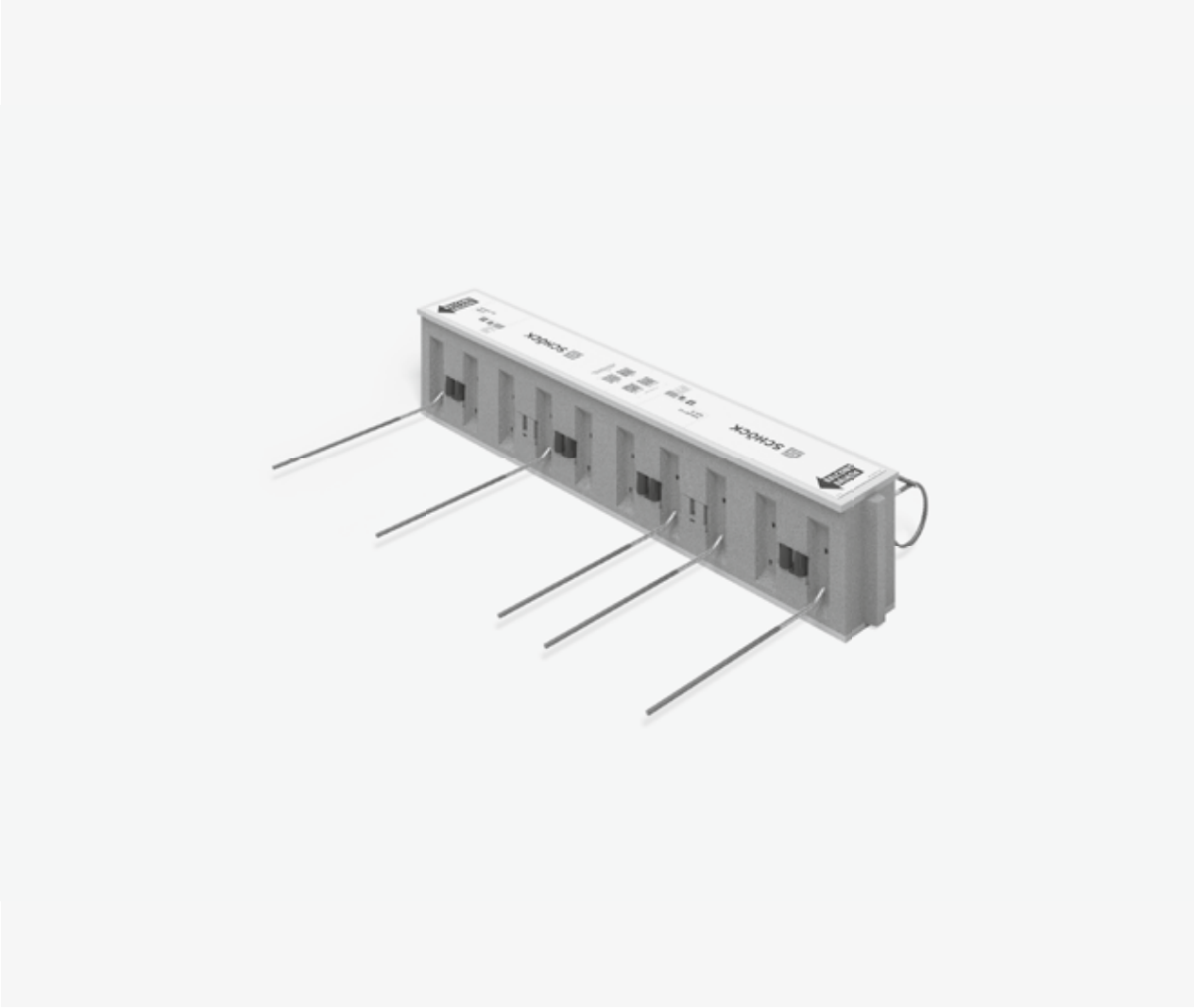
Schöck Isokorb® XT type Q



Schöck Isokorb® XT type Q
Load-bearing thermal insulation element for supported balconies. The element transfers positive shear forces. The element with the load-bearing level VV additionally transfers negative shear forces.

Schöck Isokorb® XT type Q-Z
Load-bearing thermal insulation element for supported balconies in constraint-free connection. The element transfers positive shear forces.

Element arrangement

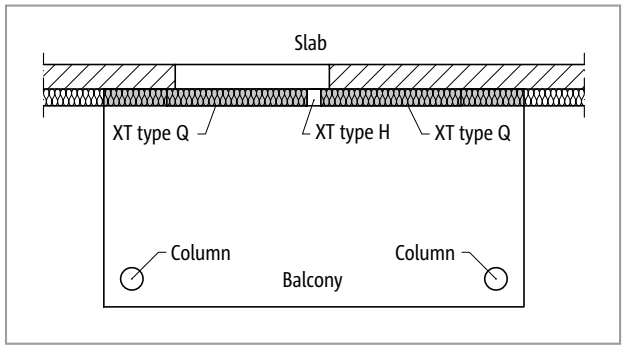


Fig. 99: Schöck Isokorb® XT type Q: Balcony with column support

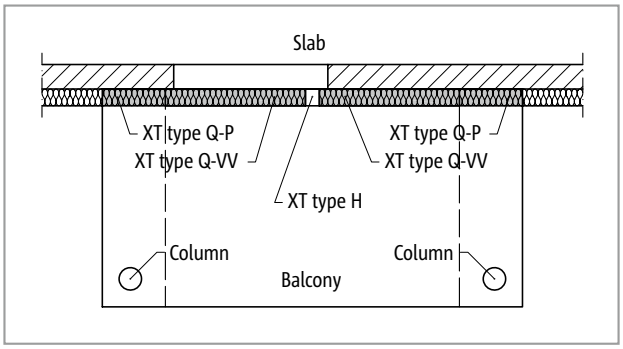


Fig. 100: Schöck Isokorb® XT type Q-P, Q-VV: Balcony with column support with different support stiffnesses; optionally with XT type H for the transmission of planned horizontal force

Installation cross sections

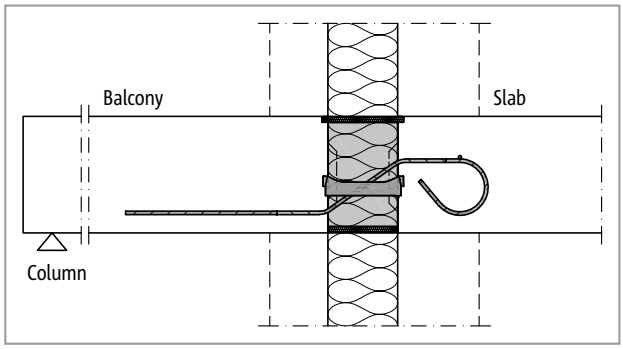


Fig. 101: Schöck Isokorb® XT type Q: Connection with single wall, thermally insulating masonry (XT type Q-V1 to V4)

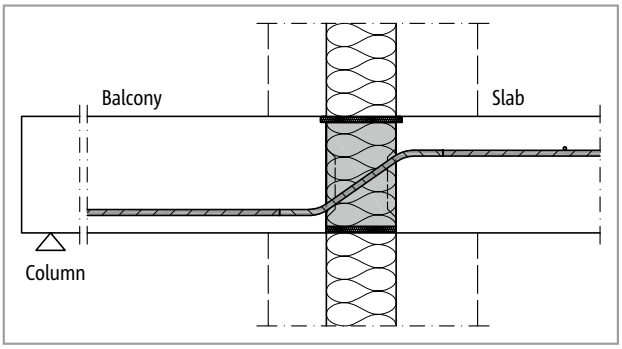


Fig. 102: Schöck Isokorb® XT type Q: Connection with non-load-bearing double wall masonry (XT type Q-V5 to V8)

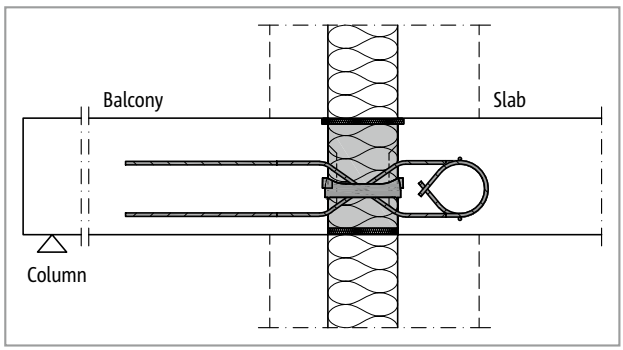


Fig. 103: Schöck Isokorb® XT Type Q: Connection with non-load-bearing cavity masonry

