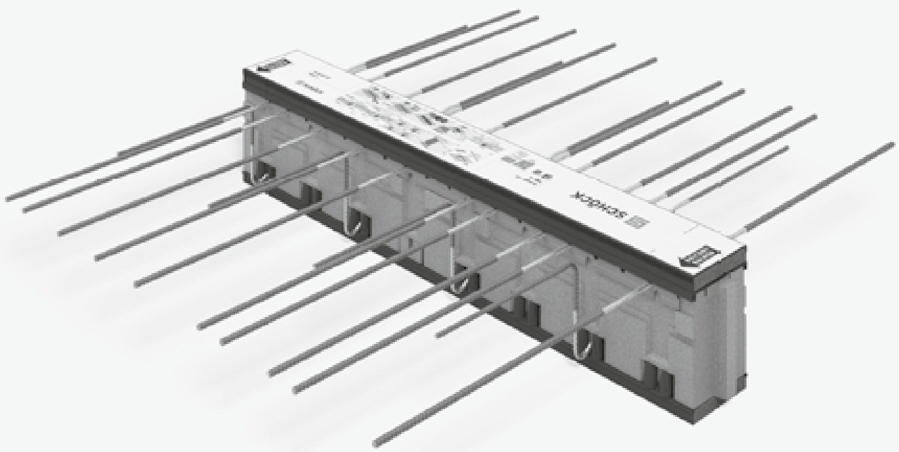
Schöck Isokorb® XT type K



Schöck Isokorb® XT type K
Load-bearing thermal insulation element for freely cantilevered balconies. The element transfers negative moments and positive shear forces. The element with the load-bearing level VV additionally transfers negative shear forces.

Element arrangement | Installation cross sections

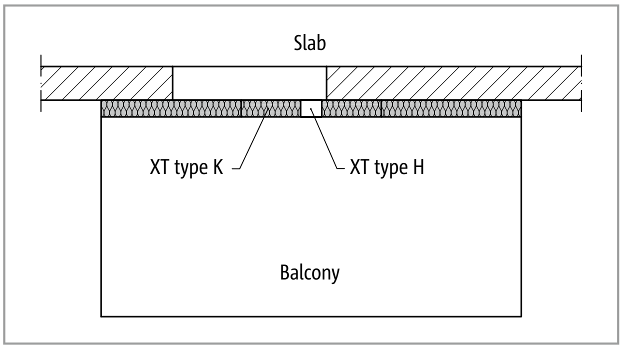


Fig. 20: Schöck Isokorb® XT type K: Balcony freely cantilevered; optional with XT type H (from page 125) with planned horizontal loads (e. g. closed ballustrades)

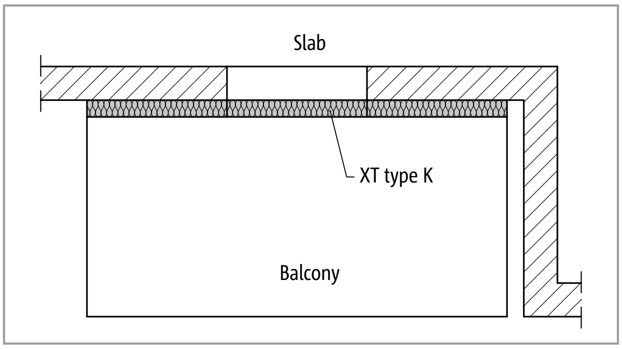


Fig. 21: Schöck Isokorb® XT type K: Balcony with facade offset

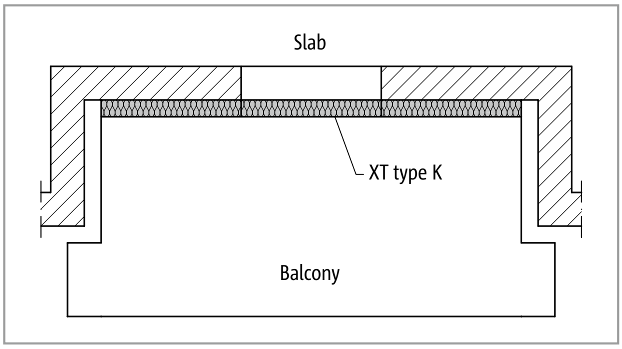


Fig. 22: Schöck Isokorb® XT type K: Balcony with facade recess

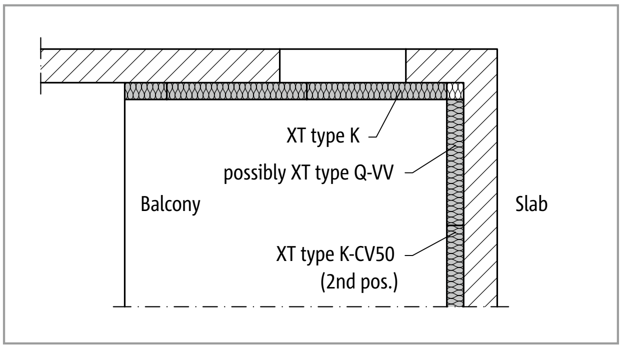


Fig. 23: Schöck Isokorb® XT type K, Q-VV: balcony with inner corner, supported two-sided

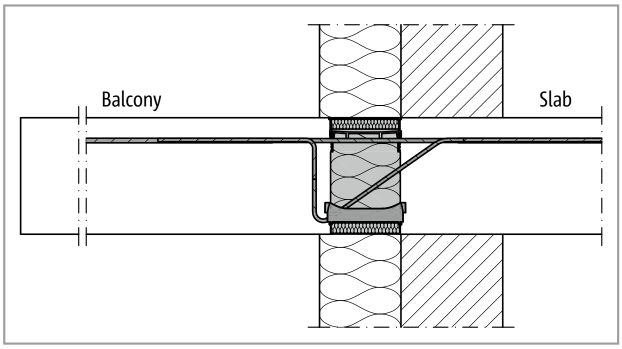


Fig. 24: Schöck Isokorb® XT type K: Connection with thermal insulation composite system (TICS)

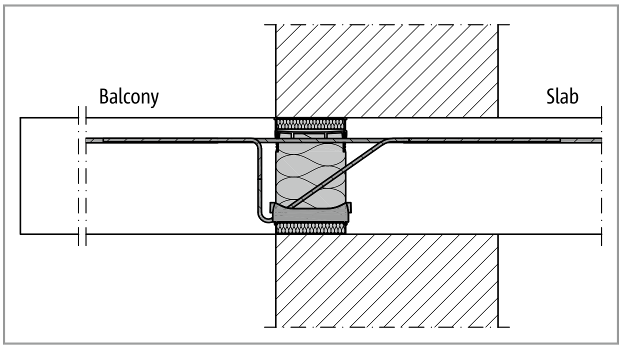


Fig. 25: Schöck Isokorb® XT type K: Connection with single-leaf masonry

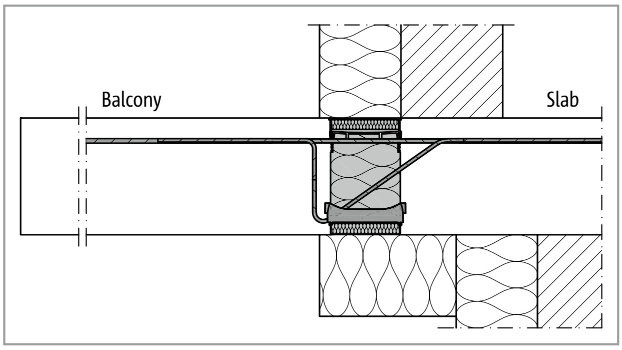


Fig. 26: Schöck Isokorb® XT type K: Connection for indirectlypositioned floor and TICS

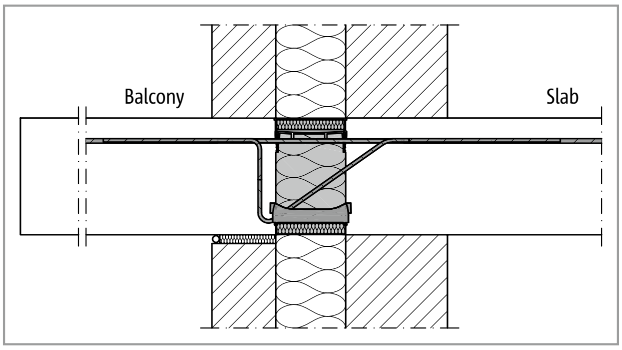


Fig. 27: Schöck Isokorb® XT type K: Cavity wall with a balcony at inner slab level