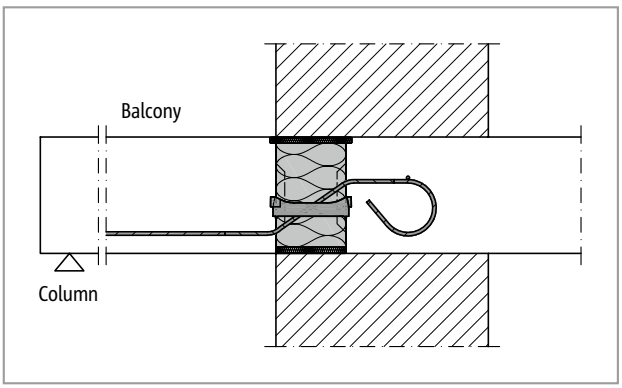


Fig. 104: Schöck Isokorb® XT type Q: Connection with single wall, thermally insulating masonry (XT type Q-V1 to V4)

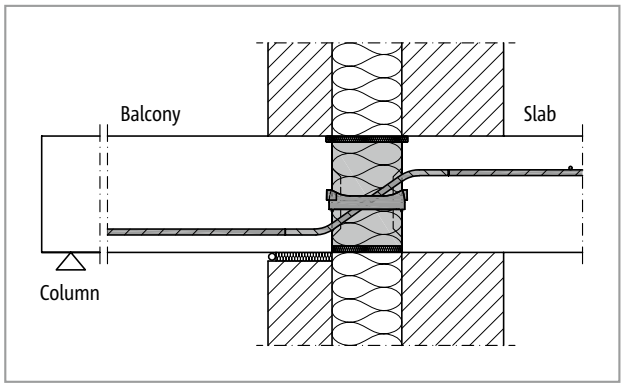


Fig. 105: Schöck Isokorb® XT type Q: Connection with filled cavity brickwork with core insulation (XT type Q-V5 to V11)

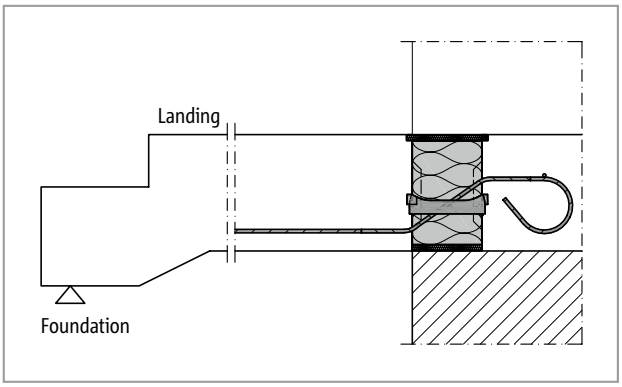


Fig. 106: Schöck Isokorb® XT type Q: Connection stair landing with single wall thermally insulating masonry (XT type Q-V1 to V4)

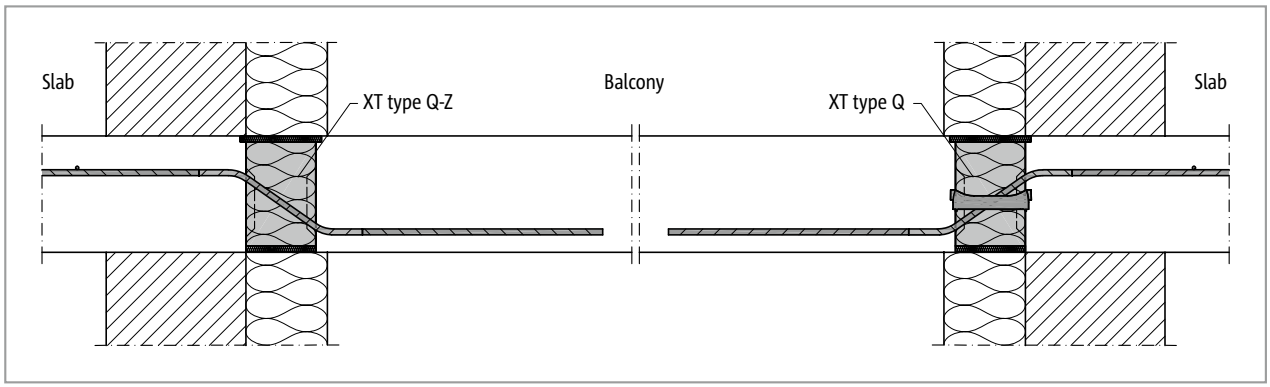


Fig. 107: Schöck Isokorb® XT type Q, Q-Z: Application case single direction tensioned reinforced concrete slab

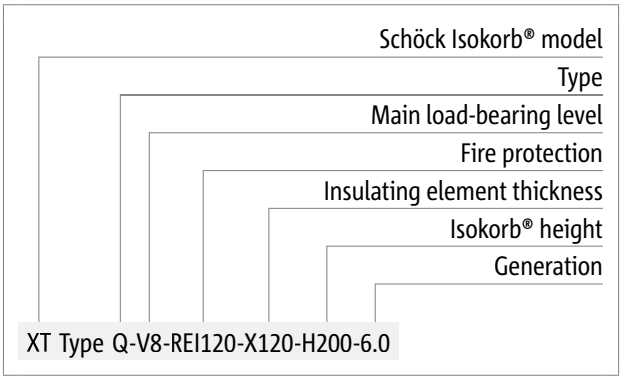
Product selection | Type designations | Special designs

Schöck Isokorb® XT type Q variants

The configuration of the Schöck Isokorb® XT types Q can be varied as follows:
XT type Q: Shear force bar for positive shear force
XT type Q-VV: Shear force bar for positive and negative shear force
XT type Q-Z: Free of constraint forces without pressure bearing, shear force bar for positive shear force

- Main load-bearing level:
  V1 to V8
  VV1 to VV8
  Main load-bearing levels V1 to V4: Shear force bar, floor side bent, balcony side straight.
  Main load-bearing levels V5 to V8: Shear force bar on floor side straight, on balcony side straight.
- Fire resistance class:
  REI120 (Standard): Projection upper fire protection board, both sides 10 mm
- Concrete cover of the shear force bars:
  Below: CV ≥ 30 mm
  Above: CV ≥ 27 mm (depending on height of shear force bars)
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = H_{min} to 250 mm (take into account minimum slab height depending on load-bearing level and fire protection)
- Generation:
  6.0

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.
This also applies with additional requirements as a result of precast concrete construction. For additional requirements determined by manufacturing or transportation there are solutions available with coupler bars.

C25/30 design

Schöck Isokorb® XT type Q		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Design values with		$v_{Rd,z}$ [kN/m]										
Concrete strength class	C25/30	35.3	42.3	56.4	70.5	87.8	98.0	117.6	137.2	156.8	225.7	252.1

Schöck Isokorb® XT type Q	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Placement with	Isokorb® length [mm]										
	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Shear force bars	5 ⌀ 6	6 ⌀ 6	8 ⌀ 6	10 ⌀ 6	7 ⌀ 8	5 ⌀ 10	6 ⌀ 10	7 ⌀ 10	8 ⌀ 10	8 ⌀ 12	8 ⌀ 14
Pressure bearing [piece]	4	4	4	4	4	4	5	6	6	8	8
H_{min} width REI120 [mm]	160	160	160	160	170	180	180	180	180	190	200

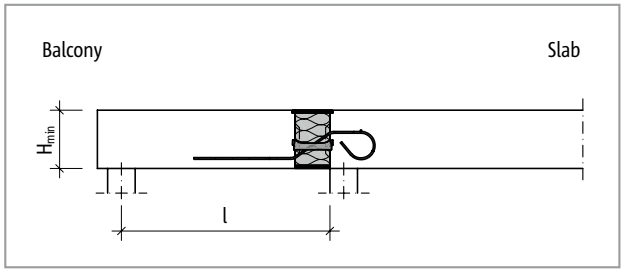


Fig. 108: Schöck Isokorb® XT type Q: Static system (XT type Q-V1 to V4)

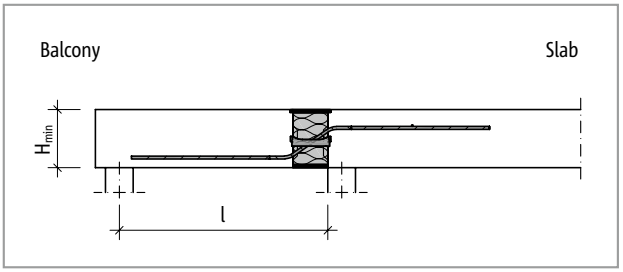


Fig. 109: Schöck Isokorb® XT type Q: Static system (XT type Q-V5 to V11)