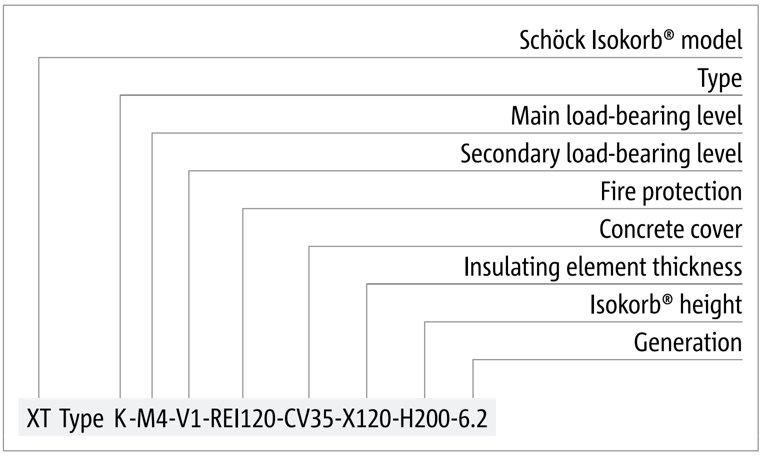
Product selection | Type designations | Special designs

Schöck Isokorb® XT type K variants

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

- Main load-bearing level:
  M1 to M13
- Secondary load-bearing level:
  V1 to V3, VV1
- Fire resistance class:
  REI120 (standard)
- Concrete cover of the tension bars:
  CV35 = 35 mm, CV50 = 50 mm
- Insulating element thickness:
  X120 = 120 mm
- Isokorb® height:
  H = 160 to 250 mm for Schöck Isokorb® XT type K-M1 to M10 and concrete cover CV35
  H = 180 to 250 mm for Schöck Isokorb® XT type K-M1 to M10 and concrete cover CV50
  H = H_{min} to 250 mm for Schöck Isokorb® XT type K-M11 to M13
- Isokorb® length:
  1000 mm for M1 to M10
  500 mm for M11 to M13 – required in the type designation: XT Type K-M12-V1-REI120-CV35-X120-H200-**L500**-6.1
- Generation:
  6.2: M1 to M10
  6.1: M11 to M13

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.

Design

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 θ = 45 ° and α = 90 ° (slab load-bearing capacity).
- Minimum height H_{min} Schöck Isokorb® XT type K-M1 to M10 for CV50: H_{min}=180mm, XT type K-M11 to K-M13 see page 29.
- For cantilever slab constructions without live load, stressed from moment loading without direct shear force effectiveness or lightweight constructions, please use the Schöck design software or contact our Technical Design Department.
- The indicative minimum concrete strength class of the external structural component is C32/40.
- Note FEM guidelines if a FEM program is to be used for design.

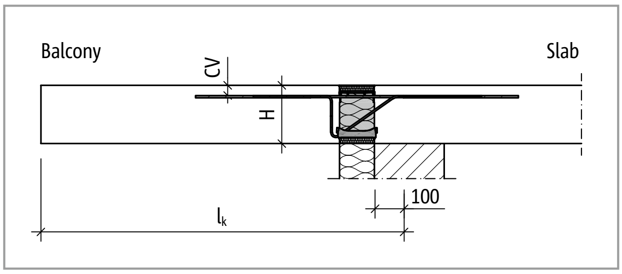


Fig. 28: Schöck Isokorb® XT type K-M1 to M10: Static system

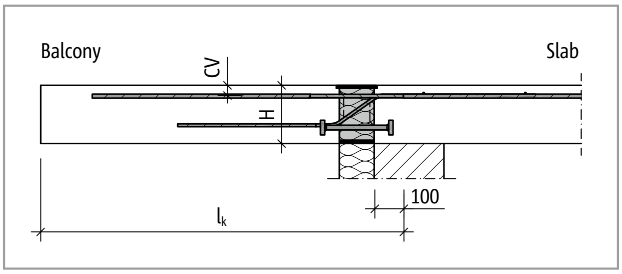


Fig. 29: Schöck Isokorb® XT type K-M11: Static system

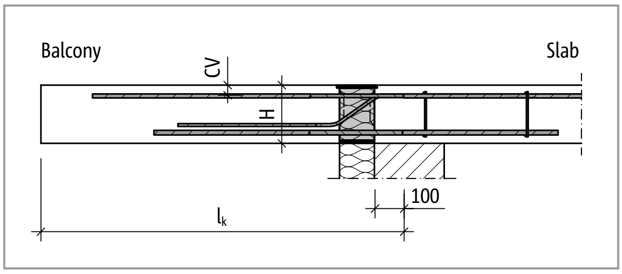


Fig. 30: Schöck Isokorb® XT type K-M12 to M13: Static system

C25/30 design

Schöck Isokorb® XT type K			M1	M2	M3	M4	M5	M6
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30					
	CV35	CV50	$m_{Rd,y}$ [kNm/m]					
Isokorb® height H [mm]	160		-8.9	-15.0	-20.8	-23.8	-25.5	-29.3
		180	-9.5	-16.0	-22.0	-25.2	-27.2	-31.3
	170		-10.0	-16.9	-23.2	-26.5	-28.8	-33.0
		190	-10.7	-17.9	-24.4	-27.9	-30.6	-35.0
	180		-11.2	-18.8	-25.6	-29.2	-32.1	-36.8
		200	-11.8	-19.8	-26.7	-30.6	-33.9	-38.8
	190		-12.3	-20.7	-27.9	-31.9	-35.5	-40.6
		210	-13.0	-21.8	-29.1	-33.3	-37.1	-42.4
	200		-13.6	-22.7	-30.3	-34.6	-38.7	-44.2
		220	-14.3	-23.8	-31.5	-36.0	-40.3	-46.0
	210		-14.8	-24.7	-32.7	-37.3	-41.9	-47.8
		230	-15.5	-25.8	-33.8	-38.7	-43.4	-49.6
	220		-16.0	-26.7	-35.0	-40.0	-45.0	-51.4
		240	-16.8	-27.9	-36.2	-41.4	-46.6	-53.2
	230		-17.3	-28.7	-37.4	-42.7	-48.2	-55.0
		250	-18.1	-29.9	-38.6	-44.1	-49.7	-56.8
	240		-18.6	-30.8	-39.8	-45.4	-51.3	-58.6
	250		-20.0	-33.0	-42.1	-48.1	-54.4	-62.2
			$v_{Rd,z}$ [kN/m]					
Secondary load-bearing level		V1	28.2	28.2	28.2	35.3	35.3	35.3
		V2	50.1	50.1	62.7	62.7	62.7	62.7
		V3	-	-	-	100.3	87.8	100.3
		VV1	-	-	±50.1	±50.1	±50.1	±50.1

Schöck Isokorb® XT type K	M1	M2	M3	M4	M5	M6
Placement with	Isokorb® length [mm]					
	1000	1000	1000	1000	1000	1000
Tension bars V1/V2	4 ⌀ 8	7 ⌀ 8	10 ⌀ 8	12 ⌀ 8	13 ⌀ 8	15 ⌀ 8
Tension bars V3	-	-	-	12 ⌀ 8	13 ⌀ 8	15 ⌀ 8
Tension bars VV1	-	-	12 ⌀ 8	14 ⌀ 8	15 ⌀ 8	8 ⌀ 12
Shear force bars V1	4 ⌀ 6	4 ⌀ 6	4 ⌀ 6	5 ⌀ 6	5 ⌀ 6	5 ⌀ 6
Shear force bars V2	4 ⌀ 8	4 ⌀ 8	5 ⌀ 8	5 ⌀ 8	5 ⌀ 8	5 ⌀ 8
Shear force bars V3	-	-	-	8 ⌀ 8	7 ⌀ 8	8 ⌀ 8
Shear force bars VV1	-	-	4 ⌀ 8 + 4 ⌀ 8	4 ⌀ 8 + 4 ⌀ 8	4 ⌀ 8 + 4 ⌀ 8	4 ⌀ 8 + 4 ⌀ 8
Pressure bearing V1/V2 [piece]	4	6	7	8	7	8
Pressure bearing V3 [piece]	-	-	-	8	7	8
Pressure bearing VV1 [piece]	-	-	8	8	12	13
Special stirrup VV1 [Stk.]	-	-	-	-	-	4

Notes on design

- Static system and information on the design see page 26.
- Schöck Isokorb® XT type K for balconies with height offset, design internal forces see page 56.

C25/30 design

Schöck Isokorb® XT type K			M7	M8	M9	M10	M10
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30				≥ C30/37
	CV35	CV50	$m_{Rd,y}$ [kNm/m]				
Isokorb® height H [mm]	160		-33.1	-37.1	-46.4	-46.4	-50.2
		180	-35.4	-39.7	-49.2	-49.2	-53.3
	170		-37.5	-42.0	-52.1	-52.1	-56.3
		190	-39.8	-44.6	-54.9	-54.9	-59.4
	180		-41.8	-46.8	-57.8	-57.8	-62.5
		200	-44.2	-49.2	-60.7	-60.7	-65.6
	190		-46.2	-51.5	-63.5	-63.5	-68.7
		210	-48.6	-53.8	-66.4	-66.4	-71.8
	200		-50.7	-56.2	-69.3	-69.3	-74.9
		220	-53.1	-58.5	-72.1	-72.1	-78.0
	210		-55.2	-60.8	-75.0	-75.0	-81.1
		230	-57.7	-63.1	-77.8	-77.8	-84.2
	220		-59.8	-65.4	-80.7	-80.7	-87.3
		240	-62.1	-67.8	-83.6	-83.6	-90.4
	230		-64.2	-70.1	-86.4	-86.4	-93.5
		250	-66.4	-72.4	-89.3	-89.3	-96.6
	240		-68.5	-74.7	-92.2	-92.2	-99.7
	250		-72.8	-79.4	-97.9	-97.9	-105.9
			$v_{Rd,z}$ [kN/m]				
Secondary load-bearing level		V1	75.2	87.8	112.8	112.8	112.8
		V2	100.3	112.8	125.4	125.4	125.4
		VV1	75.2/−50.1	87.8/−50.1	-	-	-

Schöck Isokorb® XT type K	M7	M8	M9	M10	M10
Placement with	Isokorb® length [mm]				
	1000	1000	1000	1000	1000
Tension bars V1/V2	8 ⌀ 12	9 ⌀ 12	12 ⌀ 12	13 ⌀ 12	13 ⌀ 12
Tension bars VV1	9 ⌀ 12	11 ⌀ 12	-	-	-
Shear force bars V1	6 ⌀ 8	7 ⌀ 8	9 ⌀ 8	9 ⌀ 8	9 ⌀ 8
Shear force bars V2	8 ⌀ 8	9 ⌀ 8	10 ⌀ 8	10 ⌀ 8	10 ⌀ 8
Shear force bars VV1	6 ⌀ 8 + 4 ⌀ 8	7 ⌀ 8 + 4 ⌀ 8	-	-	-
Pressure bearing V1/V2 [piece]	11	12	18	18	18
Pressure bearing VV1 [piece]	15	17	-	-	-
Special stirrup [piece]	4	4	4	4	4

Notes on design

- Static system and information on the design see page 26.
- Schöck Isokorb® XT type K for balconies with height offset, design internal forces see page 56.

C25/30 design

Schöck Isokorb® XT type K-M11 to M13 is available in the length L = 500 mm only

Schöck Isokorb® XT type K			M11	M12	M13
Design values with	Concrete cover CV [mm]		Concrete strength class ≥ C25/30		
	CV35	CV50	$M_{Rd,y}$ [kNm/element]		
Isokorb® height H [mm]	180		-28.0	-40.4	-47.2
		200	-29.7	-42.5	-49.5
	190		-31.3	-44.5	-51.9
		210	-33.0	-46.5	-54.3
	200		-34.7	-48.5	-56.6
		220	-36.4	-50.6	-59.0
	210		-38.1	-52.6	-61.3
		230	-39.8	-54.6	-63.7
	220		-41.5	-56.6	-66.1
		240	-43.1	-58.6	-68.4
	230		-44.8	-60.7	-70.8
		250	-46.5	-62.7	-73.1
	240		-48.2	-64.7	-75.5
	250		-51.6	-68.7	-80.2
			$V_{Rd,z}$ [kN/element]		
Secondary load-bearing level		V1	58.8	58.8	58.8
		V2	84.6	84.6	84.6
		V3	115.2	115.2	115.2

Schöck Isokorb® XT type K	M11	M12	M13
Placement with	Isokorb® length [mm]		
	500	500	500
Tension bars	6 ⌀ 14	7 ⌀ 14	8 ⌀ 14
Pressure bearing	5 ⌀ 16	-	-
Compression bars	-	6 ⌀ 16	7 ⌀ 16
Shear force bars V1	3 ⌀ 10	3 ⌀ 10	3 ⌀ 10
Shear force bars V2	3 ⌀ 12	3 ⌀ 12	3 ⌀ 12
Shear force bars V3	3 ⌀ 14	3 ⌀ 14	3 ⌀ 14
H_{min} for V1-CV35 [mm]	180	180	180
H_{min} for V2-CV35 [mm]	190	190	190
H_{min} for V3-CV35 / V2-CV50 [mm]	210	210	210
H_{min} for V1-CV50 [mm]	200	200	200
H_{min} for V3-CV50 [mm]	220	220	220

Notes on design

- Static system and information on the design see page 26.
- The design values refer to the element length (L = 500 mm), if required the values per running metre can be converted.

Deflection/Camber

Deflection

The deflection factors given in the table (tan α [%]) result alone from the deflection of the Schöck Isokorb® under 100% steel utilisation. They serve for the estimation of the required camber. The total arithmetic camber of the balcony slab formwork results from the calculation according to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA plus the deflection from Schöck Isokorb®. The camber of the balcony slab formwork to be given by the structural engineer/designer in the implementation plans (Basis: Calculated total deflection from cantilever slab + floor rotation angle + Schöck Isokorb®) should be so rounded that the scheduled drainage direction is maintained (round up: with drainage to the building facade, round down: with drainage towards the cantilever slab end).

Deflection (p) as a result of Schöck Isokorb®

$p = \tan\alpha \cdot l_k \cdot (m_{pd} / m_{Rd}) \cdot 10$ [mm]

Factors to be applied

- $\tan\alpha$ = apply value from table
- l_k = cantilever length [m]
- m_{pd} = relevant bending moment [kNm/m] in the ultimate limit state for the determination of the p [mm] from Schöck Isokorb®.
  The load combination to be applied for the deflection is determined by the structural engineer.
  (Recommendation: Load combination for the determination of the camber p : determine g+q/2, m_{pd} in the ultimate limit state)
- m_{Rd} = maximum design moment [kNm/m] of the Schöck Isokorb®

Calculation example see page 43

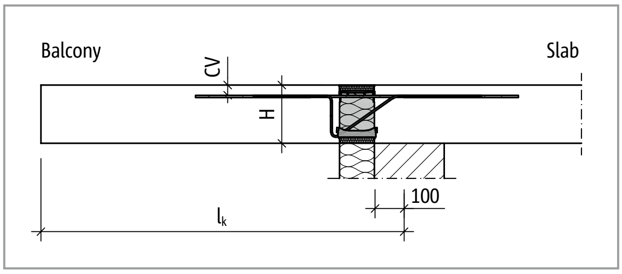


Fig. 31: Schöck Isokorb® XT type K-M1 to M10: Static system

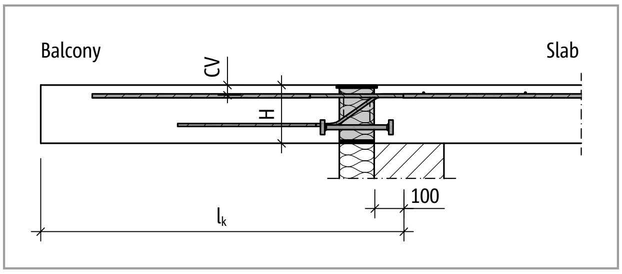


Fig. 32: Schöck Isokorb® XT type K-M11: Static system

Deflection/Camber

Schöck Isokorb® XT type K		M1 – M6		M7 – M10	
Deflection factors when		CV35	CV50	CV35	CV50
		tan α [%]			
Isokorb® height H [mm]	160	1.1		1.4	
	170	1.0		1.2	
	180	0.9	1.1	1.1	1.3
	190	0.9	1.0	1.0	1.1
	200	0.8	0.9	0.9	1.0
	210	0.7	0.8	0.8	1.0
	220	0.7	0.8	0.8	0.9
	230	0.6	0.7	0.7	0.8
	240	0.6	0.7	0.7	0.8
	250	0.6	0.6	0.7	0.7

Schöck Isokorb® XT type K		M11		M12 – M13	
Deflection factors when		CV35	CV50	CV35	CV50
		tan α [%]			
Isokorb® height H [mm]	180	1.4	-	1.6	-
	190	1.2	-	1.5	-
	200	1.1	1.3	1.3	1.5
	210	1.0	1.2	1.2	1.4
	220	0.9	1.0	1.2	1.3
	230	0.9	1.0	1.1	1.2
	240	0.8	0.9	1.0	1.1
	250	0.7	0.8	1.0	1.0

Slenderness

Slenderness
In order to safeguard the serviceability limit state we recommend the limitation of the slenderness to the following maximum cantilever lengths max l_k [m]:

Schöck Isokorb® XT type K		M1 – M13	
Maximum cantilever length with		CV35	CV50
		$l_{k,max}$ [m]	
Isokorb® height H [mm]	160	1.65	-
	170	1.78	-
	180	1.90	1.70
	190	2.03	1.80
	200	2.15	1.90
	210	2.28	2.00
	220	2.40	2.10
	230	2.53	2.20
	240	2.65	2.30
	250	2.78	2.40

Maximum cantilever length
The tabular values are based on the following assumptions:
- Accessible balcony
- Concrete weight density γ = 25 kN/m^3
- Dead weight of the balcony surfacing $g_2 \leq 1.2$ kN/m^2
- Balcony rail $g_R \leq 0.75$ kN/m
- Service load q = 4.0 kN/m^2 with the coefficient $\psi_{2,i}$ = 0.3 for the quasi-permanent combination

i Maximum cantilever length
- The maximum cantilever length for ensuring the serviceability limit state is a benchmark. It can be limited with the employment of the Schöck Isokorb® XT type K through the load-bearing capacity.