Schöck Isokorb® XT type Q-Z		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Design values with		$v_{Rd,z}$ [kN/m]										
Concrete strength class	C25/30	35.3	42.3	56.4	70.5	87.8	98.0	117.6	137.2	156.8	225.7	252.1

Isokorb® XT type Q-Z	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Placement with	Isokorb® length [mm]										
	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Shear force bars	5 ⌀ 6	6 ⌀ 6	8 ⌀ 6	10 ⌀ 6	7 ⌀ 8	5 ⌀ 10	6 ⌀ 10	7 ⌀ 10	8 ⌀ 10	8 ⌀ 12	8 ⌀ 14
Pressure bearing [piece]	-	-	-	-	-	-	-	-	-	-	-
H_{min} width REI120 [mm]	160	160	160	160	170	180	180	180	180	190	200

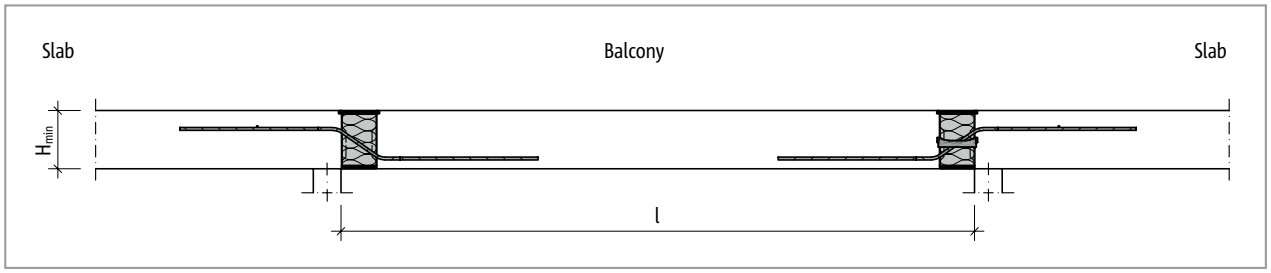


Fig. 110: Schöck Isokorb® XT type Q-Z, Q: Static system (XT type Q-Z-V5 to Q-Z-V11, Q-V5 to Q-V11)

C25/30 design

Schöck Isokorb® XT type Q		VV1	VV2	VV3	VV4	VV5	VV6
Design values with		$v_{Rd,z}$ [kN/m]					
Concrete strength class	C25/30	±35.3	±42.3	±56.4	±70.5	±87.8	±98.0

Schöck Isokorb® XT type Q	VV1	VV2	VV3	VV4	VV5	VV6
Placement with	Isokorb® length [mm]					
	1000	1000	1000	1000	1000	1000
Shear force bars	2 × 5 ⌀ 6	2 × 6 ⌀ 6	2 × 8 ⌀ 6	2 × 10 ⌀ 6	2 × 7 ⌀ 8	2 × 5 ⌀ 10
Pressure bearing [piece]	4	4	4	4	4	4
H_{min} width REI120 [mm]	160	160	160	160	170	180

Schöck Isokorb® XT type Q		VV7	VV8	VV9	VV10	VV11
Design values with		$v_{Rd,z}$ [kN/m]				
Concrete strength class	C25/30	±117.6	±137.2	±156.8	±225.7	±252.1

Schöck Isokorb® XT type Q	VV7	VV8	VV9	VV10	VV11
Placement with	Isokorb® length [mm]				
	1000	1000	1000	1000	1000
Shear force bars	2 × 6 ⌀ 10	2 × 7 ⌀ 10	2 × 8 ⌀ 10	2 × 8 ⌀ 12	2 × 8 ⌀ 14
Pressure bearing [piece]	5	6	6	8	8
H_{min} width REI120 [mm]	180	180	180	190	200

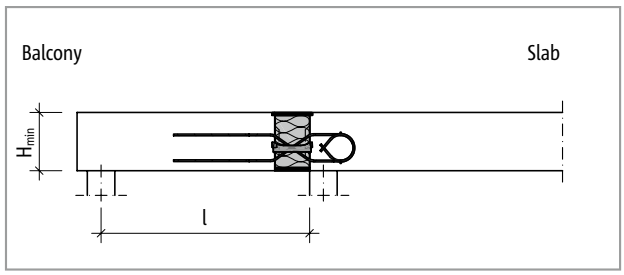


Fig. 111: Schöck Isokorb® XT type Q-VV: Static system (XT type Q-VV1 to VV4)

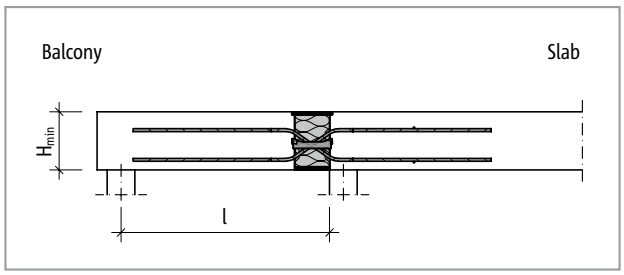


Fig. 112: Schöck Isokorb® XT type Q-VV: Static system (XT type Q-VV5 to VV11)

Notes on design

- 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).
- A structural calculation is to be produced for the reinforced concrete structural components adjacent on both sides of the Schöck Isokorb®. With a connection with Schöck Isokorb® XT type Q a freely rotatable bearing (pin connection) is to be assumed as static system. In addition, a shear force verification as per BS EN 1992-1-1 and BS EN 1992-1-1/NA of the floor slabs is to be carried out by the structural engineer.
- Additional Schöck Isokorb® XT type H are required for the transmission of scheduled horizontal forces.
- Due to the eccentric force application of the Schöck Isokorb® XT type Q and XT type Q-VV, an offset moment results on the adjacent slab edge. This is to be taken into account with the design of the slabs.
- The Schöck Isokorb® XT type Q-VV is also available as XT type Q-Z-VV variant.
- With different concrete strength classes (e.g. balcony C32/40, inner slab C25/30) basically the weaker concrete is relevant for the design of the Schöck Isokorb®.
- The indicative minimum concrete strength class of the external structural component is C32/40.

Moments from excentric connection

Moments resulting from eccentric connection

Moments from eccentric connection are to be taken into account for the design of the connection reinforcement on both sides of the shear force transferring Schöck Isokorb® XT types Q and Q-VV. These moments are respectively to be overlaid with the moments from the ordinary loading, if they have the same sign.

The following table values ΔM_{Ed} have been calculated for 100% utilisation of v_{Rd}.

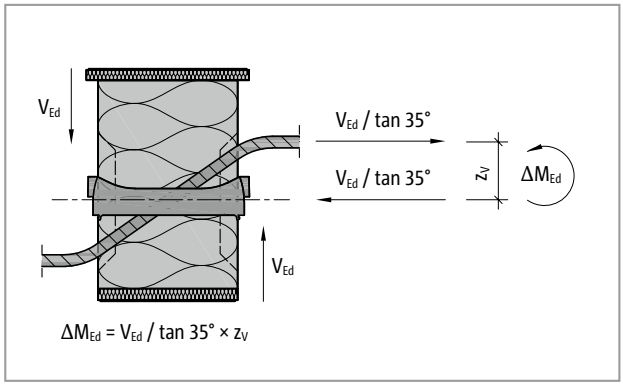


Fig. 113: Schöck Isokorb® XT type Q: Moments resulting from eccentric connection

Schöck Isokorb® XT type Q		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Design values with		Δ M_{Ed} [kNm/m]										
Concrete strength class	C25/30	2.4	2.9	3.9	4.8	6.7	7.1	8.6	10.0	11.4	17.1	20.2

Schöck Isokorb® XT type Q		VV1	VV2	VV3	VV4	VV5	VV6	VV7	VV8	VV9	VV10	VV11
Design values with		Δ M_{Ed} [kNm/m]										
Concrete strength class	C25/30	2.4	2.9	3.9	4.8	6.7	7.1	8.6	10.0	11.4	18.4	22.0

Expansion joint spacing

Maximum expansion joint spacing

If the length of the structural component length exceeds the maximum expansion joint spacing e, then the expansion joints must be integrated into the external concrete components at right angles to the insulating layer in order to limit the effect as a result of temperature changes. With fixed points such as, for example, balcony corners or with the employment of the Schöck Isokorb® XT types H, half the maximum expansion joint spacing e/2 applies.
The shear force transmission in the expansion joint can be ensured using a longitudinally displaceable shear force dowel, e.g. Schöck Stacon®.