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®.

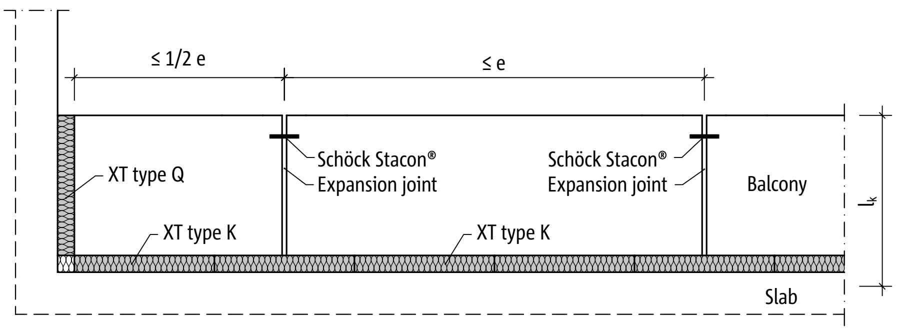


Fig. 33: Schöck Isokorb® XT type K: Expansion joint arrangement

Schöck Isokorb® XT type K		M1–M6-V1/V2/V3	M6-VV1–M10
Maximum expansion joint spacing when		e [m]	
Insulating element thickness [mm]	120	23.0	21.7

Schöck Isokorb® XT type K		M11-V1/V2 – M13-V1/V2	M11-V3 – M13-V3
Maximum expansion joint spacing when		e [m]	
Insulating element thickness [mm]	120	15.5	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 tension bars from the free edge or from the expansion joint: $e_R \geq 50$ mm and $e_R \leq 150$ mm applies.
- 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

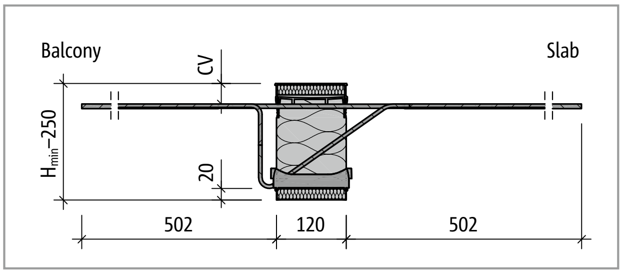


Fig. 34: Schöck Isokorb® XT type K-M1 to M4: Product section

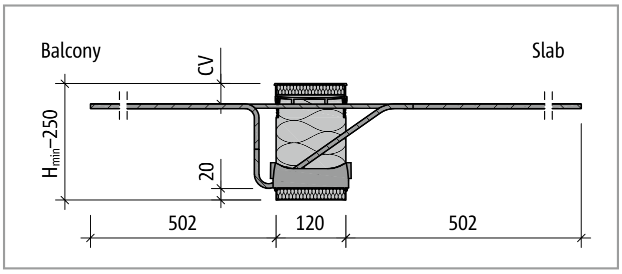


Fig. 35: Schöck Isokorb® XT type K-M5, M6: Product section

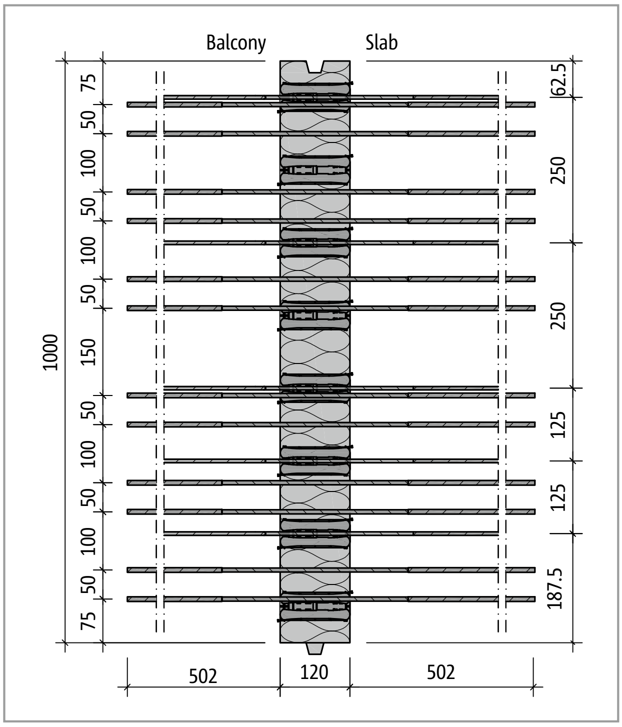


Fig. 36: Schöck Isokorb® XT type K-M4: Product plan view

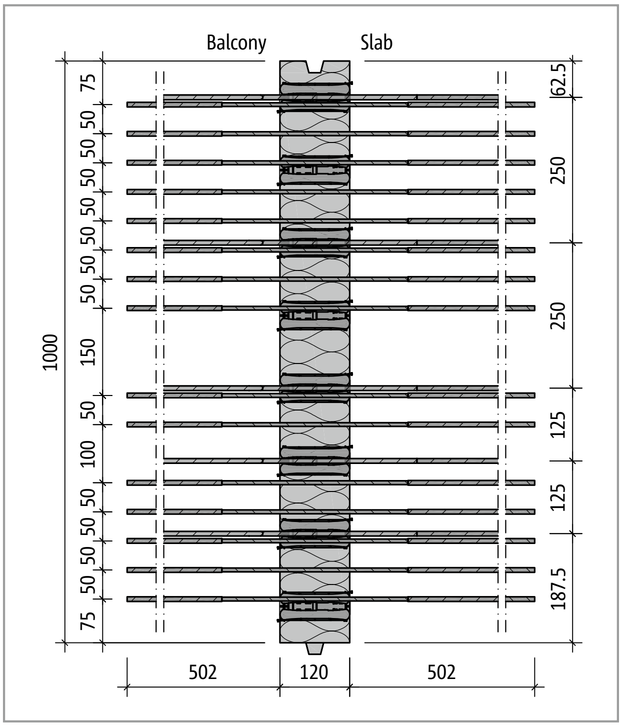


Fig. 37: Schöck Isokorb® XT type K-M6: Product plan view

Product information

- Download further product plan views and cross-sections at cad.schoeck.co.uk
- Minimum height Schöck Isokorb® XT type K with CV50: H_{min} = 180 mm
- On-site spacing of the Schöck Isokorb® XT type K at the unreinforced positions possible; due to spacing take into account reduced load-bearing capacity; take into account required edge separations
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm

Product description

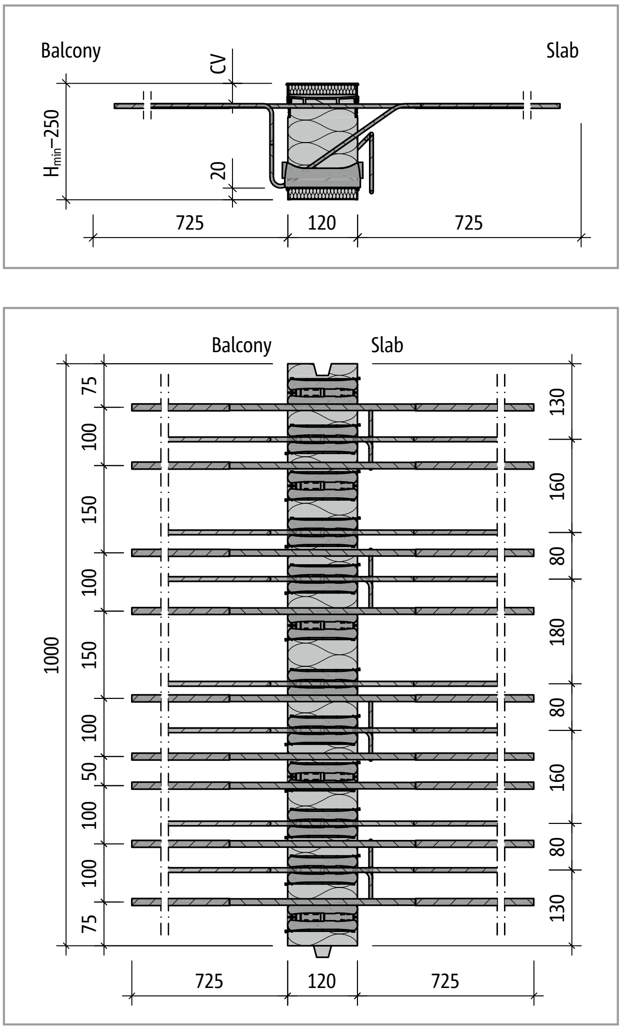


Fig. 38: Schöck Isokorb® XT type K-M8: Product plan view

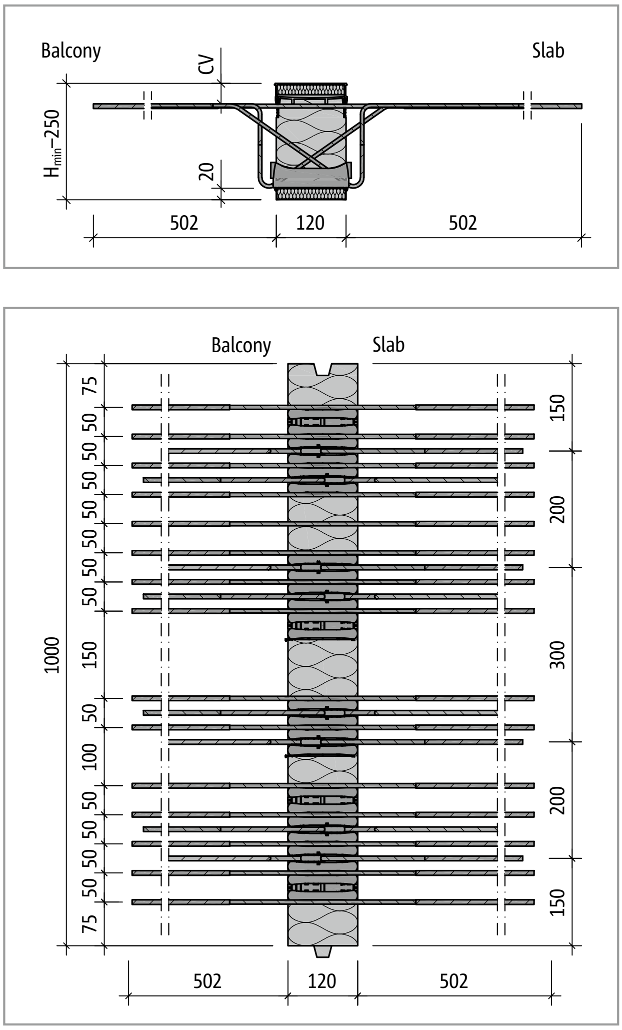


Fig. 39: Schöck Isokorb® XT type K-M5-VV1: Product plan view

Product information

- Download further product plan views and cross-sections at cad.schoeck.co.uk
- Minimum height Schöck Isokorb® XT type K with CV50: H_{min} = 180 mm
- On-site spacing of the Schöck Isokorb® XT type K at the unreinforced positions possible; due to spacing take into account reduced load-bearing capacity; take into account required edge separations
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm

Product description

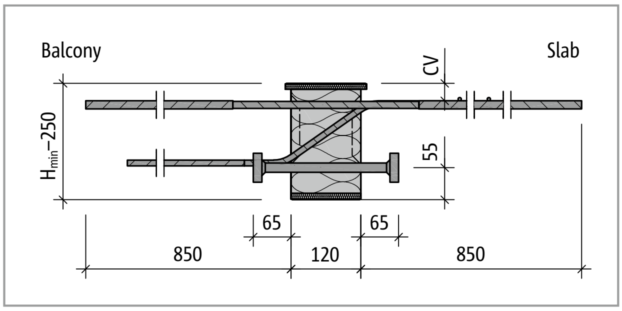


Fig. 40: Schöck Isokorb® XT type K-M11: Cross-section of the product

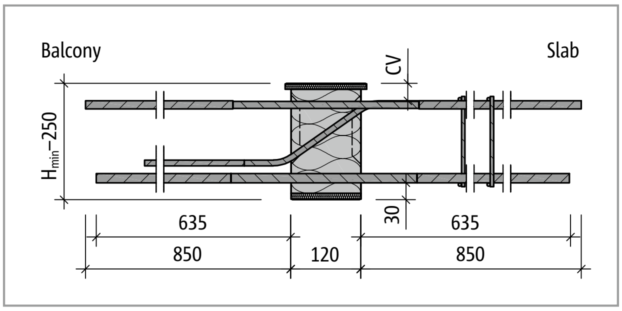


Fig. 41: Schöck Isokorb® XT type K-M12 to M13: Cross-section of the product

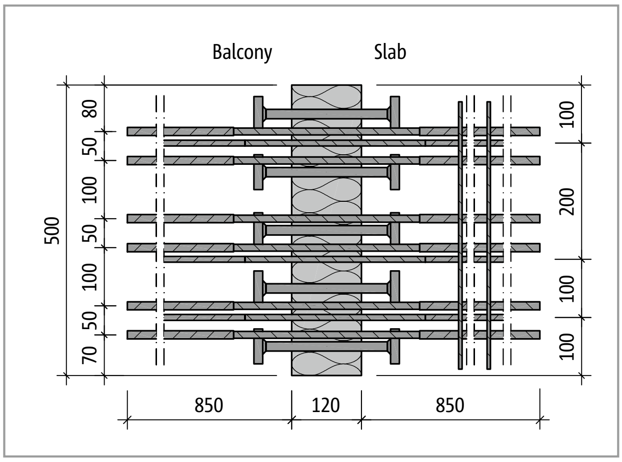


Fig. 42: Schöck Isokorb® XT type K-M11: Product layout

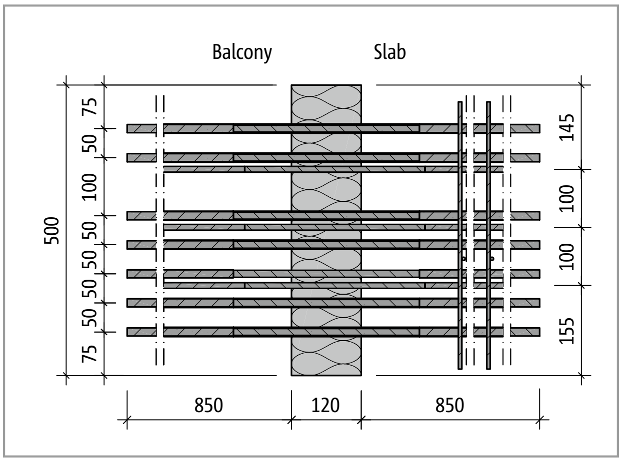


Fig. 43: Schöck Isokorb® XT type K-M12: Product layout

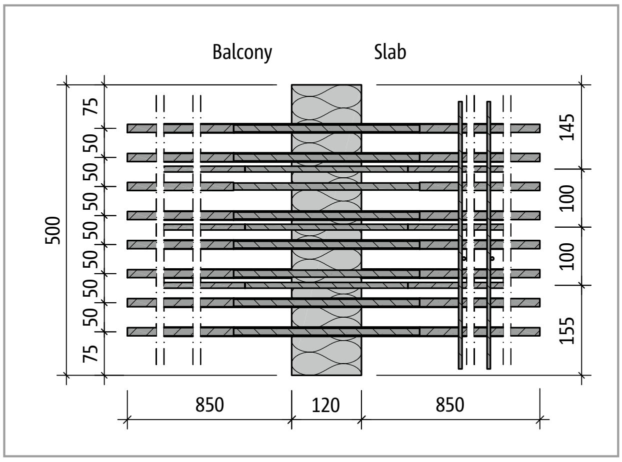


Fig. 44: Schöck Isokorb® XT type K-M13: Product layout

Product information

- Download further product plan views and cross-sections at cad.schoeck.co.uk
- Minimum height H_{min} Schöck Isokorb® XT type K-M11 to M13 see page 29
- On-site spacing of the Schöck Isokorb® XT type K at the unreinforced positions possible; due to spacing take into account reduced load-bearing capacity; take into account required edge separations
- Concrete cover of the tension bars: CV35 = 35 mm, CV50 = 50 mm

On-site reinforcement

Direct support

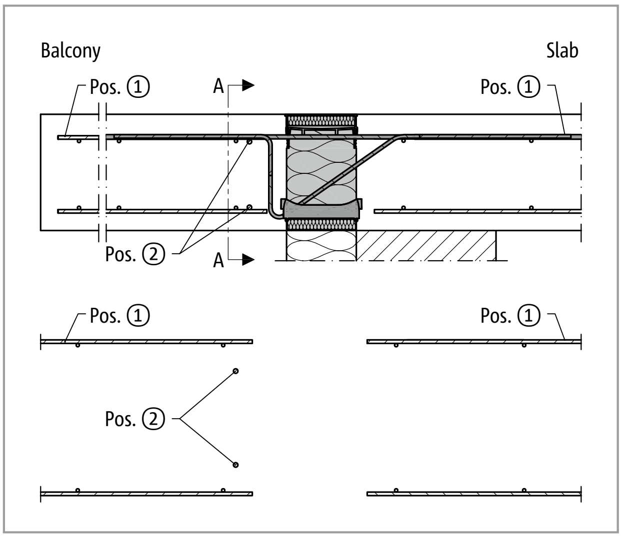


Fig. 45: Schöck Isokorb® XT type K-M1 to M10: on-site reinforcement with direct support