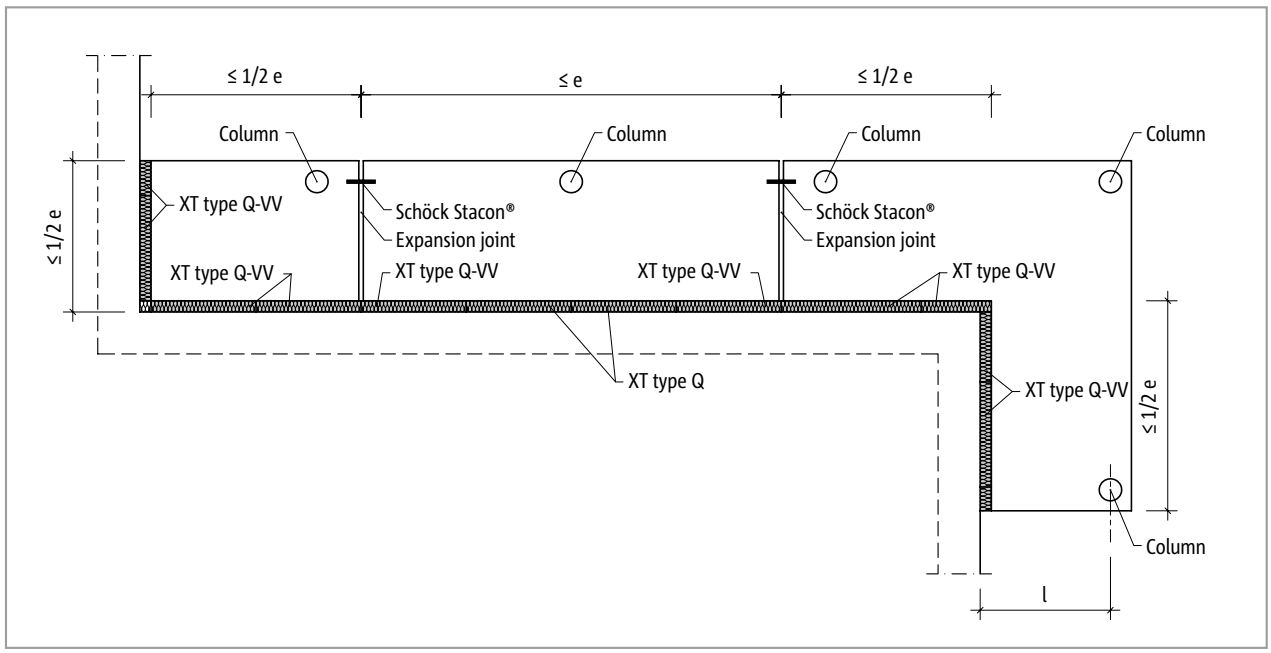


Fig. 114: Schöck Isokorb® XT type Q, Q-VV: Expansion joint arrangement

Schöck Isokorb® XT type Q, Q-Z		V1–V5 VV1–VV5	V6–V9 VV6–VV9	V10 VV10	V11 VV11
Maximum expansion joint spacing when		e [m]			
Insulating element thickness [mm]	120	20.6	19.5	17.7	15.3

Edge distances

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

- For the centre distance of the compression elements from the free edge or expansion joint the following applies: $e_R \geq 50$ mm and $e_R \leq 150$ mm.
- For the centre distance of the shear force bars from the free edge or from the expansion joints the following applies: $e_R \geq 100$ mm and $e_R \leq 150$ mm.