Indirect support

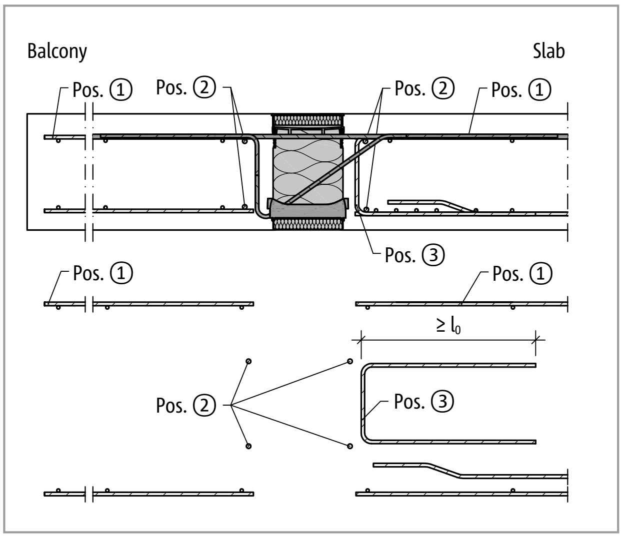


Fig. 46: Schöck Isokorb® XT type K-M1 to M10: On-site reinforcement with indirect support

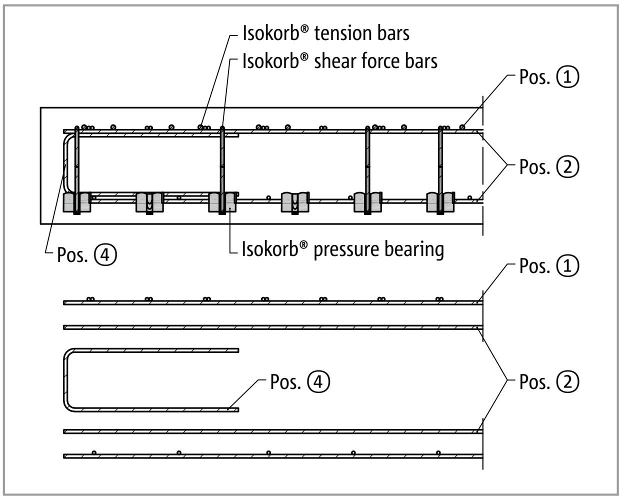


Fig. 47: Schöck Isokorb® XT type K-M1 to M10: On-site reinforcement balcony side in section A-A; Pos. 4 = side reinforcement on the free edge perpendicular to the Schock Isokorb®

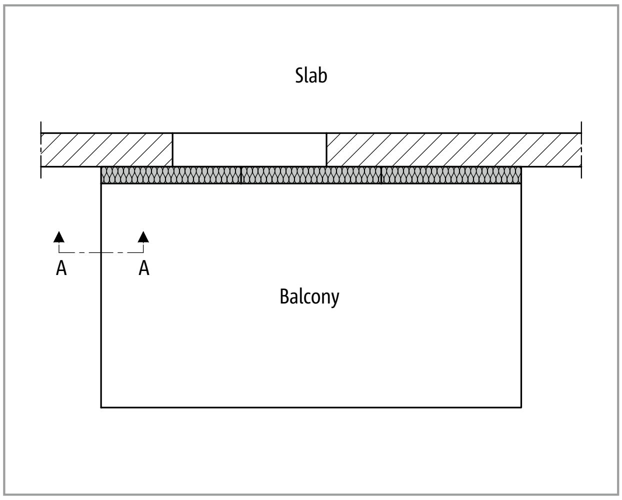


Fig. 48: Schöck Isokorb® XT type K: Representation of the position of the cross-section A-A

The reinforcement in the reinforced concrete slab is determined from the structural engineer's design. With this both the effective moment 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 inner slab reinforcement can be taken into account as long as the maximum separation to the tension bars of the Schöck Isokorb® of 4⌀ is maintained. Additional reinforcement may be required.

On-site reinforcement

Recommendation for the on-site connection reinforcement

Information on the on-site reinforcement for Schöck Isokorb® with a loading of 100 % of the maximum design moment and the shear force with C25/30. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire-mesh reinforcement – see type approval.

Schöck Isokorb® XT type K			M1		M2		M3			M4			
			V1	V2	V1	V2	V1	V2	VV1	V1	V2	V3	VV1
On-site reinforcement	Type of bearing	Height [mm]	Concrete strength class ≥ C25/30										
Overlap reinforcement depending on bar diameter													
Pos. 1 with ⌀8 [mm²/m]	direct/ indirect	160–250	289	258	457	426	575	544	603	661	622	622	689
Pos. 1 with ⌀10 [mm²/m]	direct/ indirect	160–250	352	317	553	518	695	662	722	798	755	762	825
Pos. 1 with ⌀12 [mm²/m]	direct/ indirect	160–250	422	381	664	622	834	794	866	958	906	914	990
Steel bars along the insulation joint													
Pos. 2	direct	160–250	2 • H8										
	indirect		4 • H8										
Vertical reinforcement													
Pos. 3 [mm²/m]	indirect	160–250	113	113	113	113	113	113	–	113	113	113	–
Supplementary edge reinforcement													
Pos. 4	direct/ indirect	160–250	according to BS EN 1992-1-1 (EC2), 9.3.1.4										

Schöck Isokorb® XT type K			M5				M6				M7		
			V1	V2	V3	VV1	V1	V2	V3	VV1	V1	V2	VV1
On-site reinforcement	Type of bearing	Height [mm]	Concrete strength class ≥ C25/30										
Overlap reinforcement depending on bar diameter													
Pos. 1 with ⌀8 [mm²/m]	direct/ indirect	160–250	762	724	724	754	866	827	827	880	979	979	990
Pos. 1 with ⌀10 [mm²/m]	direct/ indirect	160–250	920	877	881	902	1044	1001	1007	880	1040	1061	990
Pos. 1 with ⌀12 [mm²/m]	direct/ indirect	160–250	1104	1052	1058	1082	1253	1201	1209	880	1102	1143	990
Steel bars along the insulation joint													
Pos. 2	direct	160–250	2 • H8										
	indirect		4 • H8										
Vertical reinforcement													
Pos. 3 [mm²/m]	indirect	160–250	113	113	113	–	125	125	125	–	113	113	–
Supplementary edge reinforcement													
Pos. 4	direct/ indirect	160–250	according to BS EN 1992-1-1 (EC2), 9.3.1.4										

On-site reinforcement

Schöck Isokorb® XT type K			M8			M9		M10	
			V1	V2	VV1	V1	V2	V1	V2
On-site reinforcement	Type of bearing	Height [mm]	Concrete strength class ≥ C25/30						
Overlap reinforcement depending on bar diameter									
Pos. 1 with ⌀10 [mm²/m]	direct/ indirect	160–250	1140	1160	1210	1409	1419	1517	1527
Pos. 1 with ⌀12 [mm²/m]	direct/ indirect	160–250	1212	1253	1210	1502	1522	1609	1630
Steel bars along the insulation joint									
Pos. 2	direct	160–250	2 • H8						
Pos. 2	indirect	160–250	4 • H8						
Vertical reinforcement									
Pos. 3 [mm²/m]	indirect	160–250	113	113	–	113	113	113	113
Supplementary edge reinforcement									
Pos. 4	direct/ indirect	160–250	according to BS EN 1992-1-1 (EC2), 9.3.1.4						

i Information about on-site reinforcement

- When reinforcing with different diameters the reinforcement specification for the largest diameter is relevant.
- The mixing of steel bar and wire mesh reinforcement is possible. The corresponding mesh reinforcement can be taken into account when determining the additional reinforcement.
- Alternative connection reinforcements are possible. Determine lap length according to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA. A reduction of the required lap length with m_{Ed}/m_{Rd} is permitted. For the overlap (l_0) with the Schöck Isokorb® XT using types K-M1 to M6-V2 a length of the tension bars 465 mm and with types K-M6-VV1 to M10 a length of the tension bars of 695 mm can be invoiced.
- The reinforcement at the free edges Pos. 4 of the structural component perpendicular to the Schöck Isokorb® should be selected as low as possible so that it can be arranged between the upper and lower reinforcement layer.

i Information on side reinforcement

- The side reinforcement of the slab edge parallel to the Schöck Isokorb® is covered on-site by the integrated suspension reinforcement of the Schöck Isokorb®.

On-site reinforcement

Indirect support

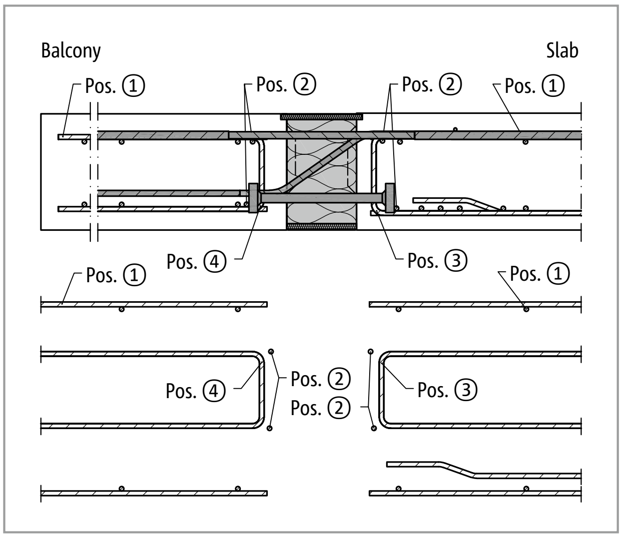


Fig. 49: Schöck Isokorb® XT type K-M11: On-site reinforcement for indirect support

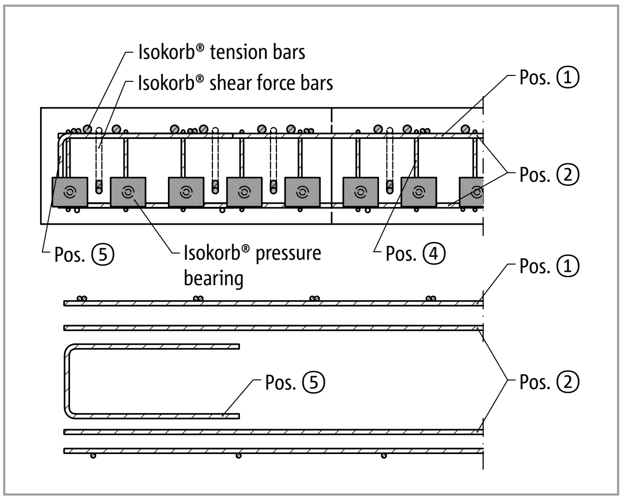


Fig. 50: Schöck Isokorb® XT type K-M11: On-site reinforcement balcony side in section A-A; Pos. 5 = side reinforcement on the free edge perpendicular to the Schock Isokorb

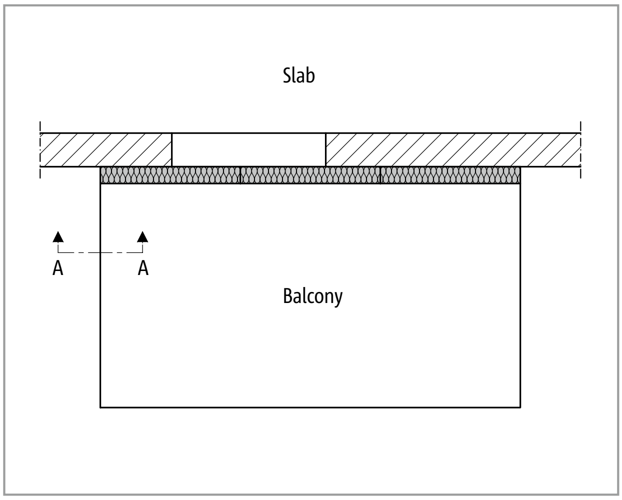


Fig. 51: Schöck Isokorb® XT type K: Representation of the position of the cross-section A-A

On-site reinforcement

Recommendation for the on-site connection reinforcement

Details of the on-site reinforcement for Schöck Isokorb® with a loading of 100% of the maximum design moment and of the shear force with C25/30. The required reinforcement cross-section depends on the bar diameter of the steel bar or wire mesh reinforcement.

Schöck Isokorb® XT type K-M11 to M13 is available in the length L = 500 mm only

Schöck Isokorb® XT type K			M11			M12			M13		
			V1	V2	V3	V1	V2	V3	V1	V2	V3
On-site reinforcement for	Type of bearing	Height [mm]	Concrete strength class ≥ C25/30								
Overlapping reinforcement											
Pos. 1 with H10 [mm²/element]	direct/ indirect	180-250	775	775	775	930	930	930	1085	1085	1085
Pos. 1 with H12 [mm²/element]											
Pos. 1 with H16 [mm²/element]			1204	1204	1204	1445	1445	1445	1686	1686	1686
Vertical reinforcement											
Pos. 3 [mm²/ Element]	direct	180–250	–	–	–	–	–	–	–	–	–
	indirect		106	106	106	57	57	57	57	57	57
Pos. 4 [mm²/ element]	direct/ indirect	180–250	241	300	371	135	195	265	135	195	265

Information about on-site reinforcement

- When reinforcing with different diameters the reinforcement specification for the largest diameter is relevant.
- The mixing of steel bar and wire mesh reinforcement is possible. The corresponding mesh reinforcement can be taken into account when determining the additional reinforcement.
- Alternative connection reinforcements are possible. Determine lap length according to BS EN 1992-1-1 (EC2) and BS EN 1992-1-1/NA. A reduction of the required lap length with m_{Ed}/m_{Rd} is permitted. For the overlap (l_0) with the Schöck Isokorb® for the XT type K-M11 to K-M13 a length of the tension bars of 820 mm can be brought to account.
- The side reinforcement Pos. 5 at the edge of the structural component should be selected as low as possible so that it can be arranged between top and bottom reinforcement position.
- The details on the on-site reinforcement refer to the element length (L = 500 mm), if required the values per running metre can be converted.

Tight fit/Concreting section | Precast/Compression joints

Tight fit/Concreting section

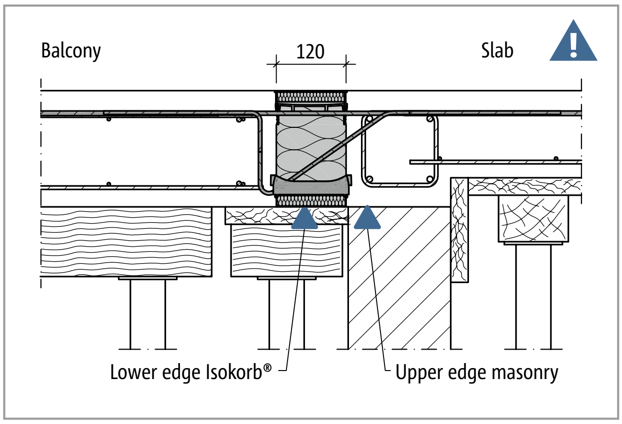


Fig. 52: Schöck Isokorb® XT type K: In-situ concrete balcony with height offset floor on masonry wall

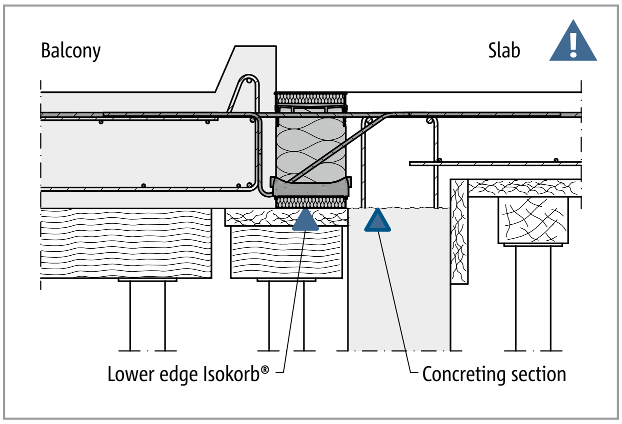


Fig. 53: Schöck Isokorb® XT type K: Fully finished balcony with height offset floor on precast reinforced concrete wall

⚠ Hazard note: Tight fit with different height levels

The tight fit of the pressure bearings to the freshly poured concrete is to be ensured, therefore the upper edge of the masonry respectively of the concreting section is to be arranged below the lower edge of the Schöck Isokorb®. This is to be taken into account above all with a different height level between inner slab and balcony.

- The concreting joint and the upper edge of the masonry are to be arranged below the lower edge of the Schöck Isokorb®.
- The position of the concreting section is to be indicated in the formwork and reinforcement drawing.
- The joint planning is to be coordinated between precast concrete plant and construction site.