Product description

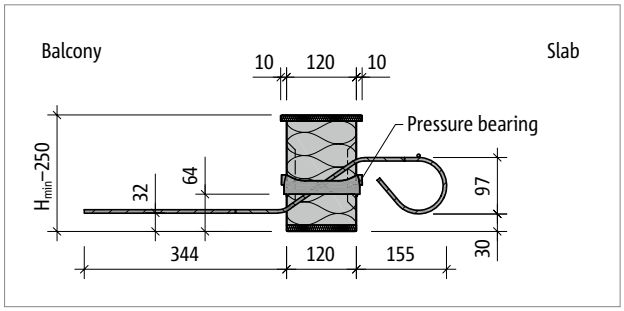


Fig. 115: Schöck Isokorb® XT type Q-V1 to Q-V4: Product section

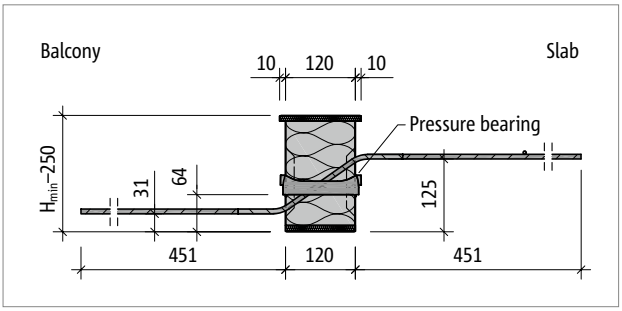


Fig. 116: Schöck Isokorb® XT type Q-V5: Cross-section of the product

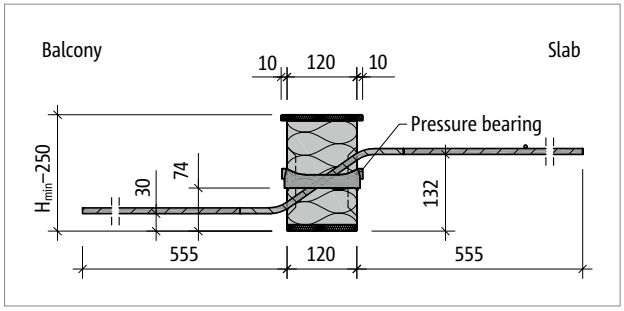


Fig. 117: Schöck Isokorb® XT type Q-V6 to Q-V8: Cross-section of the product

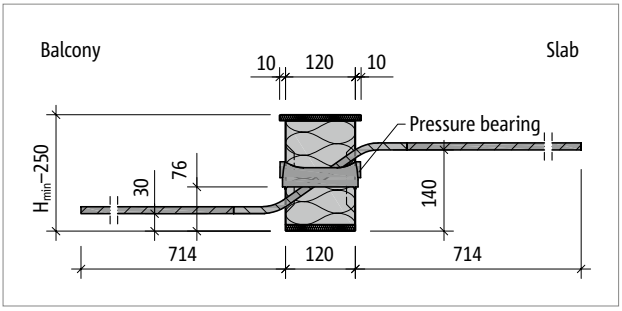


Fig. 118: Schöck Isokorb® XT type Q-V10: Product section

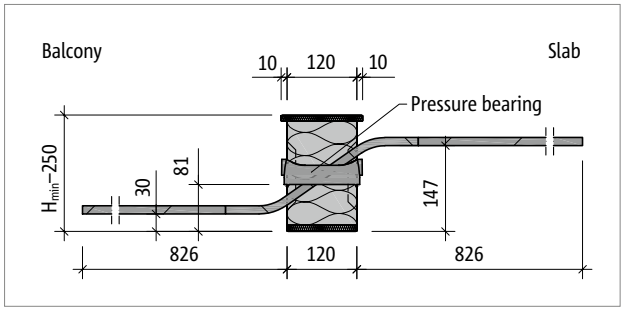


Fig. 119: Schöck Isokorb® XT type Q–V11: Product section

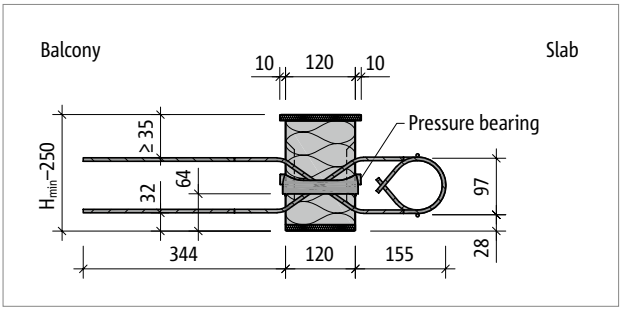


Fig. 120: Schöck Isokorb® XT type Q-VV1 to Q-VV4: Product section

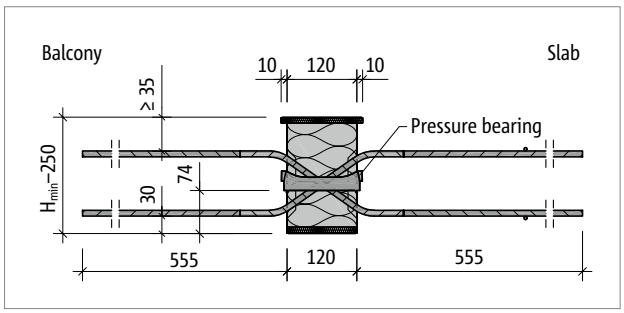


Fig. 121: Schöck Isokorb® XT type Q-VV6 to Q-VV8: Cross-section of the product

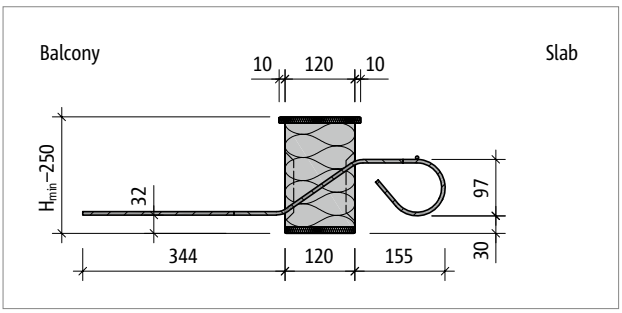


Fig. 122: Schöck Isokorb® XT type Q-Z-V1 to Q-Z-V4: Product section

Product description

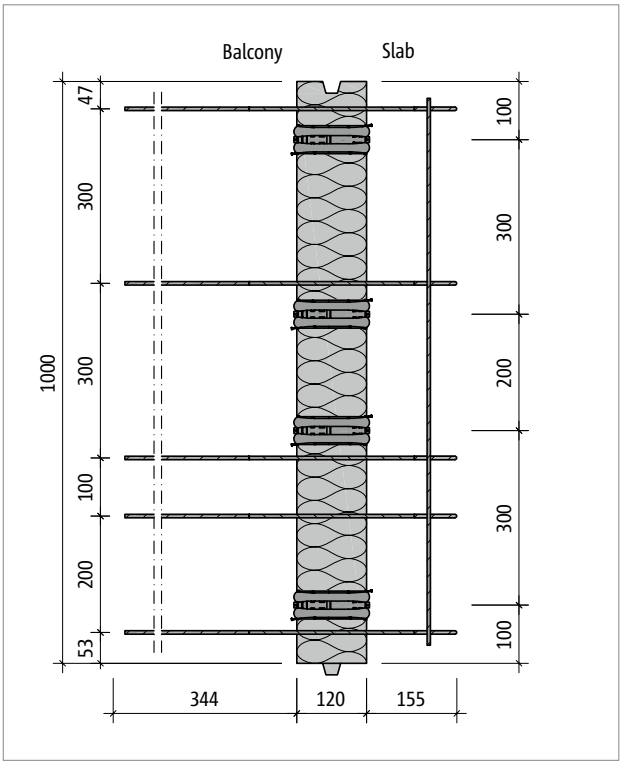


Fig. 123: Schöck Isokorb® XT type Q-V1: Product plan view

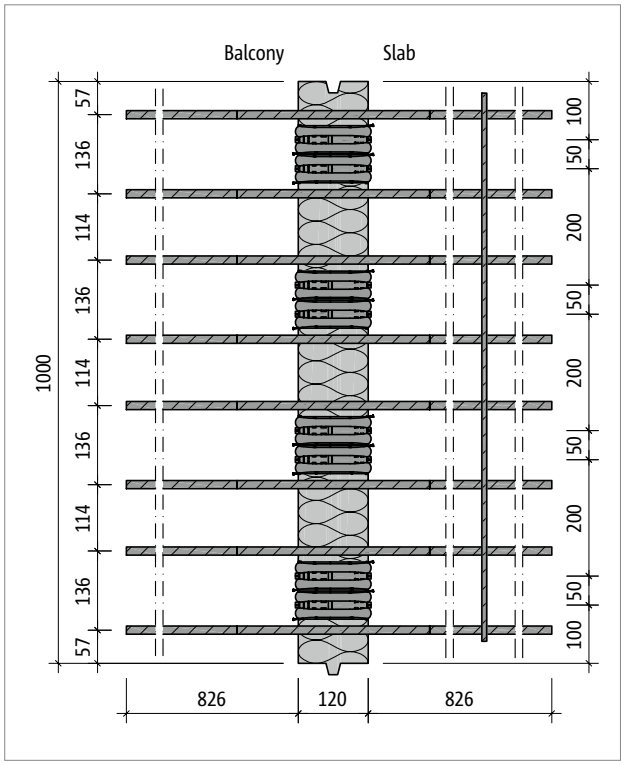


Fig. 124: Schöck Isokorb® XT type Q-V11: Product plan view

Product information

- Download further product plan views and cross-sections at cad.schoeck.co.uk
- Observe minimum height$_{min}$ Schöck Isokorb® XT type Q, Q-VV and Q-Z.

On-site reinforcement

Direct support

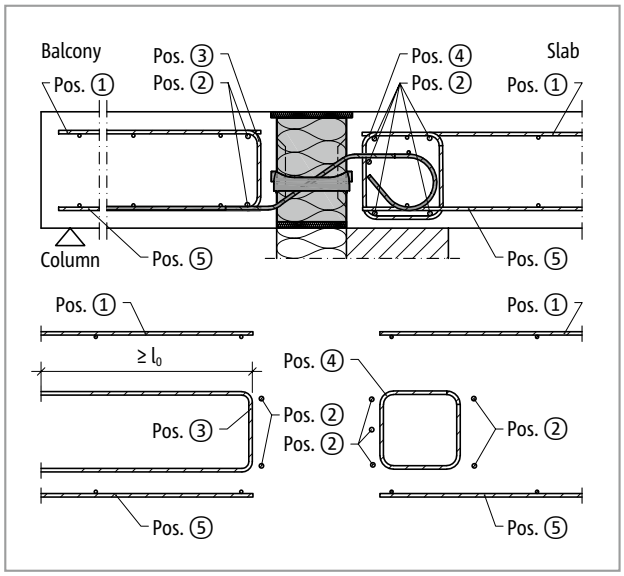


Fig. 125: Schöck Isokorb® XT type Q-V1 to V4: On-site reinforcement

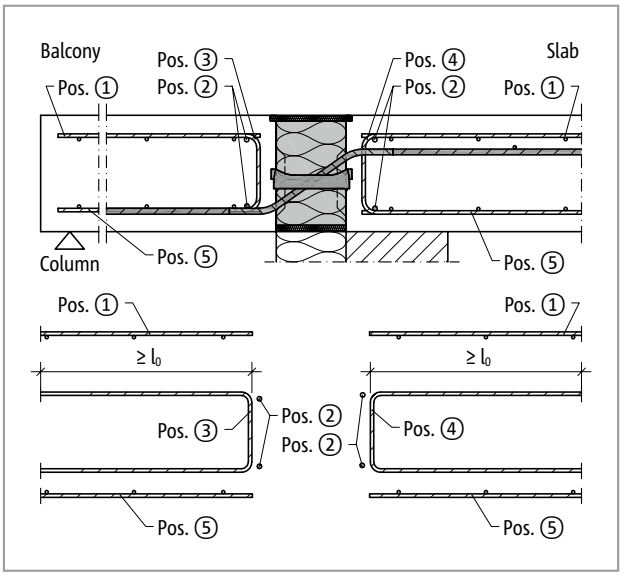


Fig. 126: Schöck Isokorb® XT type Q-V5 to Q-V11: On-site reinforcement

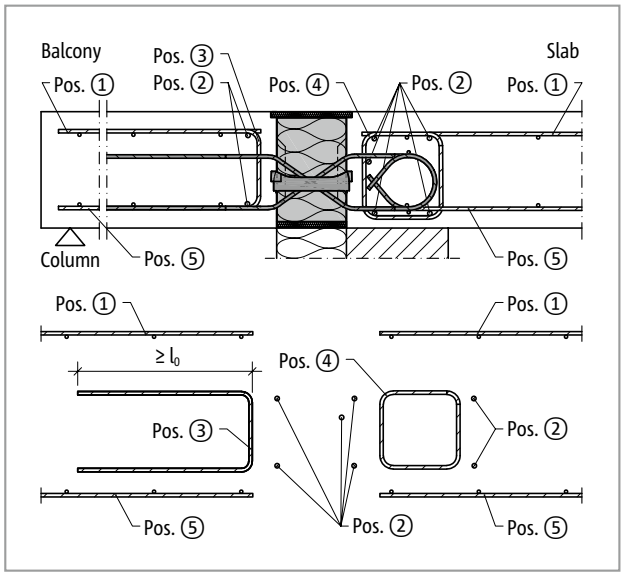


Fig. 127: Schöck Isokorb® XT type Q-VV1 to VV4 on-site reinforcement

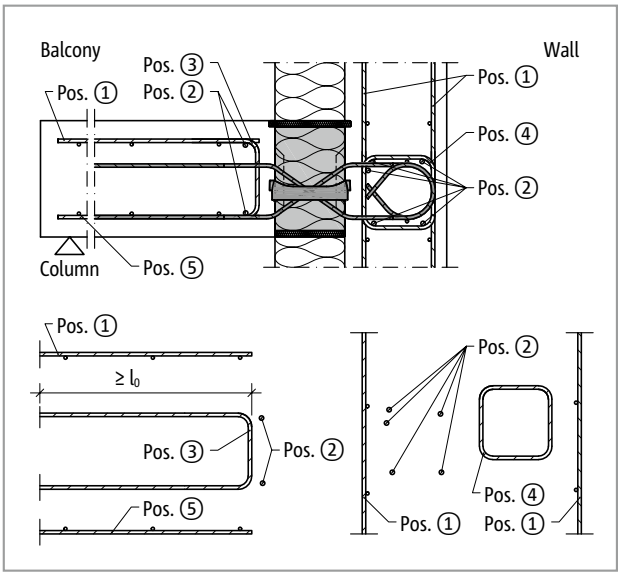


Fig. 128: Schöck Isokorb® XT type Q-VV1 to VV4 on-site reinforcement in wall

On-site reinforcement

Direct support

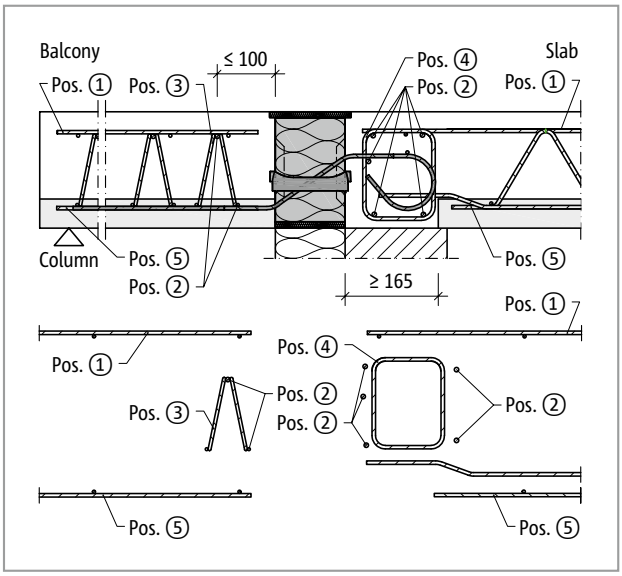


Fig. 129: Schöck Isokorb® XT type Q-V1 to V4 on-site reinforcement with lattice beam

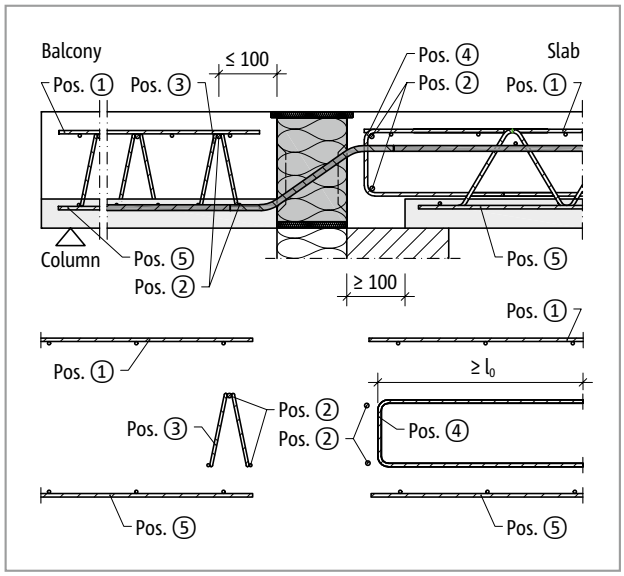


Fig. 130: Schöck Isokorb® XT type Q-V5 to V11: On-site reinforcement with lattice beam

On-site reinforcement

Indirect support

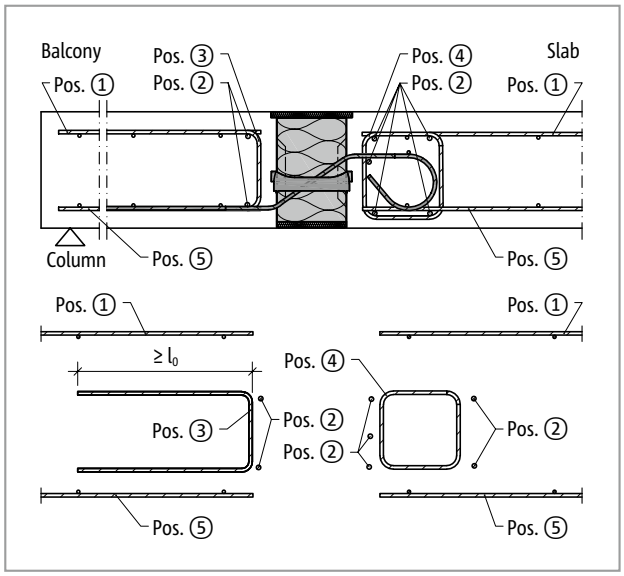


Fig. 131: Schöck Isokorb® XT type Q-V1 to V4: On-site reinforcement

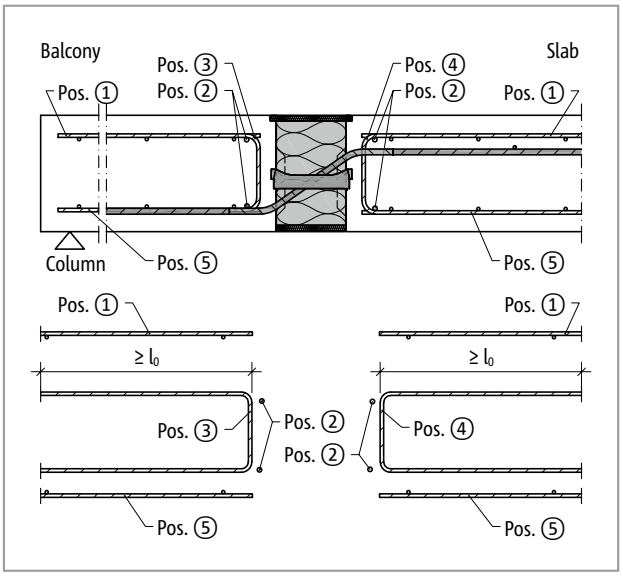


Fig. 132: Schöck Isokorb® XT type Q-V5 to Q-V11: On-site reinforcement

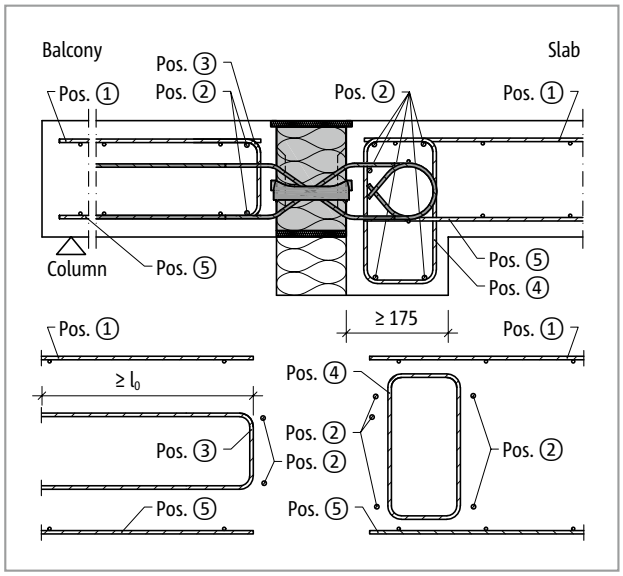


Fig. 133: Schöck Isokorb® XT type Q-VV1 to VV4 on-site reinforcement in downstand beam