Precast/Compression joints

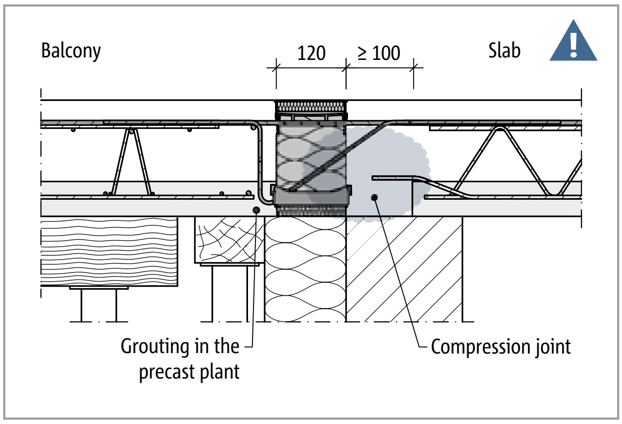


Fig. 54: Schöck Isokorb® XT type K: Direct support, installation in conjunction with element slabs (here: h ≤ 180 mm), compression joint on floor side

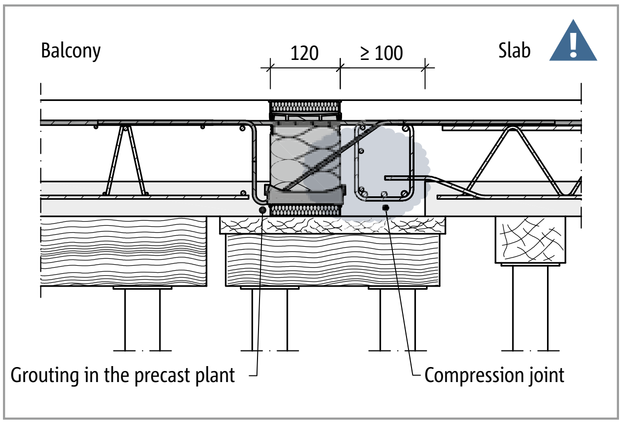


Fig. 55: Schöck Isokorb® XT type K: Indirect support, installation in conjunction with element slabs (here: h ≤ 180 mm), compression joint on floor side

⚠ Hazard note: Compression joints

Compression joints are joints which, with unfavourable loading combination, remain always in compression. The underside of a cantilever balcony is always a compression zone. If the cantilever balcony is a precast part or an element slab, and/or the floor is an element slab, then the definition of the standard is effective.

- Compression joints are to be indicated in the formwork and reinforcement drawing!
- Compression joints between precast parts are always to be grouted using in-situ concrete. This also applies for compression joints with the Schöck Isokorb®!
- With compression joints between precast parts (on the inner slab or balcony side) and the Schöck Isokorb® an in-situ concrete resp. pour of ≥ 100 mm width is to be cast. This is to be entered in the working drawings.
- We recommend the installation of the Schöck Isokorb® and the pouring of the balcony-side compression joint already in the precast concrete plant.

Design example

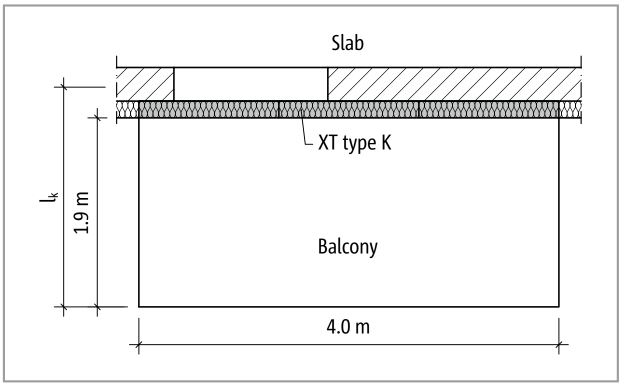


Fig. 56: Schöck Isokorb® XT type K: Plan view

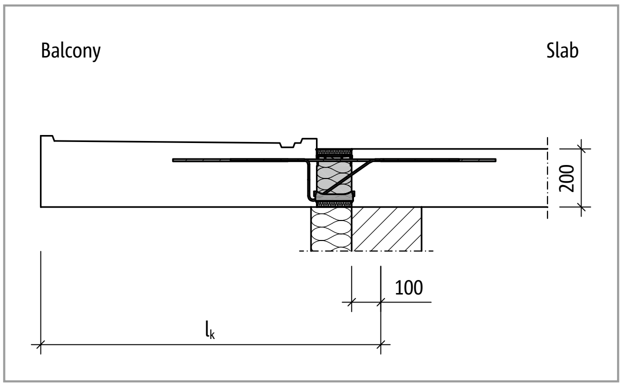


Fig. 57: Schöck Isokorb® XT type K: Static system

Static system and design load

Geometry:	Cantilever length	l_k = 2.12 m
	Balcony slab thickness	h = 200 mm
Loading assumptions:	Balcony slab and finishes	g = 6.5 kN/m²
	Live load	g = 4.0 kN/m²
	Edge load (balustrade)	g_R = 1.5 kN/m
Exposure classes:	External XC 4	
	Internal XC 1	
Selected:	Concrete grade C25/30 for balcony and floor	
	Concrete cover c_{nom} = 35 mm for Isokorb® tension bars	
	(Reduction Δc_{def} by 5 mm, concerning quality measures Schöck Isokorb® production)	
Connection geometry:	No height offset, no floor edge downstand, no balcony upstand	
Floor support:	Floor edge directly supported	
Balcony support:	Restraint of the cantilever slab using XT type K	

Recommendation on slenderness

Geometry:	Cantilever length	l_k = 2.12 m
	Balcony slab thickness	h = 200 mm
	Concrete cover	CV35
	Maximum cantilever length	$l_{k,max}$ = 2.15 m (from table, see page 32) > l_k

Verification in the ultimate limit state (moment and shear force)

Internal forces:

$m_{Ed} = -[(\gamma_G \cdot g + \gamma_Q \cdot q) \cdot l_k^2/2 + \gamma_G \cdot g_R \cdot l_k]$

$m_{Ed} = -[(1.35 \cdot 6.5 + 1.5 \cdot 4) \cdot 2.12^2/2 + 1.35 \cdot 1.5 \cdot 2.12] = -37.5$ kNm/m

$v_{Ed} = +(\gamma_G \cdot g + \gamma_Q \cdot q) \cdot l_k + \gamma_G \cdot g_R$

$v_{Ed} = +(1.35 \cdot 6.5 + 1.5 \cdot 4.0) \cdot 2.12 + 1.35 \cdot 1.5 = +33.3$ kN/m

Selected: **Schöck Isokorb® XT type K-M5-V1-REI120-CV35-X120-H200**

m_{Rd} = −38.7 kNm/m (see page 27) > m_{Ed}

v_{Rd} = +35.3 kN/m (see page 27) > v_{Ed}

$\tan \alpha$ = 0,8 (see page 31)

Design example | Installation instructions

Serviceability limit state (deflection/precamber)

Deflection factor: $\tan \alpha$ = 0.8 (from table, see page 31)

Selected load combination: $g + q/2$

(Recommendation for calculating the Schöck Isokorb® camber)

Determine $m_{üd}$ in the ultimate limit state

$m_{üd} = -[(\gamma_G \cdot g + \gamma_Q \cdot q/2) \cdot l_k^2/2 + \gamma_G \cdot g_R \cdot l_k]$

$m_{üd} = -[(1.35 \cdot 6.5 + 1.5 \cdot 4.0/2) \cdot 2.12^2/2 + 1.35 \cdot 1.5 \cdot 2.12] = -30.8$ kNm/m

$w_ü = [\tan \alpha \cdot l_k \cdot (m_{üd} / m_{Rd})] \cdot 10$ [mm]

$w_ü = [0.8 \cdot 2.12 \cdot (-30.8/-38.7)] \cdot 10 = 13.5$ mm

Arrangement of expansion joints Length of balcony: 4.00 m < 23.00 m

=> no expansion joints required

Installation instructions

The current installation instruction can be found online under:
www.schoeck.com/view/6419

☑ Check list

- ☐ 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?
- ☐ Has the additional deformation due to the Schöck Isokorb® been taken into account?
- ☐ Is the drainage direction taken into account with the resulting camber information? Is the degree of camber entered in the working drawings?
- ☐ Is the increased minimum slab thickness taken into account with CV50?
- ☐ Are the recommendations for the limitation of the slenderness observed?
- ☐ Are the maximum allowable expansion joint spacings taken into account?
- ☐ Are the Schöck FEM guidelines taken into account with the calculation using FEM?
- ☐ With the selection of the design table is the relevant concrete cover taken into account?
- ☐ 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?
- ☐ 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 the required in-situ concrete strips for the respective Schöck Isokorb® type in conjunction with the compression joint been plotted in the implementation plans?
- ☐ Have the requirements for on-site reinforcement of connections been defined in each case?
- ☐ 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?
- ☐ Is the XT type K-U, K-O or a special construction required instead of Schöck Isokorb® XT type K due to the connection with height offset or to a wall?