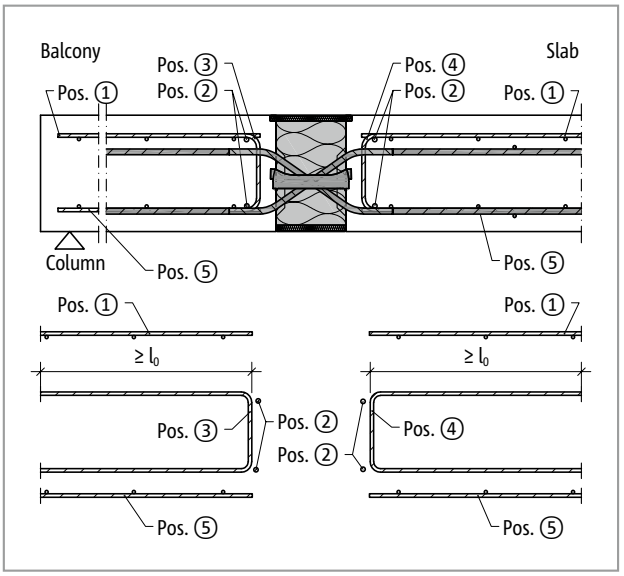


Fig. 134: Schöck Isokorb® XT type Q-VV5 to VV11 on-site reinforcement

On-site reinforcement

Indirect support

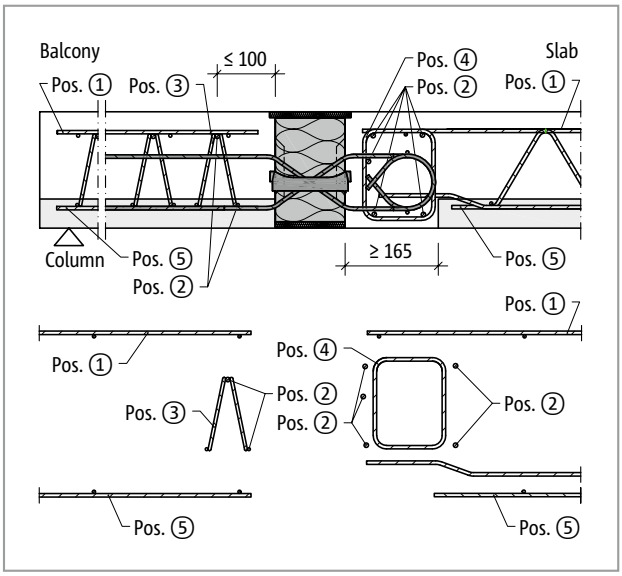


Fig. 135: Schöck Isokorb® XT type Q-VV1 to VV4 on-site reinforcement with lattice beam

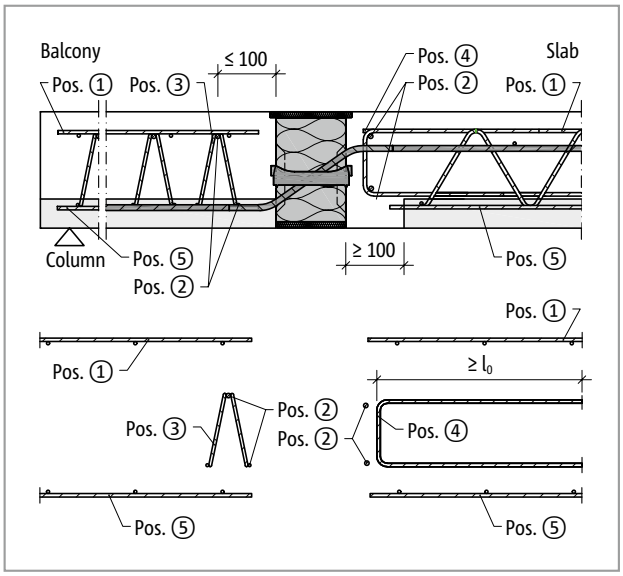


Fig. 136: Schöck Isokorb® XT type Q-V5 to V11 on-site reinforcement with lattice beam

On-site reinforcement

Schöck Isokorb® XT type Q, Q-Z		V1	V2	V3	V4	V5	V6
On-site reinforcement for	Type of bearing	Concrete strength class ≥ C25/30					
Overlapping reinforcement							
Pos. 1		acc. to the specifications of the structural engineer					
Steel bars along the insulation joint							
Pos. 2 - balcony side		2 • H8					
Pos. 2 - floor side		2 • H8 / 5 • H8					
Vertical reinforcement							
Pos. 3 [mm²/m]	direct/indirect	113	127	170	212	264	296
Pos. 4 [mm²/m]	direct	141	141	141	141	–	–
	indirect	141	141	170	212	264	296
Lapping reinforcement							
Pos. 5		necessary in the tension zone, as specified by the structural engineer					
Side reinforcement at the free edge							
Pos. 6		Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4					

Schöck Isokorb® XT type Q, Q-Z		V7	V8	V9	V10	V11
On-site reinforcement	Type of bearing	Concrete strength class ≥ C25/30				
Overlapping reinforcement						
Pos. 1		acc. to the specifications of the structural engineer				
Steel bars along the insulation joint						
Pos. 2 - balcony side		2 • H8				
Pos. 2 - floor side		2 • H8 / 5 • H8				
Vertical reinforcement						
Pos. 3 [mm²/m]	direct/indirect	356	415	474	674	755
Pos. 4 [mm²/m]	direct	–	–	–	–	–
	indirect	356	415	474	674	755
Lapping reinforcement						
Pos. 5		necessary in the tension zone, as specified by the structural engineer				
Side reinforcement at the free edge						
Pos. 6		Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4				

Information about on-site reinforcement

- Lapping of the reinforcement in the connecting reinforced concrete components must be applied as close as possible to the insulating element of the Schöck Isokorb®, the required concrete cover must be observed.
- The shear force bars are to be anchored with their straight ends in the pressure zone. In the tension zone the shear force bars are to be lapped.
- The structural edging Pos. 6 should be selected so low that it can be arranged between the upper and lower reinforcement position.
- The indicative minimum concrete strength class of the external structural component is C32/40.
- The above presentation shows only the first lattice beam in its function as suspension reinforcement. Connection variants with lattice beams deviating from the presentation are also possible. Here attention should be paid to the appropriate rules from BS EN 1992-1-1 (EC2), para. 10.9.3 and BS EN 1992-1-1/NA, NCI to 10.9.3 (e.g. separation of the lattice beams < 2h) and from the approvals of the lattice beams.
- Depending on the configuration of the Schöck Isokorb® attention is to be paid that a sufficiently wide in-situ concrete strip is arranged between the Schöck Isokorb® and the element slab.
- Further reinforcement values for Pos. 3 and Pos. 4 see type testing in www.schoeck.com/de/downloads.

On-site reinforcement

Schöck Isokorb® XT type Q, Q-Z		VV1	VV2	VV3	VV4	VV5	VV6
On-site reinforcement for	Type of bearing	Concrete strength class ≥ C25/30					
Overlapping reinforcement							
Pos. 1		acc. to the specifications of the structural engineer					
Steel bars along the insulation joint							
Pos. 2 - balcony side		2 • H8					
Pos. 2 - floor side		2 • H8 / 5 • H8					
Vertical reinforcement							
Pos. 3 [mm²/m]	direct/indirect	113	127	170	212	264	296
Pos. 4 [mm²/m]	direct	141	141	141	141	113	113
	indirect	141	141	170	212	264	296
Lapping reinforcement							
Pos. 5		necessary in the tension zone, as specified by the structural engineer					
Side reinforcement at the free edge							
Pos. 6		Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4					

Schöck Isokorb® XT type Q, Q-Z		VV7	VV8	VV9	VV10	VV11
On-site reinforcement	Type of bearing	Concrete strength class ≥ C25/30				
Overlapping reinforcement						
Pos. 1		acc. to the specifications of the structural engineer				
Steel bars along the insulation joint						
Pos. 2 - balcony side		2 • H8				
Pos. 2 - floor side		2 • H8 / 5 • H8				
Vertical reinforcement						
Pos. 3 [mm²/m]	direct/indirect	356	415	474	674	755
Pos. 4 [mm²/m]	direct	113	113	114	155	175
	indirect	356	415	474	674	755
Lapping reinforcement						
Pos. 5		necessary in the tension zone, as specified by the structural engineer				
Side reinforcement at the free edge						
Pos. 6		Edging as per BS EN 1992-1-1 (EC2), 9.3.1.4				

Information about on-site reinforcement

- Lapping of the reinforcement in the connecting reinforced concrete components must be applied as close as possible to the insulating element of the Schöck Isokorb®, the required concrete cover must be observed.
- The shear force bars are to be anchored with their straight ends in the pressure zone. In the tension zone the shear force bars are to be lapped.
- The structural edging Pos. 6 should be selected so low that it can be arranged between the upper and lower reinforcement position.
- The indicative minimum concrete strength class of the external structural component is C32/40.
- The above presentation shows only the first lattice beam in its function as suspension reinforcement. Connection variants with lattice beams deviating from the presentation are also possible. Here attention should be paid to the appropriate rules from BS EN 1992-1-1 (EC2), para. 10.9.3 and BS EN 1992-1-1/NA, NCI to 10.9.3 (e.g. separation of the lattice beams < 2h) and from the approvals of the lattice beams.
- Depending on the configuration of the Schöck Isokorb® attention is to be paid that a sufficiently wide in-situ concrete strip is arranged between the Schöck Isokorb® and the element slab.
- Further reinforcement values for Pos. 3 and Pos. 4 see type testing in www.schoeck.com/de/downloads.

Application example reinforced concrete slab spanning in one direction

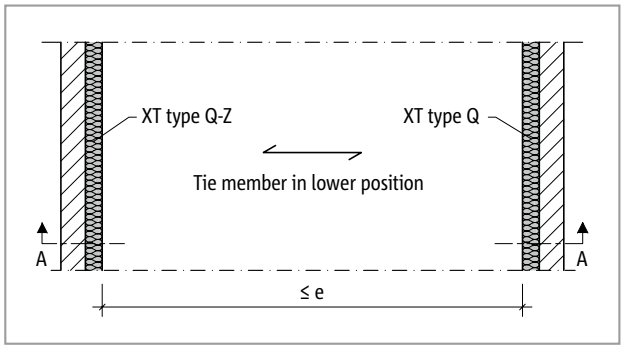


Fig. 137: Schöck Isokorb® XT type Q-Z, Q: One-way spanning reinforced concrete slab

An XT type Q-Z without pressure bearing is to be arranged on one side for support free of constraint. On the opposite side an XT type Q with pressure bearing is then required. In order to maintain the balance of forces a tie member is to reinforce between XT type Q-Z and XT type Q, which overlaps with shear force transmitting Isokorb®-bars.

Expansion joints

- Expansion joint spacing e, see page 91.

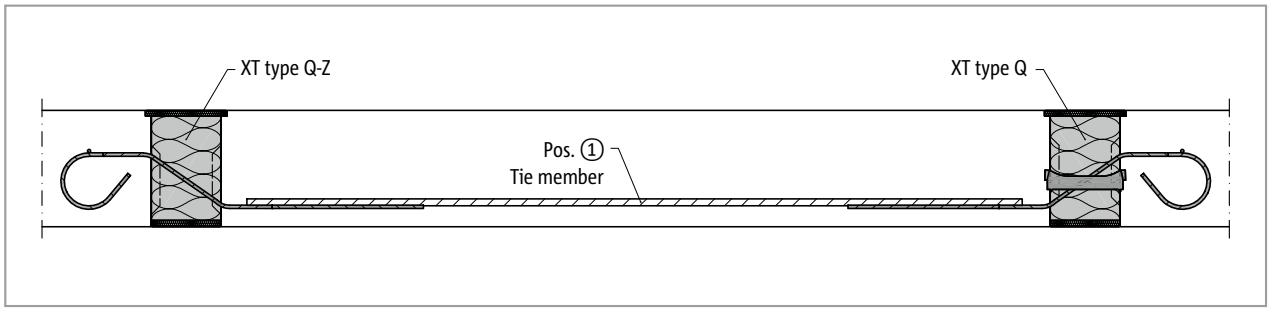


Fig. 138: Schöck Isokorb® XT type Q-Z-V1 to Q-Z-V4, Q-V1 to Q-V4: Section A-A; reinforced concrete slab tensioned in a single axis

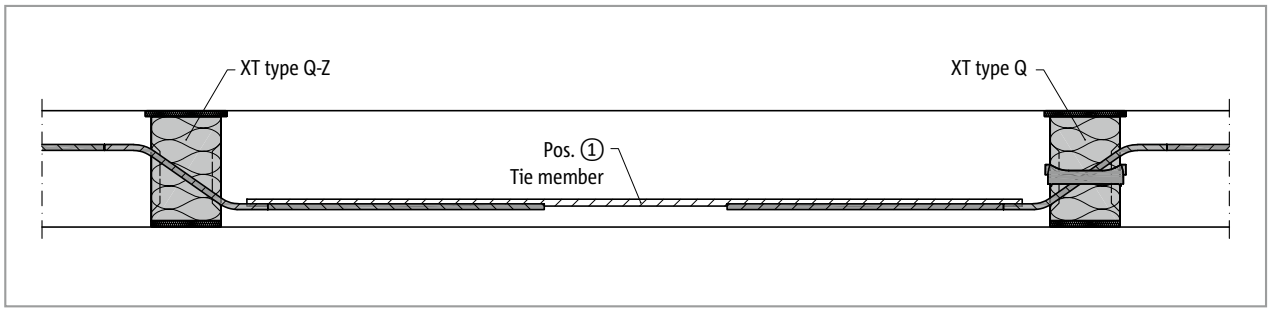


Fig. 139: Schöck Isokorb® XT type Q-Z-V5 to Q-Z-V11, Q-V5 to Q-V11: Section A-A; one direction spanned reinforced concrete slab

Schöck Isokorb® XT type Q, Q-Z	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
On-site reinforcement	Concrete strength class ≥ C20/25										
Tie											
Pos. 1	5 • H8	6 • H8	8 • H8	10 • H8	7 • H8	5 • H10	6 • H10	7 • H10	8 H 10	8 • H12	8 • H14

Information about on-site reinforcement

- The required suspension reinforcement and the on-site slab reinforcement are not shown here.
- On-site reinforcement analogous to Schöck Isokorb® XT type Q see page 94.

Type of bearing: supported | Installation instructions

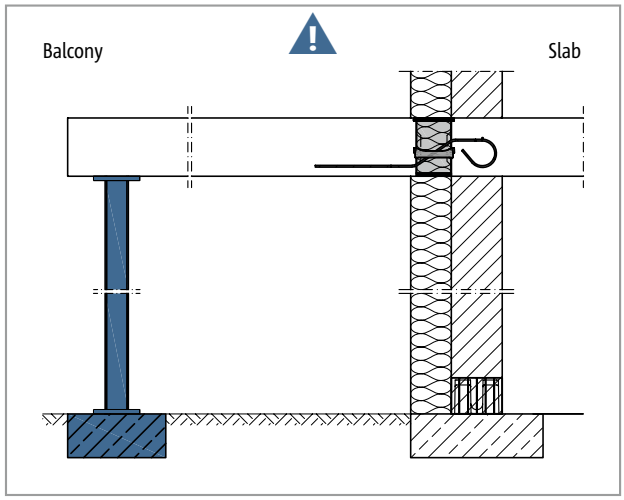


Fig. 140: Schöck Isokorb® XT type Q: Continuous support required

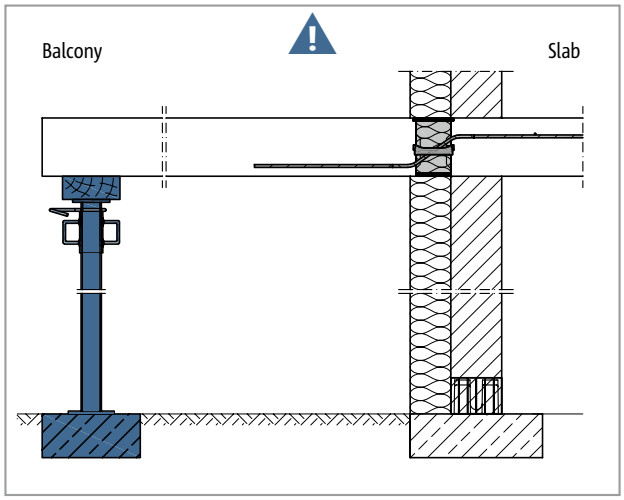


Fig. 141: Schöck Isokorb® XT type Q: Continuous support required

Supported balcony

The Schöck Isokorb® XT type Q, Q-VV and Q-Z is developed for supported balconies. It only transfers shear forces, no bending moments.

Warning – omitting the columns

- The balcony will collapse if not supported.
- At all stages of construction, the balcony must be supported with statically suitable columns or supports.
- Even when completed, the balcony must be supported with statically suitable columns or supports.
- A removal of temporary support is permitted only after installation of the final support.

Installation instructions

The current installation instruction can be found online under:
www.schoeck.com/view/6422

☑ Check list

- ☐ Has the Schöck Isokorb® type matching the static system been selected? XT type Q counts as pure shear force connection (pin connection).
- ☐ Is the balcony so planned that a continuous support is ensured in all stages of construction and in the final status?
- ☐ Is the danger notice for missing support entered in the implementation plans?
- ☐ Have the loads on the Schöck Isokorb® connection been specified at design level?
- ☐ Has the cantilevered system length or the system support width been taken as a basis?
- ☐ Are the Schöck FEM guidelines taken into account with the calculation using FEM?
- ☐ With the selection of the design table is the relevant concrete strength class taken into account?
- ☐ Is the minimum slab thickness taken into consideration with Schöck Isokorb® types in fire protection configuration?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ Is the required component geometry present with the connection to a floor or a wall? Is a special design required?
- ☐ Are the requirements with regard to fire protection explained and is the appropriate addendum entered in the Isokorb® type description in the implementation plans?
- ☐ Have existing horizontal loads e.g. from wind pressure, been taken into account as planned? Are additional Schöck Isokorb® XT type H required for this?
- ☐ For fully precast balconies, are possibly necessary gaps for the frontal transport anchors and rainwater downpipes for internal drainage taken into account? Is the maximum centre distance of 300 mm of the Isokorb® bars observed?
- ☐ With 2- or 3-sided support is a Schöck Isokorb® selected for a connection free of constraint selected (possibly XT type Q-Z, XT type Q-PZ)?